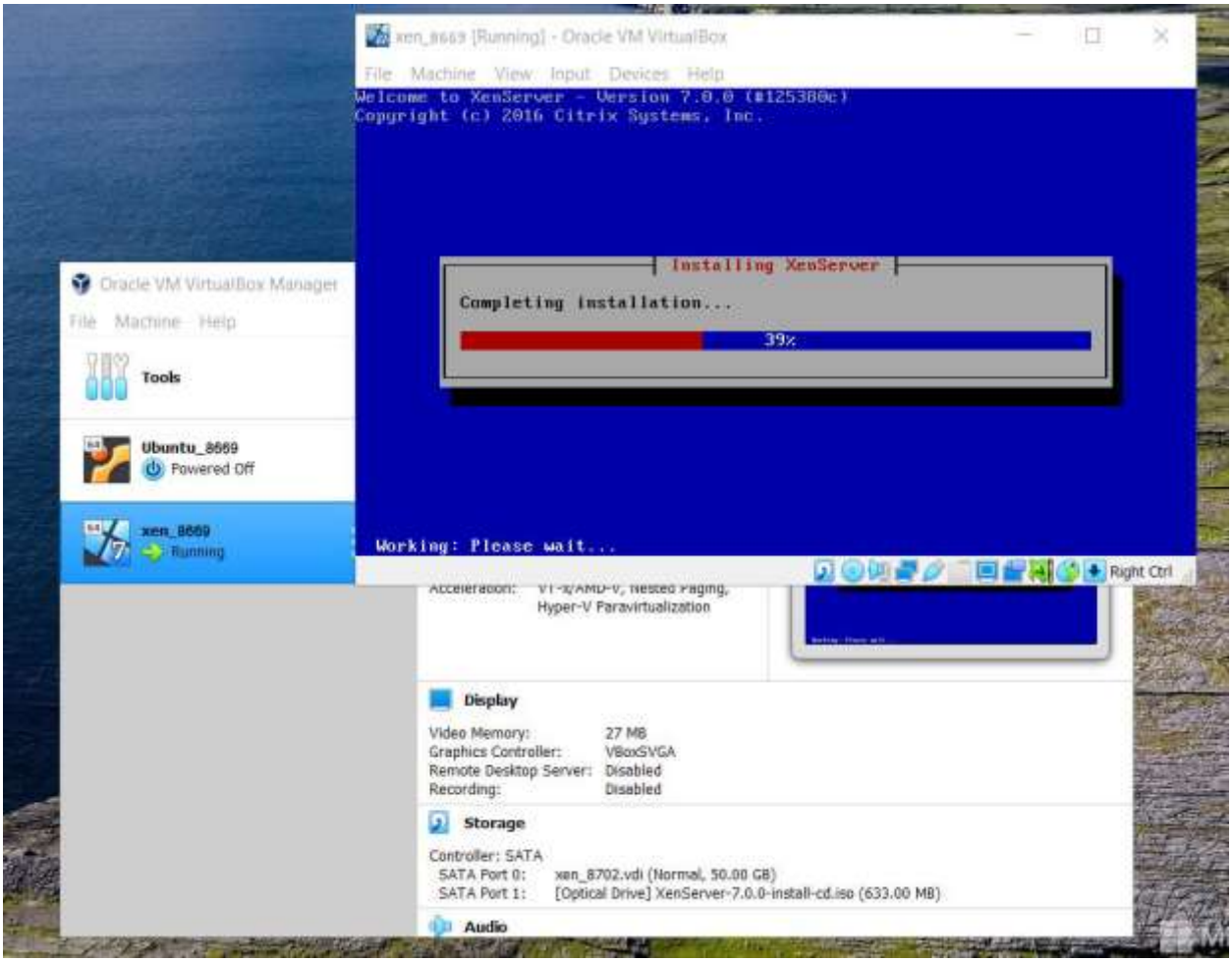
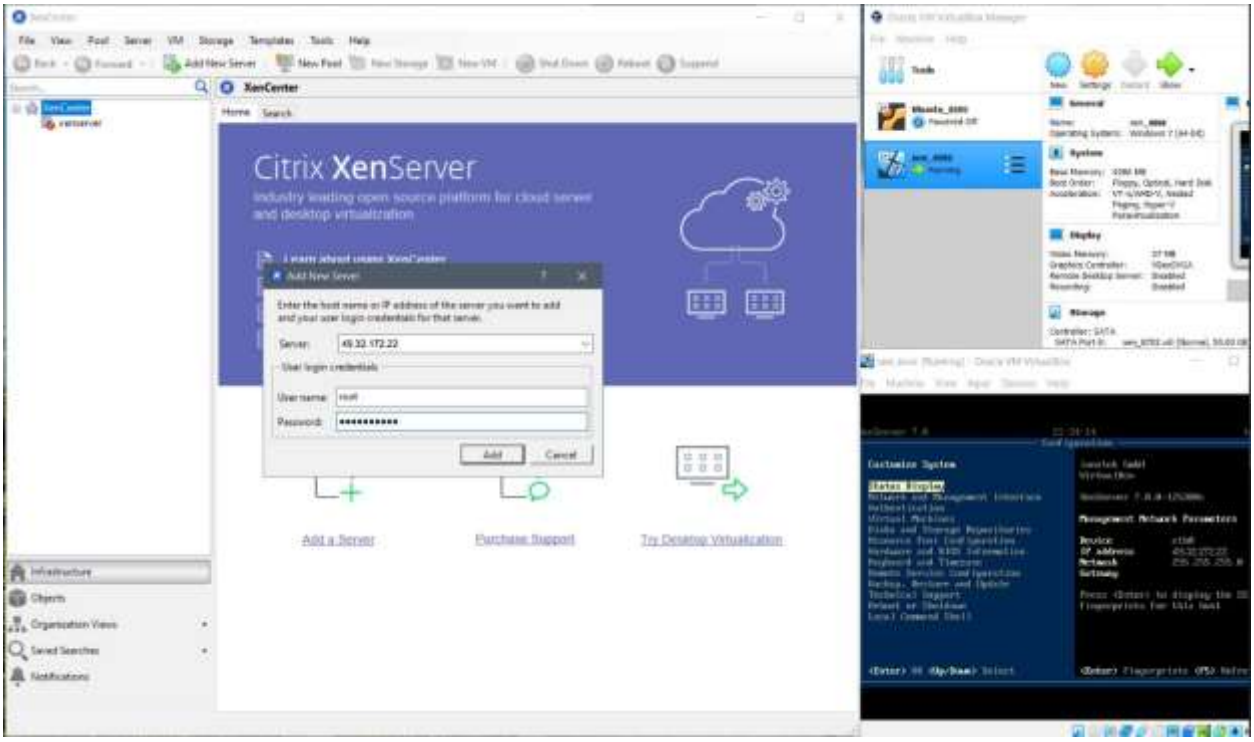
Name of candidate:	Mareena Mark Fernandes	
Roll no.: 8669	**Year: TE**	**Semester:-VI**
Branch: IT	**Subject: Cloud Service Design Lab**	
Experiment No.: 2	**Date of performance:**	**Date of submission:**
LO's Covered: LO1		

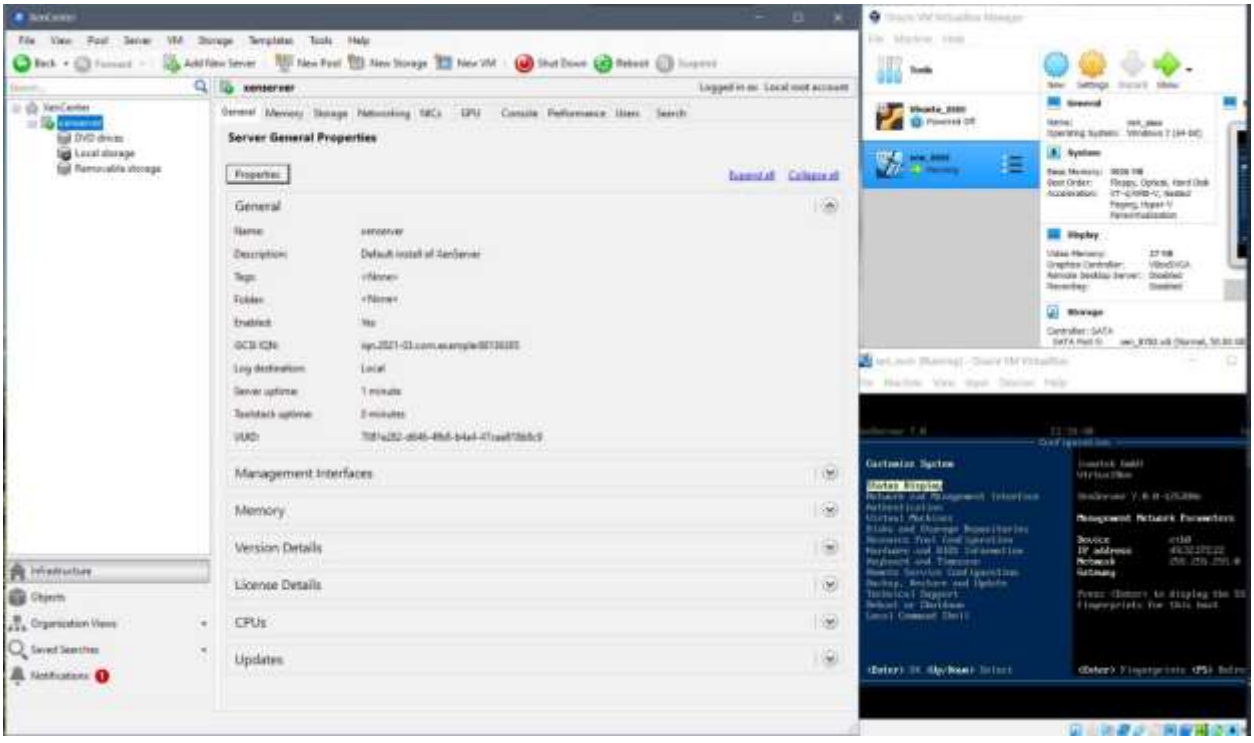
Rubrics for Practical

Indicator	**Poor**	**Average**	**Good**	**Excellent**
Timeline (3)	More than two weeks late (0)	Two weeks late (1)	One week late (2)	Early or on time (3)
Knowledge (3)	Not Able to answer any Question (0)	Able to answer a Question (1)	Able to answer few Questions (2)	Able to answer all questions (3)
Performance (4)	Able to partially perform the experiment (1)	Able to perform the experiment for certain extent (2)	Able to perform the experiment with support (3)	Able to perform the experiment considering all aspects (4)
Rubrics	**Timeline(3)**	**Knowledge(3)**	**Performance(4)**	**Total (10)**
Score				

Signature of faculty:


xen_8669 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Welcome to XenServer - Version 7.0.0 (#125380c)
Copyright (c) 2016 Citrix Systems, Inc.
Installing XenServer
Completing installation...
39%
Working: Please wait...
Right Ctrl
Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu_8669
Powered Off
xen_8669
Running
Hyper-V Paravirtualization
Display
Video Memory: 27 MB
Graphics Controller: VBoxSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: SATA
SATA Port 0: xen_8702.vdi (Normal, 50.00 GB)
SATA Port 1: [Optical Drive] XenServer-7.0.0-install-cd.iso (633.00 MB)
Audio


Citrix XenServer
Add a Server
Purchase Support
Try Desktop Virtualization


Server General Properties
General
Management Interfaces
Memory
Version Details
License Details
CPUs
Updates

Post labs:

1. Explain in detail architecture of XenServer and KVM.

Ans:

Xen is a type-1 hypervisor providing services that allow multiple operating systems to execute on the same hardware concurrently. Xen project runs in a more privileged CPU state than any other software on the machine. Xen provides a form of virtualization known as paravirtualization, in which guests run a modified operating system. The guests are modified to use a special hypercall ABI, instead of certain architectural features. Through paravirtualization, Xen can achieve high performance even on its host architecture (x86) which has a reputation for non-cooperation with traditional virtualization techniques.

XenServer virtualization platform by Citrix is best suited for enterprise environments. It can handle all types of workloads and provides features for the most demanding tasks. Citrix is proud of its proprietary features, such as Intel and NVIDIA enhanced virtualized graphics and workload security with Direct Inspect APIs. It has support for para virtualization and near native performance for I/O operations.

KVM is built into Linux as an added functionality with its code base integrated into Linux source tree. It lets you convert the Linux kernel into a hypervisor. It is sometimes confused with a type 2 hypervisor (see definition below). It has direct access to hardware along with virtual machines it hosts. It provides live migration, scheduling and resource control, alongside higher prioritization. It requires separate hardware virtualization extensions such as Intel VT, AMD V. It has limited support for paravirtualization. It is easier to maintain since it is well integrated into the infrastructure.

2. Compare Emulation, Para-virtualization and full virtualization

Ans:

When a device is being emulated, a software-based construct has replaced a hardware component. It's possible to run a complete virtual machine on an emulated server. However, virtualization makes it possible for that virtual machine to run directly on the underlying hardware, without needing to impose an emulation tax (the processing cycles needed to emulate the hardware).

Software assisted full virtualization completely relies on binary translation to trap and virtualize the execution of sensitive, non-virtualizable instructions sets. It emulates the hardware using the software instruction sets. Hardware-assisted full virtualization eliminates the binary translation and it directly interrupts with hardware using the virtualization technology.

Para Virtualization doesn't need to simulate the hardware for the virtual machines. The hypervisor is installed on a physical server (host) and a guest OS is installed into the environment.

Emulation process requires a software bridge to communicate with hardware. Full virtualization has the OS unaware that it is being virtualized and communicates directly with virtualized set of hardware. In para virtualization, the guest makes API calls to the hypervisor which is the host and thus has an extra abstraction layer between guest and underlying hardware.

Emulation is slow since it requires an interpreter to translate source code into format compatible with underlying hardware. Full virtualization is fairly fast since it makes guest OS perform direct virtualized hardware calls but this also incurs a huge performance overhead to carry out binary translation at runtime. Para virtualization is fastest among the three since it uses hypercalls to host hypervisor which is possible due to modifications to guest OS code.