

FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

Department of Computer Engineering

Course, Subject & Experiment Details

Practical No:	3
Title:	To study and Implement Bare-metal Virtualization using Xen, HyperV or VMware Esxi
Name of the Student:	Warren Fernandes
Roll No:	8940
Date of Performance:	28/03/2022
Date of Submission:	28/03/2022

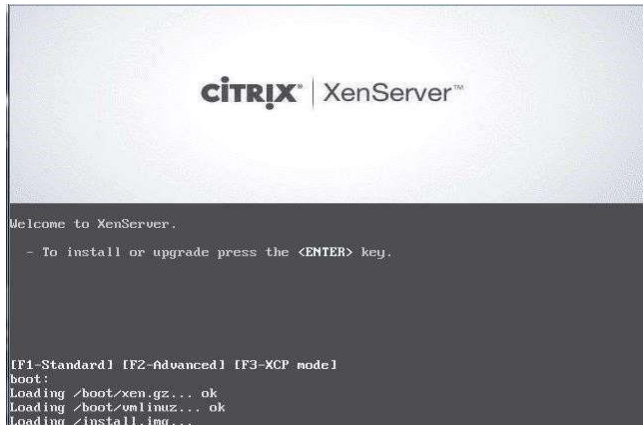
Evaluation:

Sr. No.	Rubric	Grade
1	On time submission/completion (2)	
2	Preparedness (2)	
3	Skill (4)	
4	Output (2)	

Signature of the Teacher

## Step 1: Install Xen Server

Step i:- Insert Bootable Xen Server CD into CDROM and Make first boot device as a CDROM from BIOS



Step ii:- press F2 to see the advanced options, otherwise press Enter to start installation



Step iii -: Select Keyboard Layout

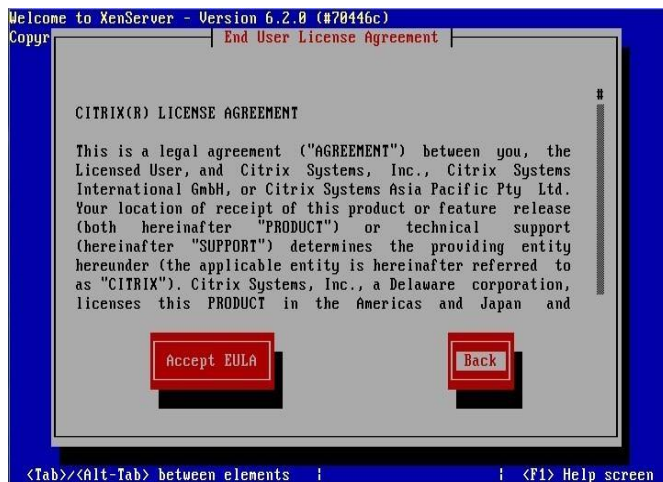


Step iv -:Press Enter to load Device Drivers

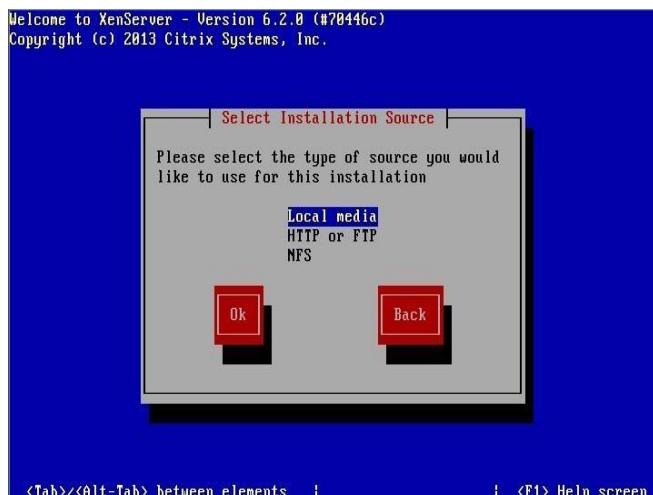


Step v -:Press Enter to Accept End user license Agreement

Step vi -:Select Appropriate disk on which you want to install Xen server



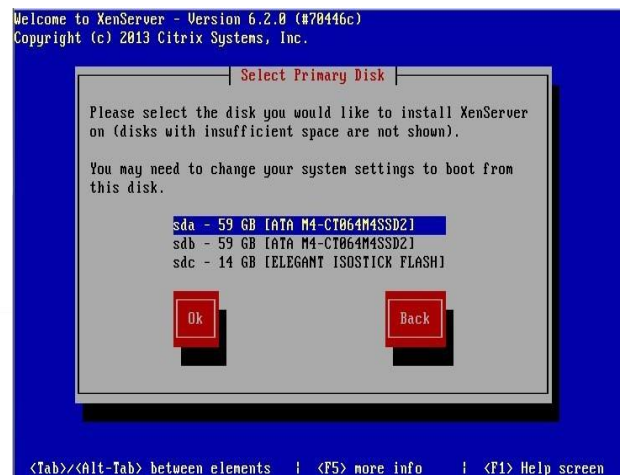
Step vii -:Select Appropriate installation Media



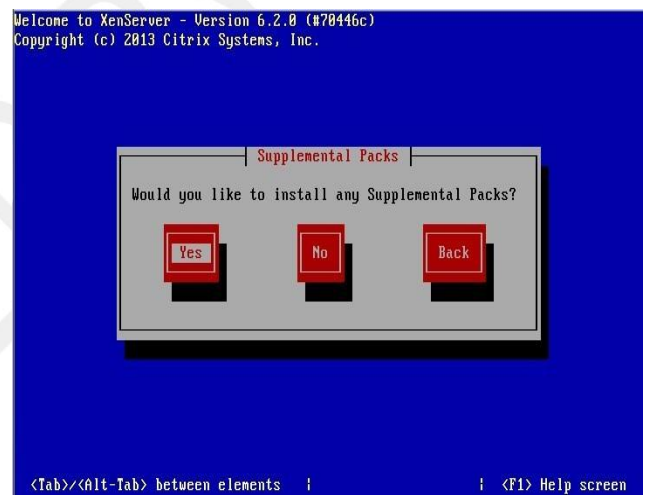
Step ix -: Specify Root password



Step xi -:Select Time Zone



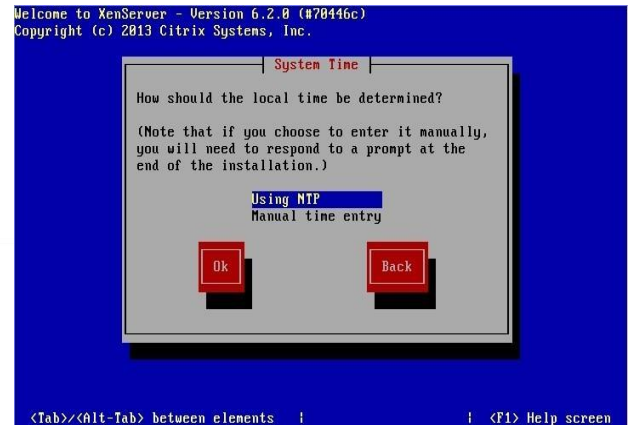
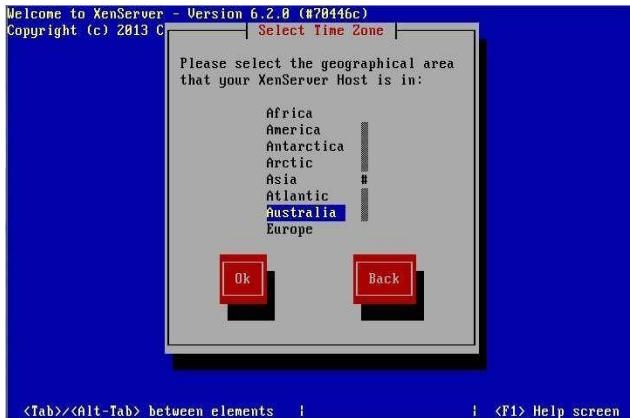
Step viii -:Select Additional Packages for installation



Step x -: Specify IP Address to a Xen Server



Step xii -:Specify NTP Servers address or use manual time entry then start installation



Once installation is done you will see the final screen shown below.



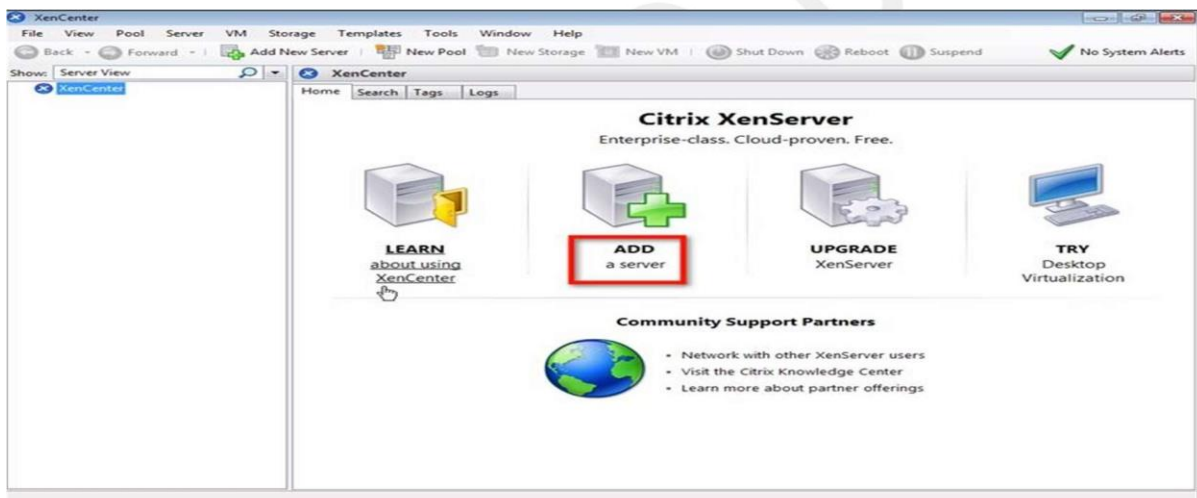
Xen Server Final Screenshot

## Step 2: Connect Xen Server to Xen Center

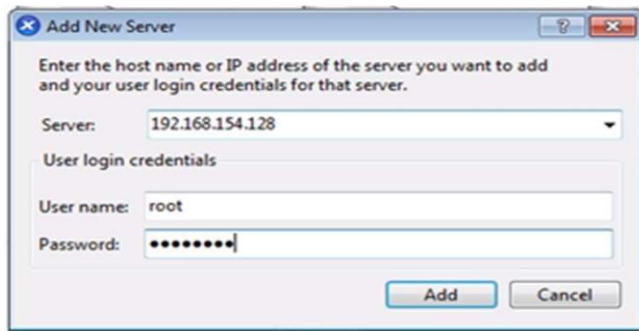
Firstly, download the xen center a management utility from xen server by opening the xen servers IP address as a URL on browser. Once Xen center is downloaded, install it. Open Xen center from start menu of Windows.



Here's how XenCenter looks like (see screenshot below) before any hosts, resource pools, and so on, are added to it. To connect to the XenServer host you configured earlier, click Add a server.



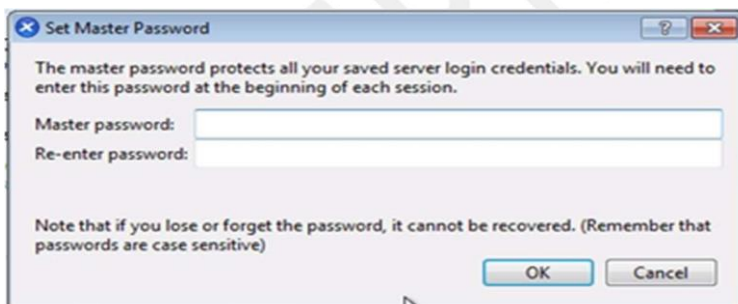
Enter the IP address I asked you to take note of earlier. Also enter the password you assigned for your root account. Click Add.



One of the first things you want to make sure as you're adding a new XenServer to XenCenter is to save and restore the server connection state on startup. Check the box that will do just that.

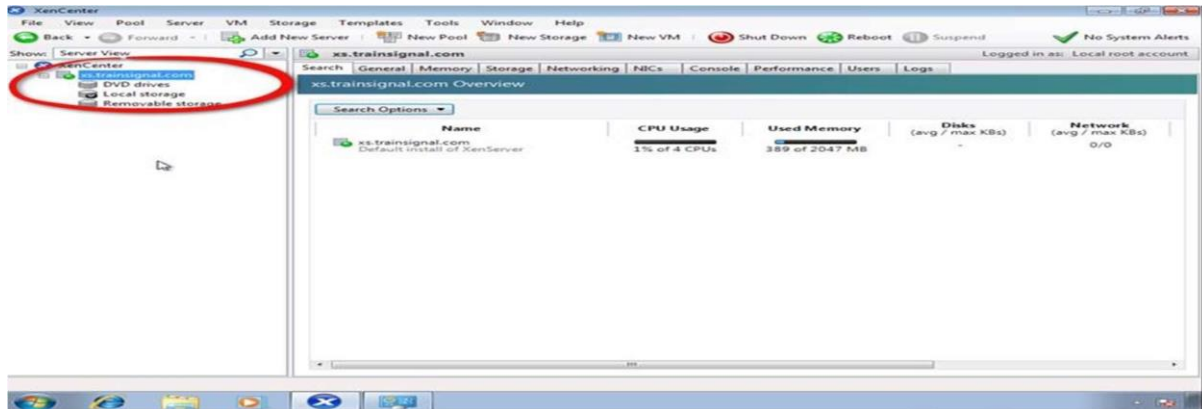


Once you do that, you will be allowed to configure a master password for all the XenServers you'll be associating with this XenCenter. Click the Require a master password checkbox if that's what you want to do, and then enter your desired master password in the fields provided.



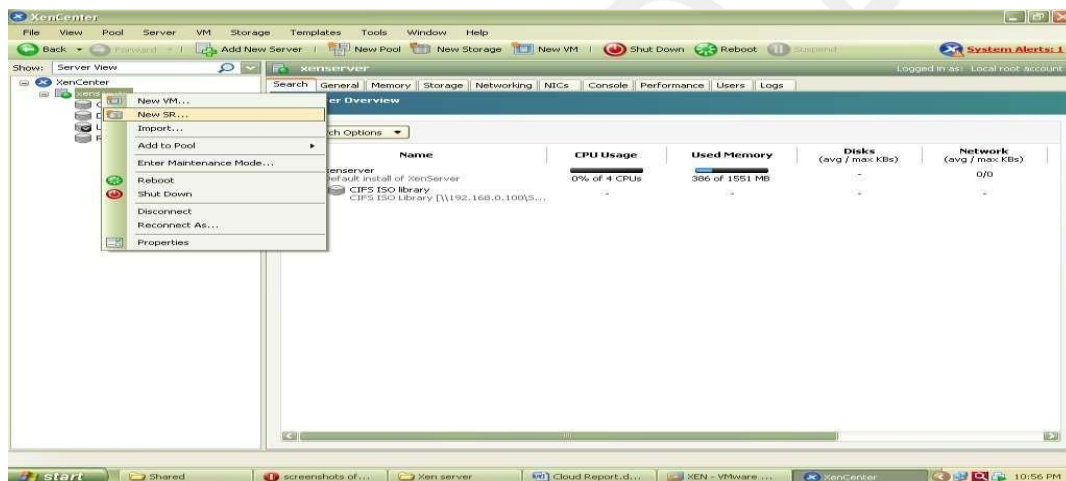
After you click OK, you'll be brought back to the main screen, where you'll see your XenServer already added to XenCenter.



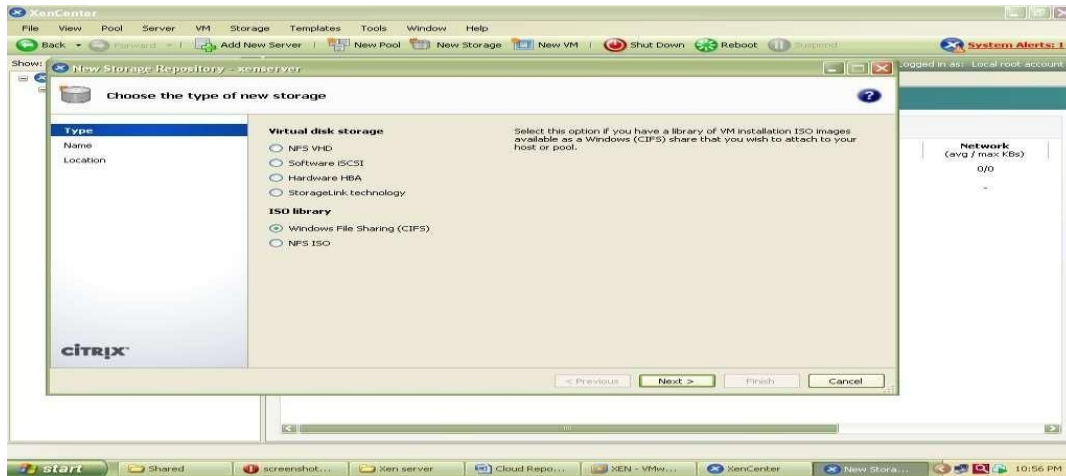


### Step-3 Create Storage Repository and Installing VM

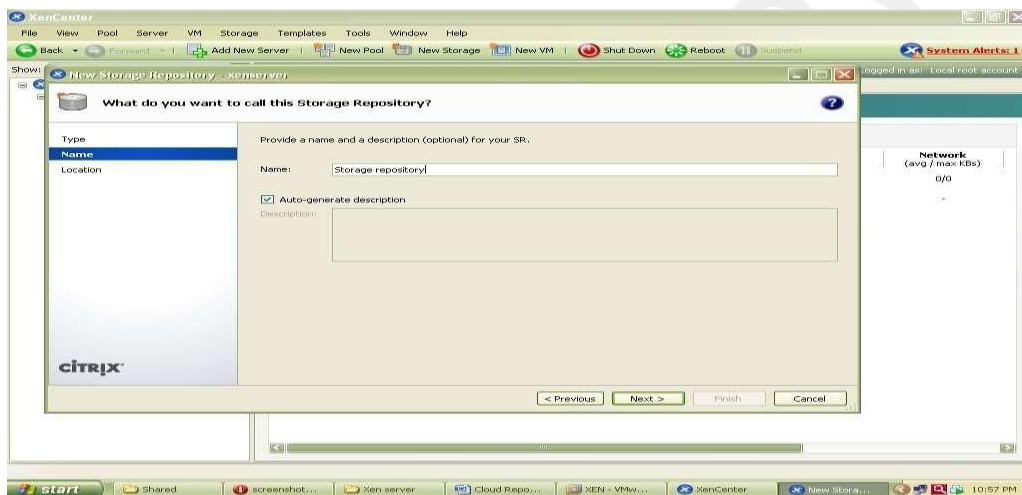
Now Before Creating VM we have to Create Storage Repository first which is nothing but shared directory on Xen Center which holds all iso files and which is required to install Operating system on Xen Server its steps are as follows. Right click on Xenserver icon on xen center and click on New SR



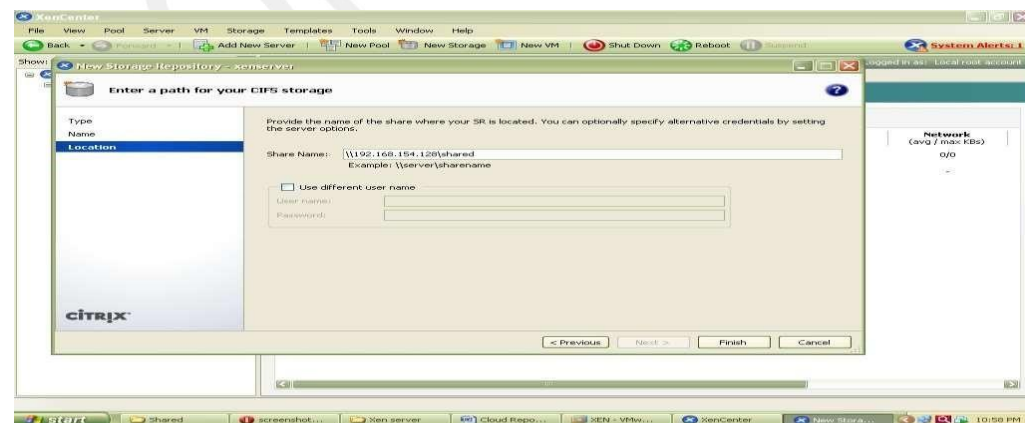
Now Select Windows CIFS library



Specify Storage Repository Name

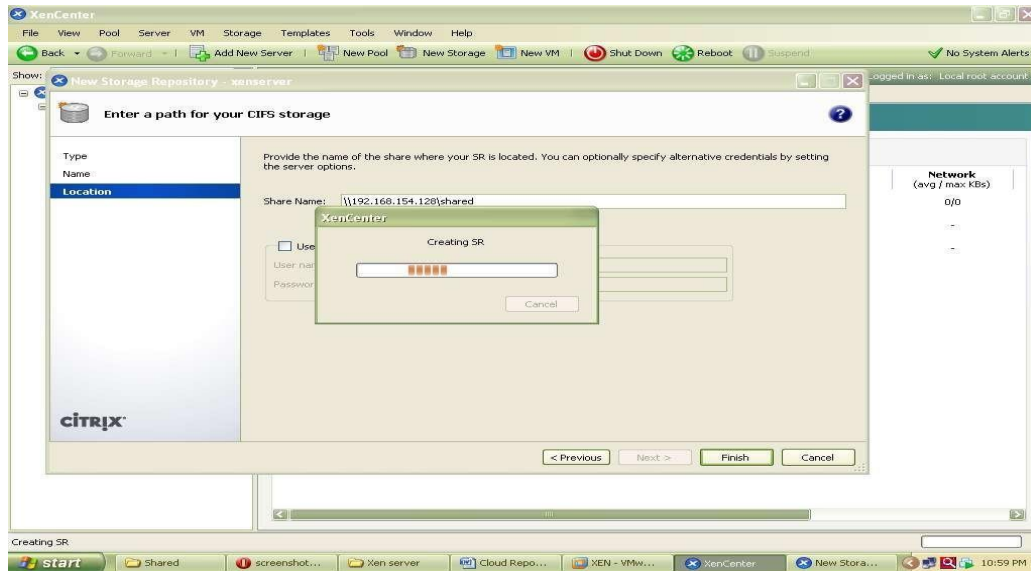


Now specify path of shared folder at client side which holds all iso files of os or VM which we are going to install on Xen Server.

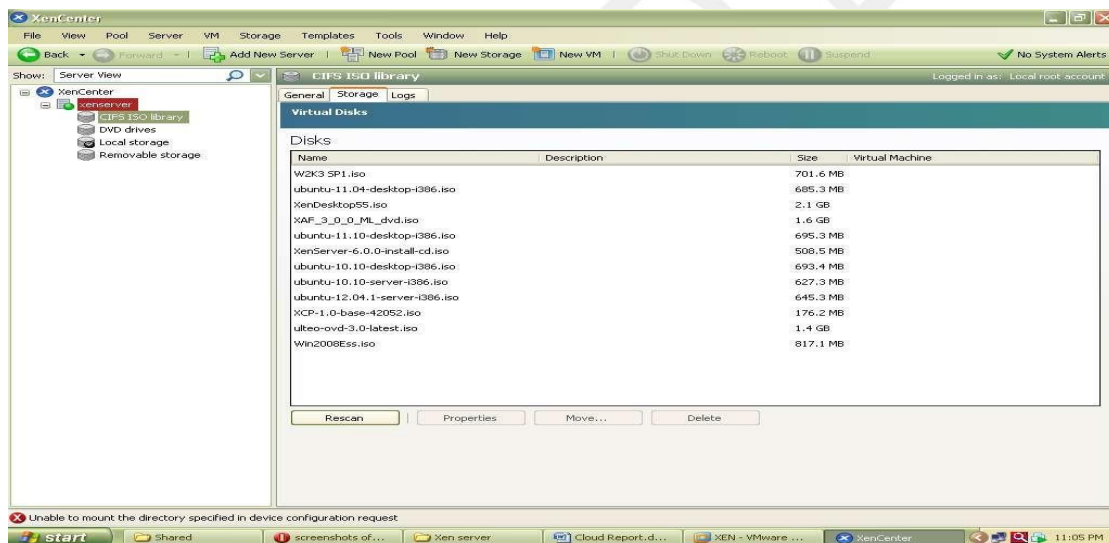


At the end Click on finish to create SR.



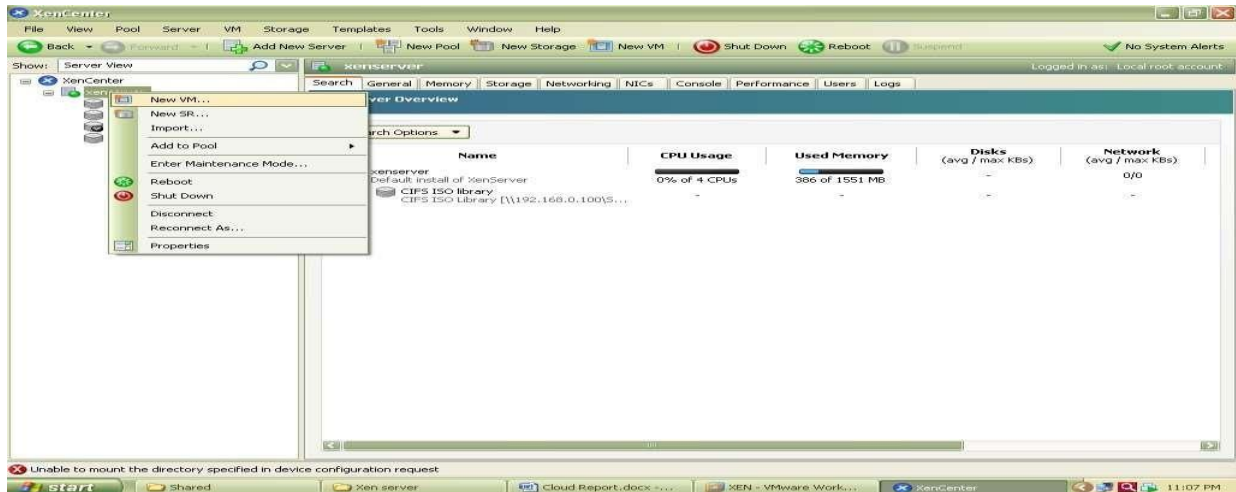


To check all iso files click on CIFS library and select storage this will show you all iso files.

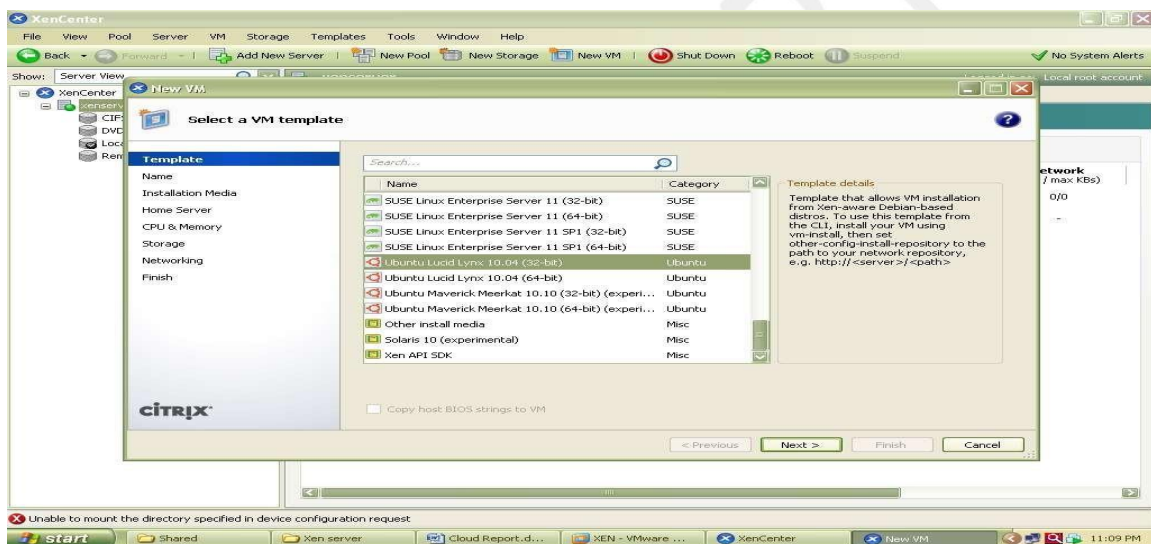


## Installation of UBUNTU Server on Xen Server

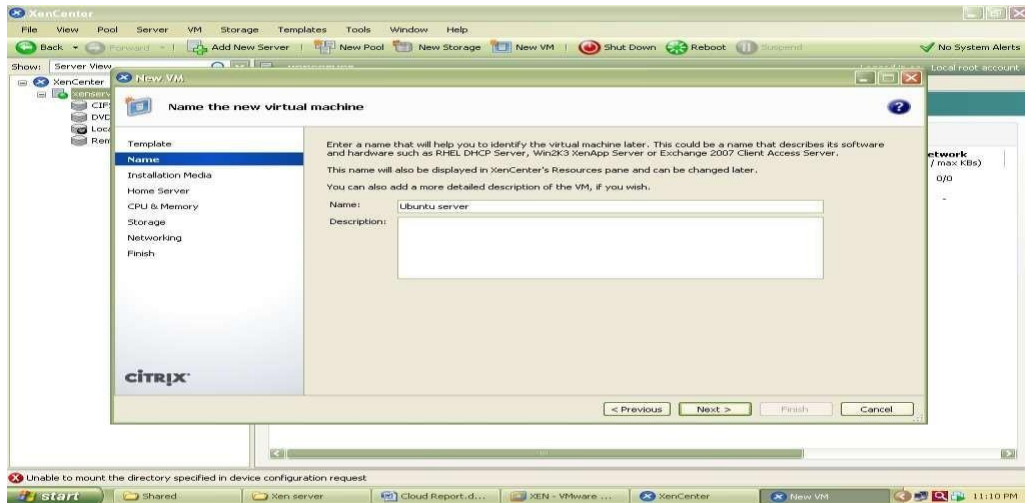
Step 1 -: Right click on Xenserver icon on xen center and select New VM



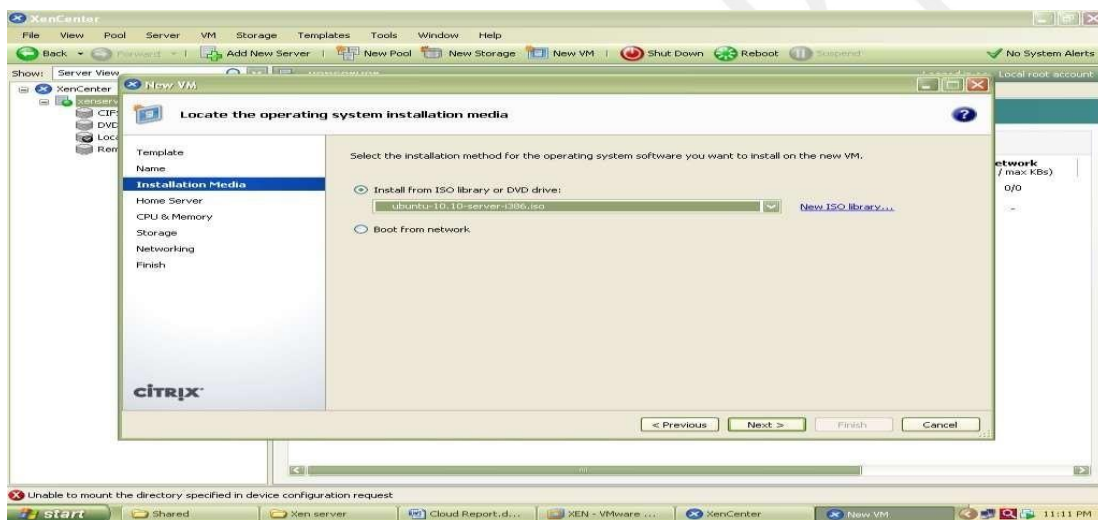
Now select an Operating System to be install here select Ubuntu Lucid Lynx and click on next



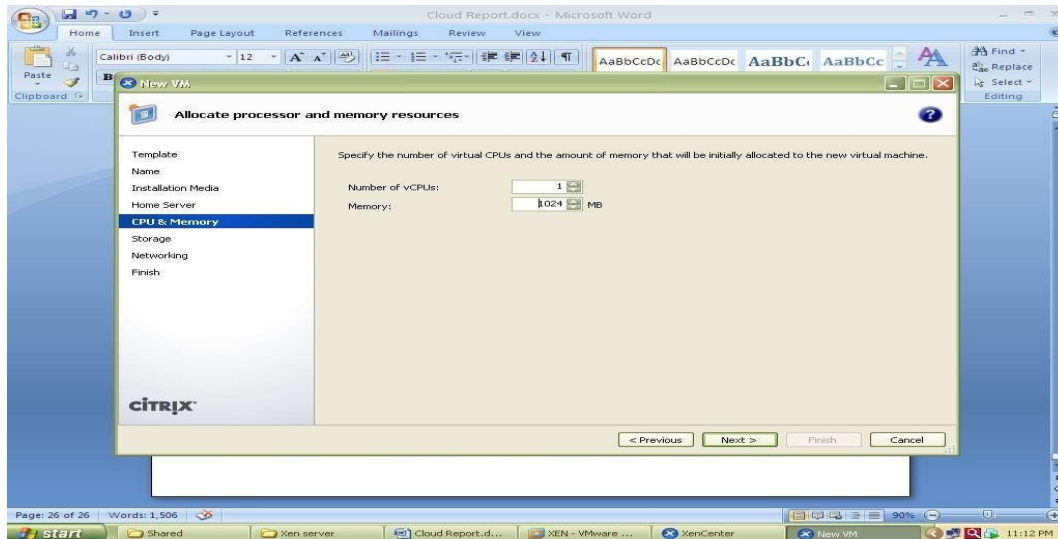
Now specify Instance Name as ubuntu server



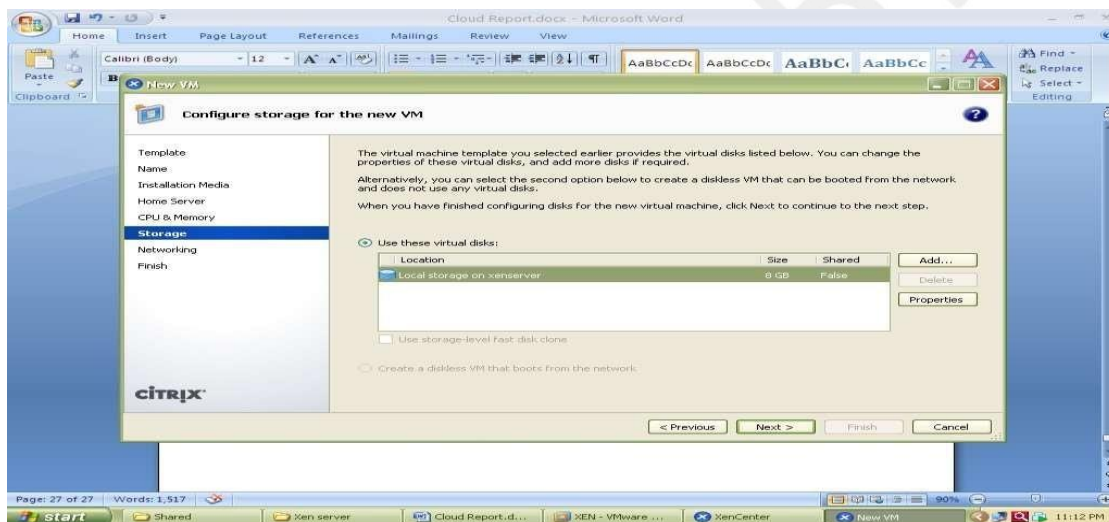
Select iso file of Ubuntu server 10.10 to be install



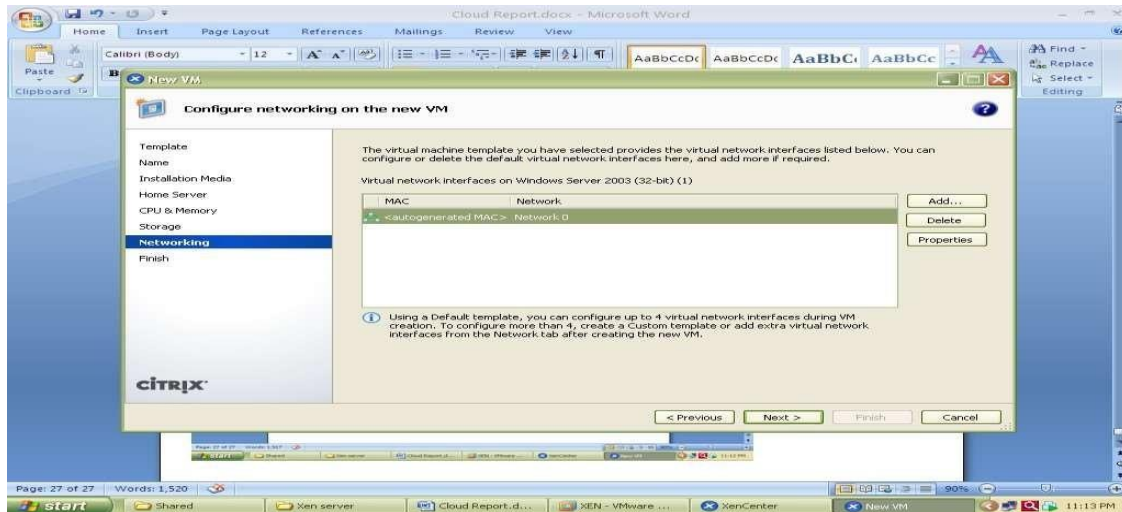
Now select hardware for vm i.e. no. of cpu's and memory



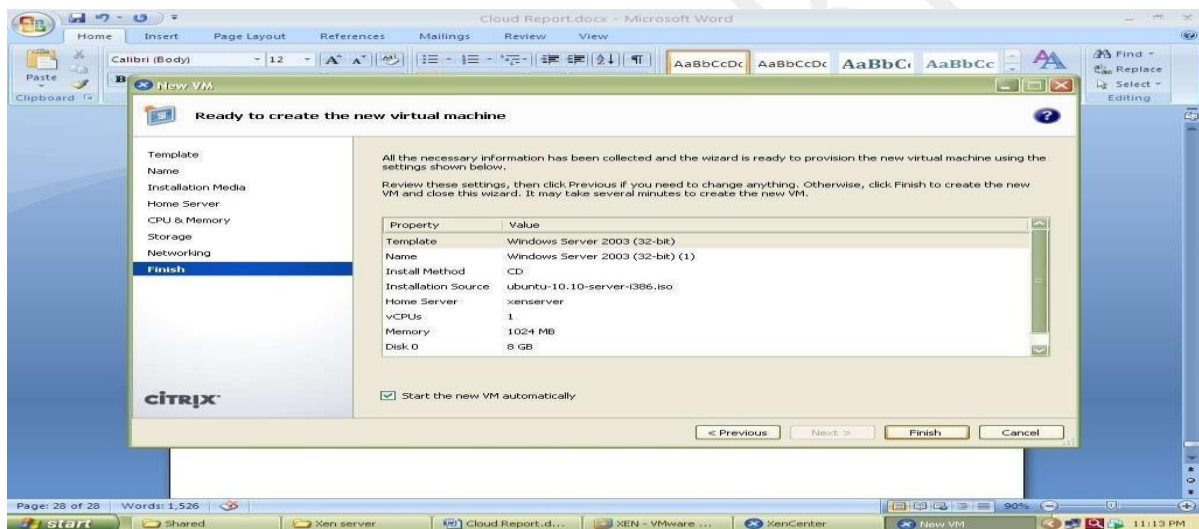
Select local storage



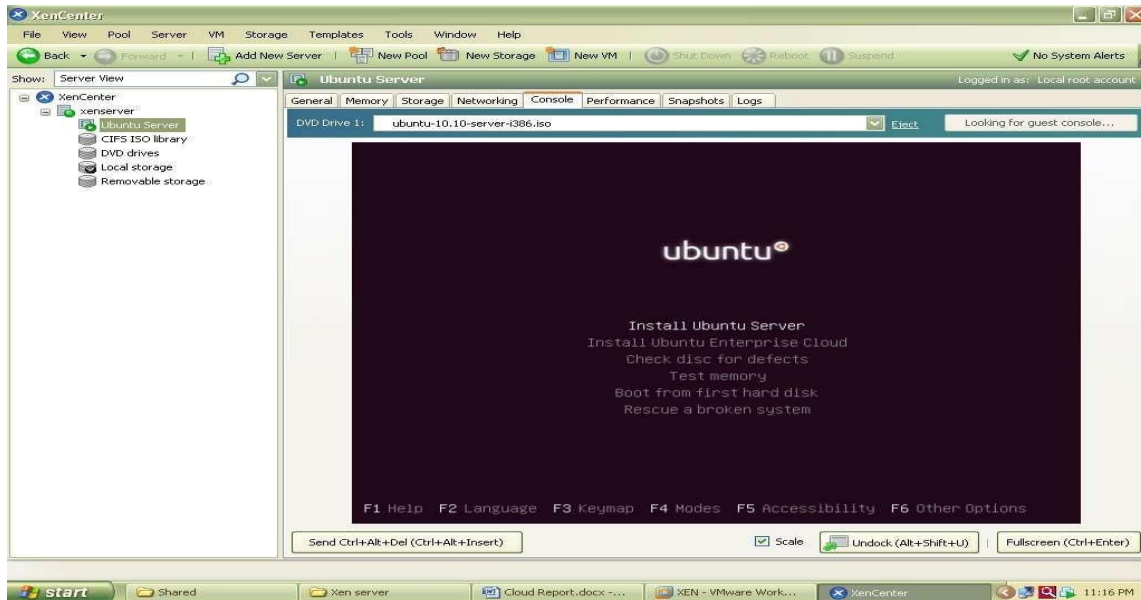
Select network



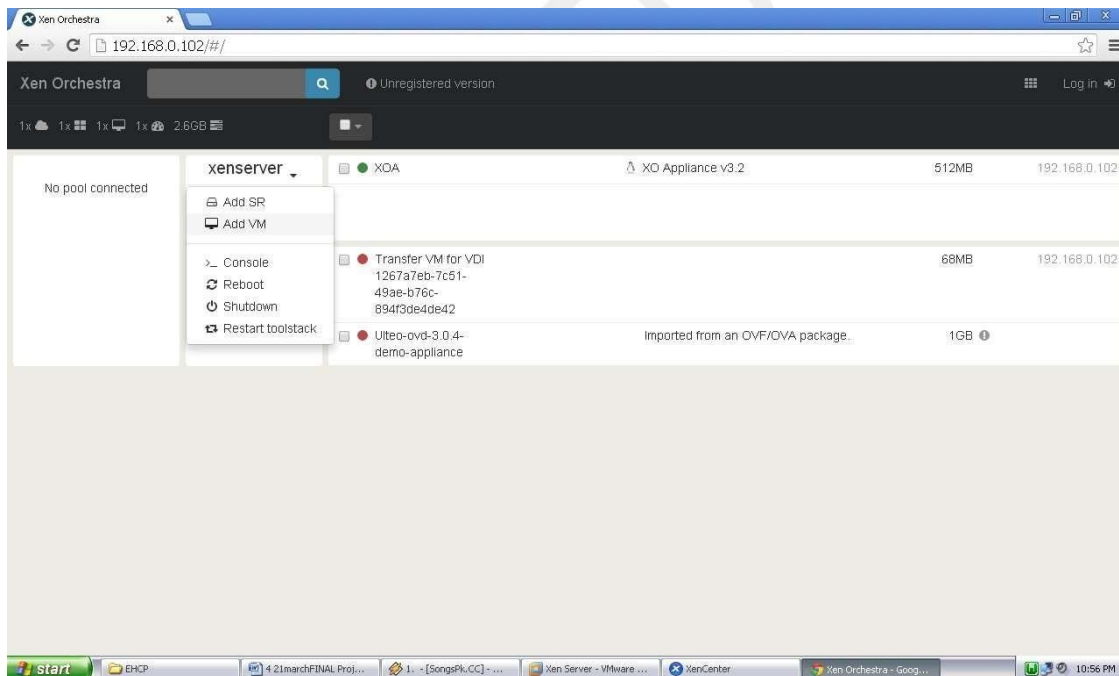
And click on finish



Now go to Console tab to install ubuntu and follow installation Steps.



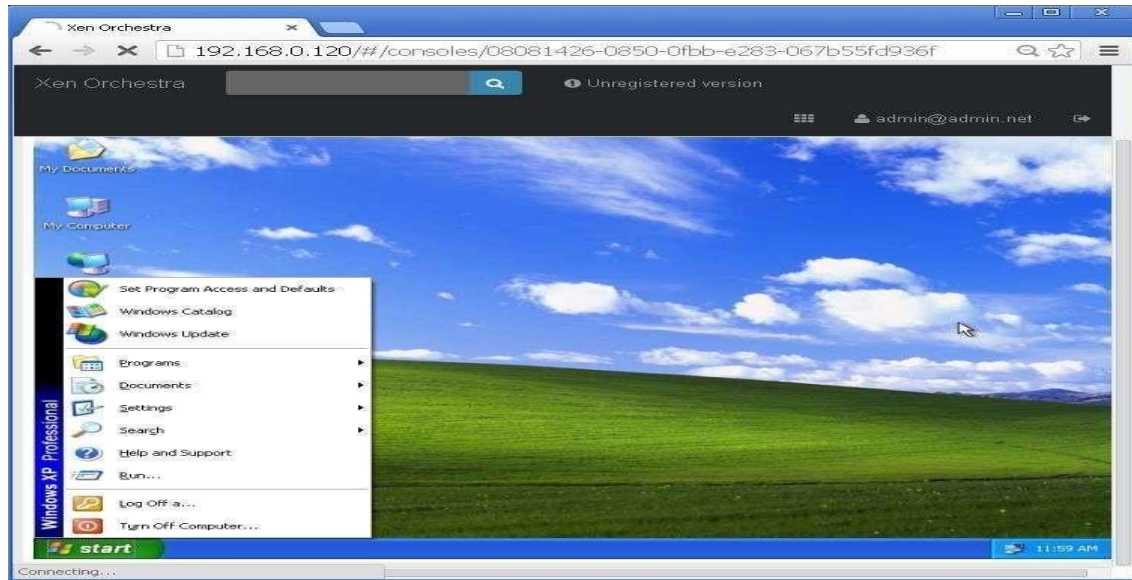
The Xen orchestra provides web based functionality of Xen Center.it provides access to all the VMs with their lifecycle management which are installed over Xen Server shown in figure 5.28



### Xen Orchestra (XOA) Portal

The Windows XP image running on Xen Orchestra over Google chrome web browser is shown in following screenshot





Windows XP running on Xen orchestra (XOA)

## Virtualization Post Lab Questions

### 1. What are the basic pros and cons of virtualization?

#### Pros of Virtualization in Cloud Computing:

##### 1. Utilization of Hardware Efficiently –

With the help of Virtualization Hardware is Efficiently used by user as well as Cloud Service Provider. In this the need of Physical Hardware System for the User is decreases and this results in less costly. In Service Provider point of View, they will vitalize the Hardware using Hardware Virtualization which decrease the Hardware requirement from Vendor side which are provided to User is decreased.

##### 2. Availability increases with Virtualization –

One of the main benefits of Virtualization is that it provides advance features which allow virtual instances to be available all the times. It also has capability to move virtual instance from one virtual Server another Server which is very tedious and risky task in Server Based System. During migration of Data from one server to another it ensures its safety. Also, we can access information from any location and any time from any device.

##### 3. Disaster Recovery is efficient and easy –

With the help of virtualization Data Recovery, Backup, Duplication becomes very easy. In traditional method, if somehow due to some disaster if Server system Damaged then the surety of Data Recovery is very less. But with the tools of Virtualization real time data backup recovery and mirroring become easy task and provide surety of zero percent data loss.

##### 4. Virtualization saves Energy –

Virtualization will help to save Energy because while moving from physical Servers to Virtual Server's, the number of Server's decreases due to this monthly power and cooling cost decreases which will Save Money as well. As cooling cost reduces it means carbon production by devices also decreases which results in Fresh and pollution free environment.

##### 5. Quick and Easy Set up –

In traditional methods Setting up physical system and servers are very time-consuming. Firstly, Purchase them in bulk after that wait for shipment. When Shipment is done then wait for Setting up and after that again spend time in installing required software etc. Which will consume very time. But with the help of virtualization the entire process is done in very less time which results in productive setup.

##### 6. Cloud Migration becomes easy –

Most of the companies those who already have spent a lot in the server have a doubt of Shifting to Cloud. But it is more cost-effective to shift to cloud services because all the data that is present in their server's can be easily migrated into the cloud server and save something from maintenance charge, power consumption, cooling cost, cost to Server Maintenance Engineer etc.

### Cons of Virtualization:

1. Data can be at Risk –

Working on virtual instances on shared resources means that our data is hosted on third party resource which put's our data in vulnerable condition. Any hacker can attack on our data or try to perform unauthorized access. Without Security solution our data is in threaten situation.

2. Learning New Infrastructure –

As Organization shifted from Servers to Cloud. They required skilled staff who can work with cloud easily. Either they hire new IT staff with relevant skill or provide training on that skill which increase the cost of company.

3. High Initial Investment –

It is true that Virtualization will reduce the cost of companies but also it is truth that Cloud have high initial investment. It provides numerous services which are not required and when unskilled organization will try to set up in cloud they purchase unnecessary services which are not even required to them.

2. What are Intel VT/ AMD-V / hvm?

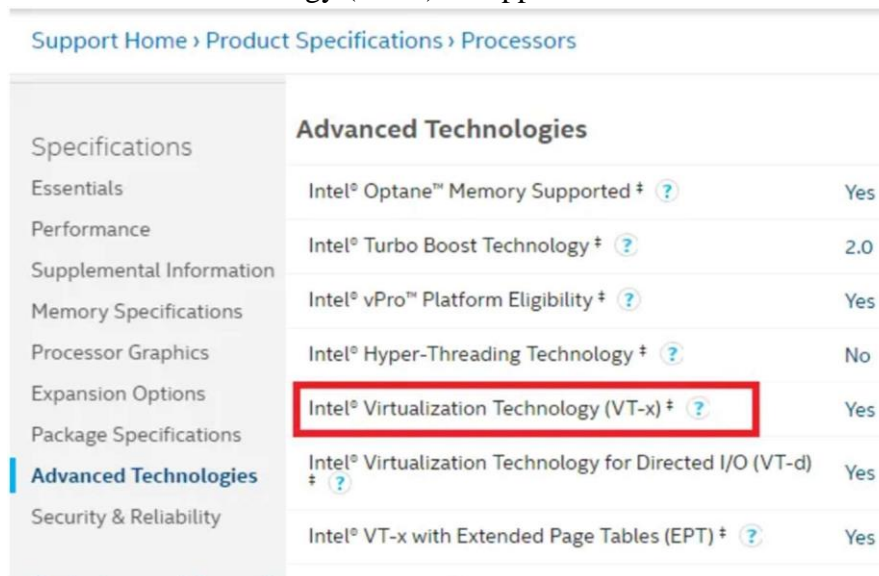
Intel VT and AMD's AMD-V are instruction set extensions that provide hardware assistance to virtual machine monitors. They enable running fully isolated virtual machines at native hardware speeds, for some workloads.

HVM (for Hardware Virtual Machine) is a vendor-neutral term often used to designate the x86 instruction set extensions.

### 3. How to find out If CPU Support Intel VT and AMD-V Virtualization Support?

Check if you have Intel VT-X –

- Use Win + S to open Start Menu search box and type System Information □ Under System Summary > Processor note down the Processor name.
- Open Intel's product specification site.
- Enter the number of the processor in the search box located on the right side.
- In the processor product page, and under Advanced Technologies, check to see if Intel® Virtualization Technology (VT-x) is supported.



Check if you have AMD-V

It's hard to figure this out clearly as there is no clear section on AMD website as Intel. The only utility available can check if you have Hyper V. [Download and run](#) the AMD-V with RVI Hyper V Compatibility Utility to check.

### 4. What is the difference between KVM and XEN?

Comparison item	Xen	KVM
Released	2003	2007
Supporting enterprise	Citrix, Novell, Oracle, Red Hat (RHEL5) and Virtual Iron	Redhat, Ubuntu, etc.
Supporting virtualization paravirtualization technology	Full virtualization,	Full virtualization
Supporting structure	x86, IA64 and ARM from AMD, Fujitsu, IBM, Sun and other companies, as well as x86/64 CPU vendors and <u>Intel CPU</u> embedded support	CPU that supports virtualization
Supporting operating system	UNIX, Linux and Microsoft Windows	UNIX, Linux and Microsoft Windows Support (not previously supported)
Live migration	stand by	
Kernel support	Need to patch the kernel	Built-in the kernel

5. What is the difference between KVM and VMware?

Feature	KVM	VMware vSphere
Hypervisor Type	Type 1	Type 1
Deployment Complexity	Difficult	Easy
Storage	All types of storage supported in Linux	SAS disks for local storage. VMFS, iSCSI, NFS datastores
Native virtual disk format	RAW(IMG), QCOW2	VMDK
Raw Device Mapping	Yes. LVM is supported	Yes
Thin provisioning	Yes	Yes
Native file systems	Linux file systems, NFS	VMFS, NFS
VM snapshots	Yes	Yes
VM live migration	Yes	Yes
VM storage migration	Yes	Yes
VM Live storage migration	No	Yes
Clustering features	Yes (limited)	Yes (wide support)
High availability	Yes, with DRBD	Yes
Load balancing	Limited	Yes (DRS)
Fault Tolerance	No	Yes
Management interface	Command line (virsh), KVM virt-manager	vSphere Client, Host Client, ESXCLI, PowerCLI

AD integration	Yes	Yes
Price	Free/Low (pay only for tech support)	High
Performance	High	High
Tech support	Oracle KVM, Red Hat KVM	Yes
Supported guest OSs	Wide	Wide
Networking	Virtual switch, Distributed switching, NIC bonding, link aggregation	vSwitch, Distributed vSwitch, NIC Teaming and link aggregation, NSX
Firewall	Wide Linux functionality with iptables	Basic ESXi firewall or additional functionality of NSX
Container Integration	Yes	Yes
Nested Virtualization	Yes	Yes
VM Linked Clones	Yes	Yes

#### 6. What is the difference between KVM and QEMU?

KVM - resides in the Linux kernel as a loadable module. Once loaded, KVM converts the Linux kernel into a type-1 hypervisor aka bare-metal hypervisor. KVM virtualization uses the Linux kernel as its hypervisor (VM is essentially a process). However, it depends on the Intel-VT and AMD-V virtualization extensions on Intel and AMD respectively for hardware assists to enable robust virtualization. Working in concert with these extensions, KVM helps deliver a better virtualization experience with higher throughput of almost near-zero latency. Thus, all the VMs (read process) can run without any performance or compatibility hit, as if it was running natively on a dedicated CPU. Also, because of the aforementioned extensions the VMs have a greater awareness of the capabilities of the underlying hardware platform. Therefore, is fair to say that KVM offers hardware virtualization in its sincerest and best form.

QEMU - On the other hand resides in the user space and provides system emulation including the processor and various peripherals. Typically, QEMU is deployed along with KVM as an in-kernel accelerator where KVM executes most of the guest code natively, while QEMU emulates the rest of the machine (peripherals) needed by the guest. In places where the VM has to talk to external devices, QEMU uses passthrough.