Fr. Conceicao Rodrigues college of Engineering
Department of Computer Engineering

Experiment 2

Title: **Study and Implementation of Virtualization.**

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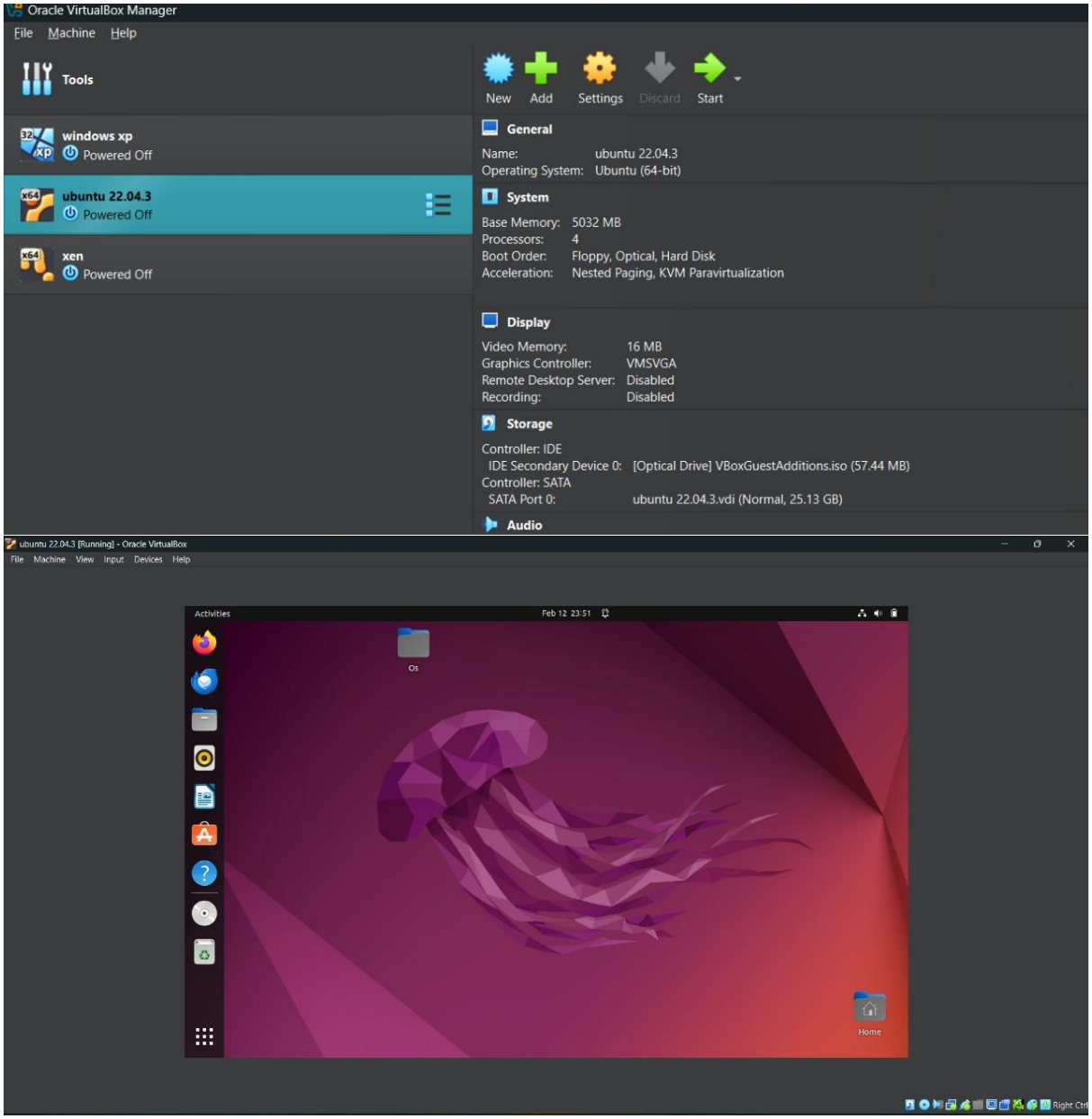
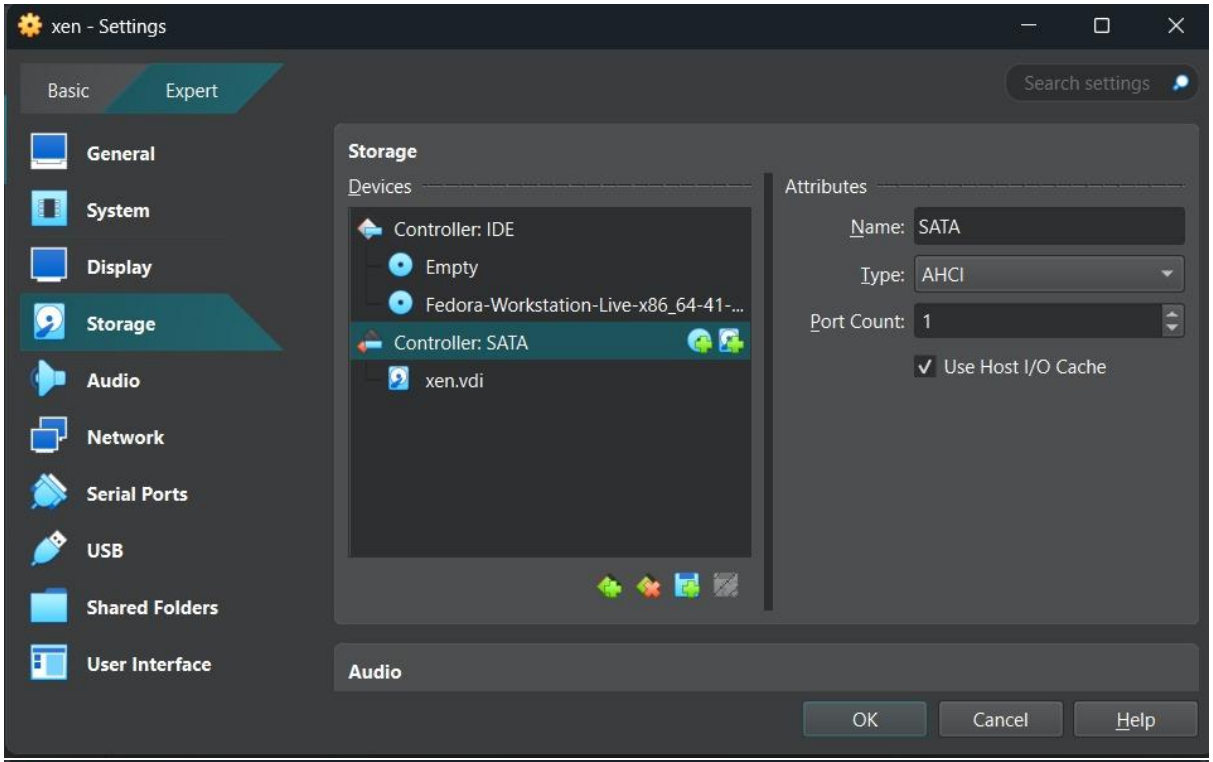
Sign here to indicate that you have read all relevant material provided/ available on Moodle/ Classroom while performing and writing this experiment				

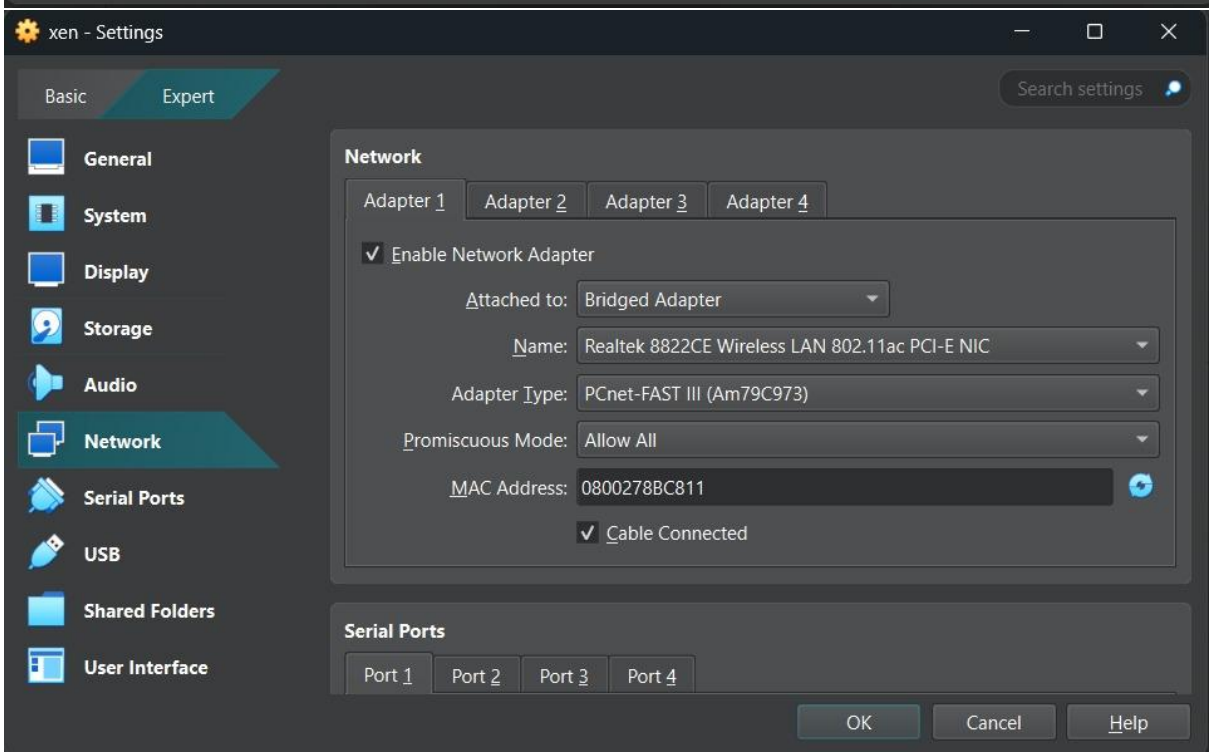
Rubrics:

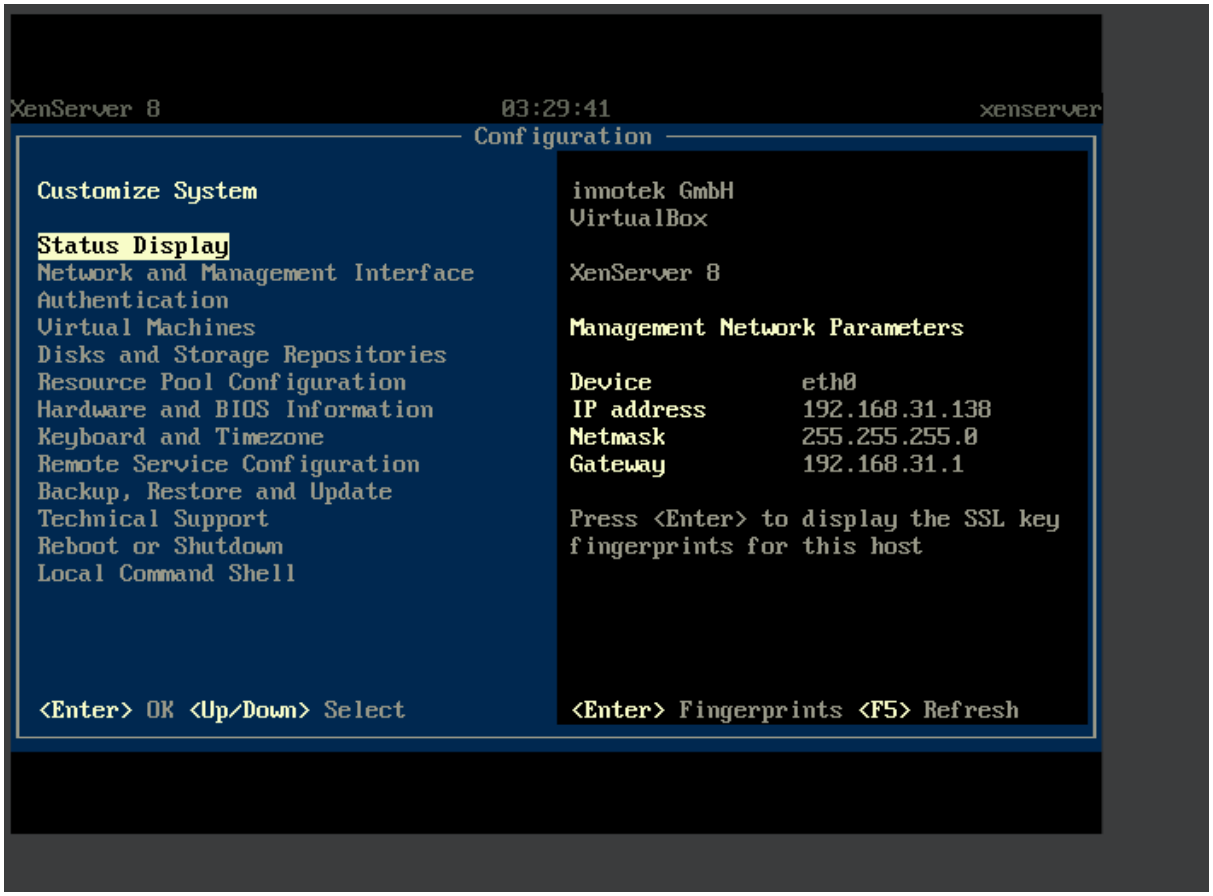
Criteria	Excellent	Good	Satisfactory	Poor	Total Marks
Understanding of Virtualization and Hypervisor (R1)	Demonstrates comprehensive understanding of virtualization concepts and hypervisor types.(6)	Good understanding with minor gaps in knowledge.(5)	Basic understanding but lacks depth in some areas.(4)	Limited or incorrect understanding of key concepts. (2)	6 05
Deployment of Type I Hypervisor (R2)	Accurately and efficiently deploys Type I hypervisor with advanced understanding. (6)	Correct deployment with minor errors or inefficiencies. (5)	Basic deployment, but with significant errors or inefficiencies. (4)	Inability to deploy or significant errors in deployment. (2)	6 05
Deployment of Type II Hypervisor (R3)	Accurately and efficiently deploys Type II hypervisor with strong application skills. (6)	Adequate deployment with minor issues. (5)	Basic deployment with several errors or inefficiencies. (4)	Fails to deploy or significant issues in deployment. (2)	6 06
Timeliness of Submission (R4)	On time (2)	1-week late (1)	2-weeks late (0)	More than 2 weeks late (Deduct up to 5 marks)	2 1
Total Marks					17

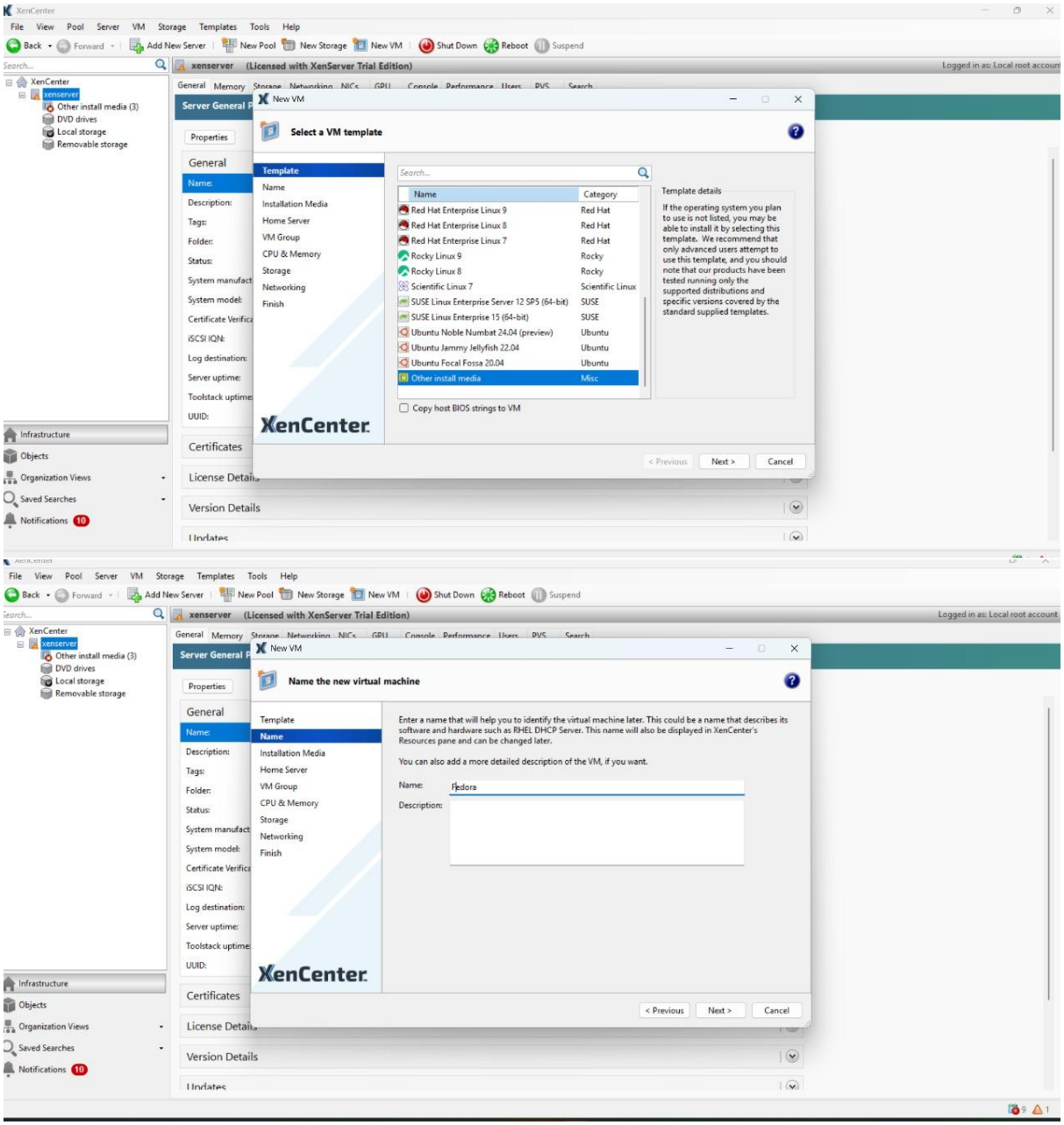
Date of Performance	Date of Submission	Signature of the Teacher


Oracle VirtualBox Manager
File Machine Help
Tools
New Add Settings Discard Start
windows xp
Powered Off
ubuntu 22.04.3
Powered Off
xen
Powered Off
General
Name: ubuntu 22.04.3
Operating System: Ubuntu (64-bit)
System
Base Memory: 5032 MB
Processors: 4
Boot Order: Floppy, Optical, Hard Disk
Acceleration: Nested Paging, KVM Paravirtualization
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Secondary Device 0: [Optical Drive] VBoxGuestAdditions.iso (57.44 MB)
Controller: SATA
SATA Port 0: ubuntu 22.04.3.vdi (Normal, 25.13 GB)
Audio
ubuntu 22.04.3 [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Activities
Feb 12 23:51
Os
Home
Right Ctrl

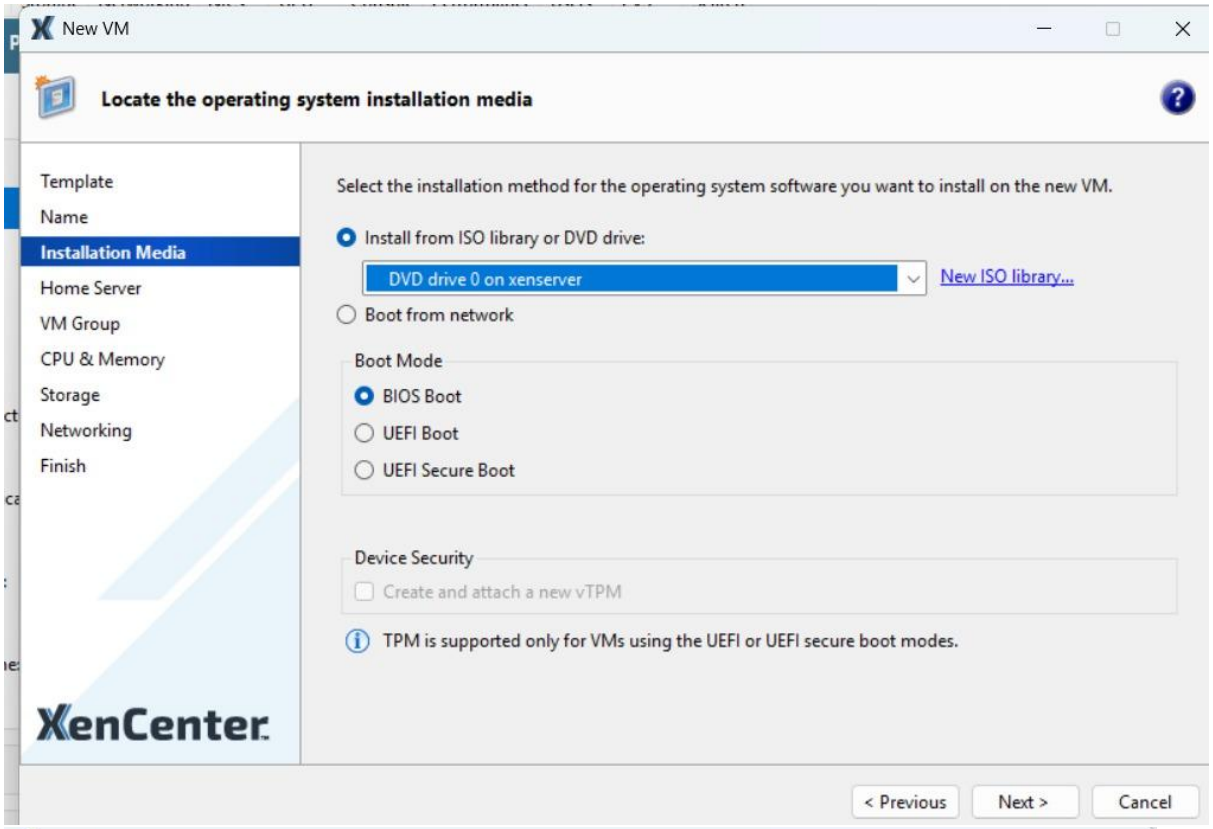

xen - Settings
Basic
Expert
Search settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Devices
Controller: IDE
Empty
Fedora-Workstation-Live-x86_64-41-...
Controller: SATA
xen.vdi
Attributes
Name: SATA
Type: AHCI
Port Count: 1
Use Host I/O Cache
Audio
OK
Cancel
Help

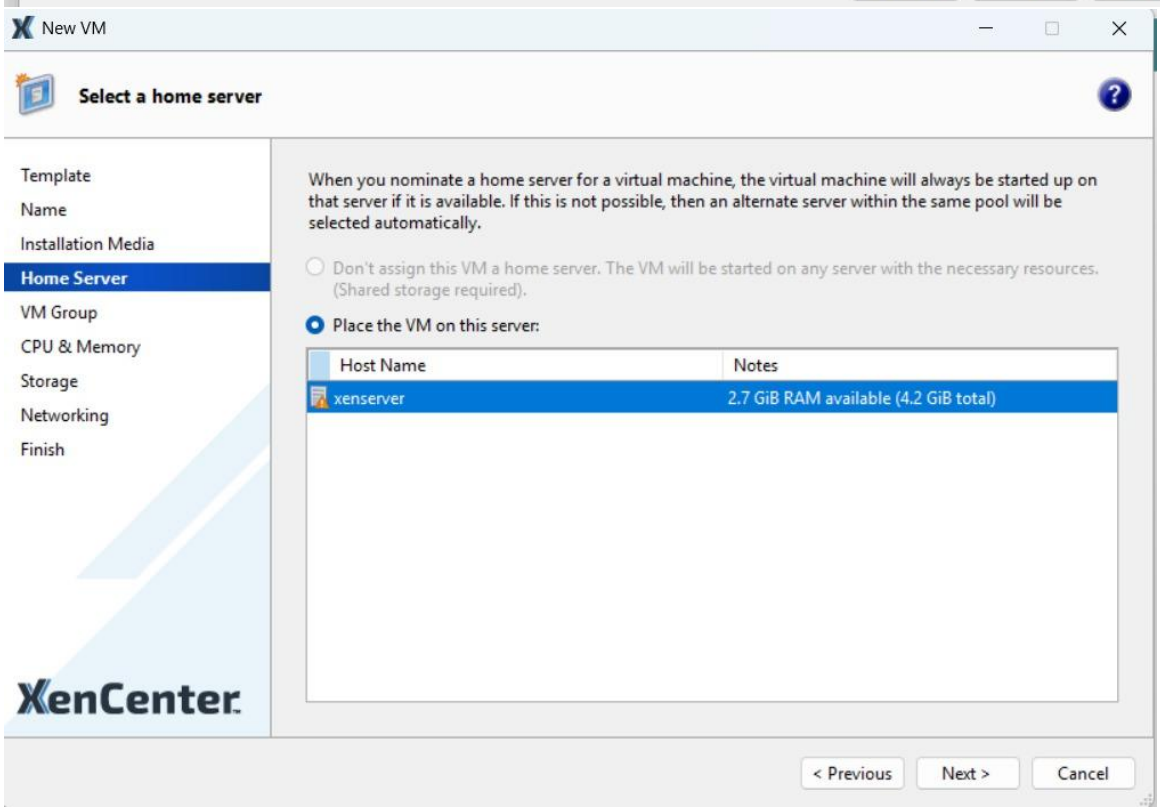

xen - Settings
Basic
Expert
Search settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Network
Adapter 1
Adapter 2
Adapter 3
Adapter 4
Enable Network Adapter
Attached to: Bridged Adapter
Name: Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
Adapter Type: PCnet-FAST III (Am79C973)
Promiscuous Mode: Allow All
MAC Address: 0800278BC811
Cable Connected
Serial Ports
Port 1
Port 2
Port 3
Port 4
OK
Cancel
Help

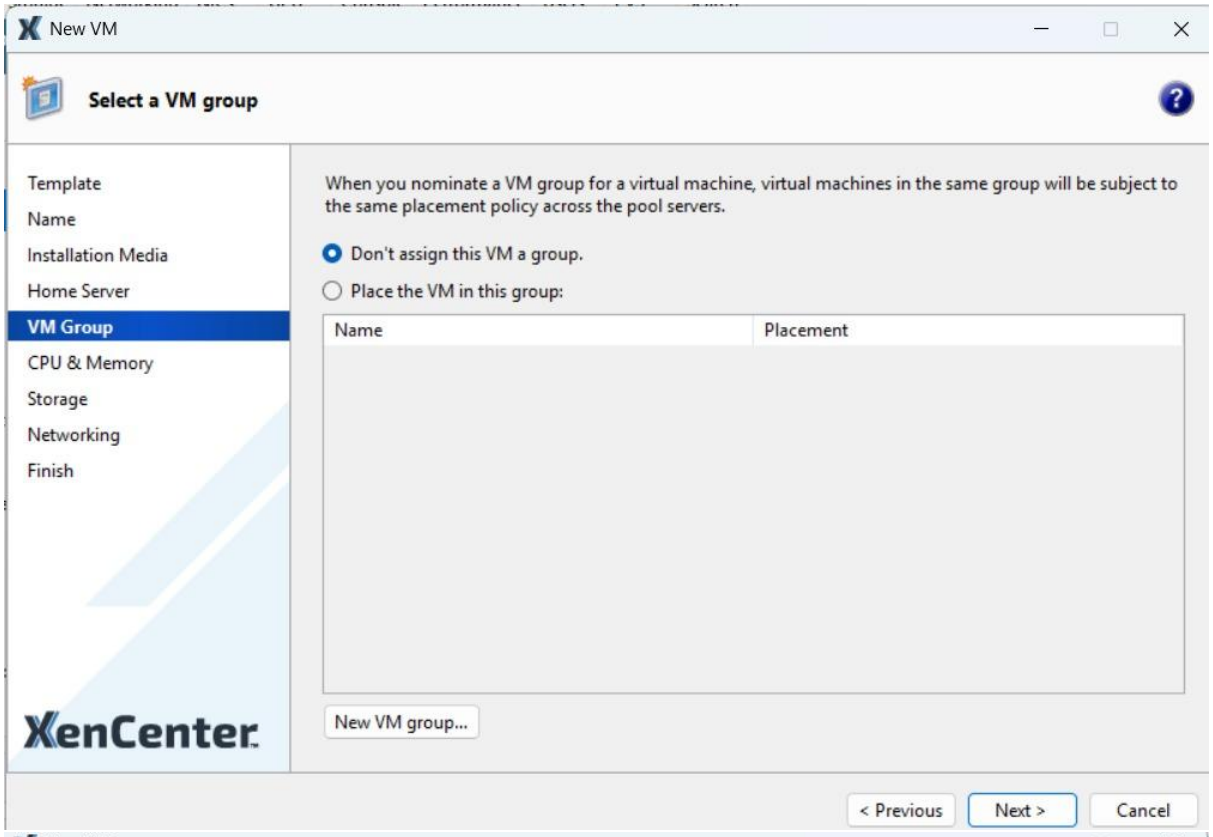

XenServer 8
03:29:41
xenserver
Configuration
Customize System
Status Display
Network and Management Interface
Authentication
Virtual Machines
Disks and Storage Repositories
Resource Pool Configuration
Hardware and BIOS Information
Keyboard and Timezone
Remote Service Configuration
Backup, Restore and Update
Technical Support
Reboot or Shutdown
Local Command Shell
<Enter> OK <Up/Down> Select
innotek GmbH
VirtualBox
XenServer 8
Management Network Parameters
Device eth0
IP address 192.168.31.138
Netmask 255.255.255.0
Gateway 192.168.31.1
Press <Enter> to display the SSL key fingerprints for this host
<Enter> Fingerprints <F5> Refresh

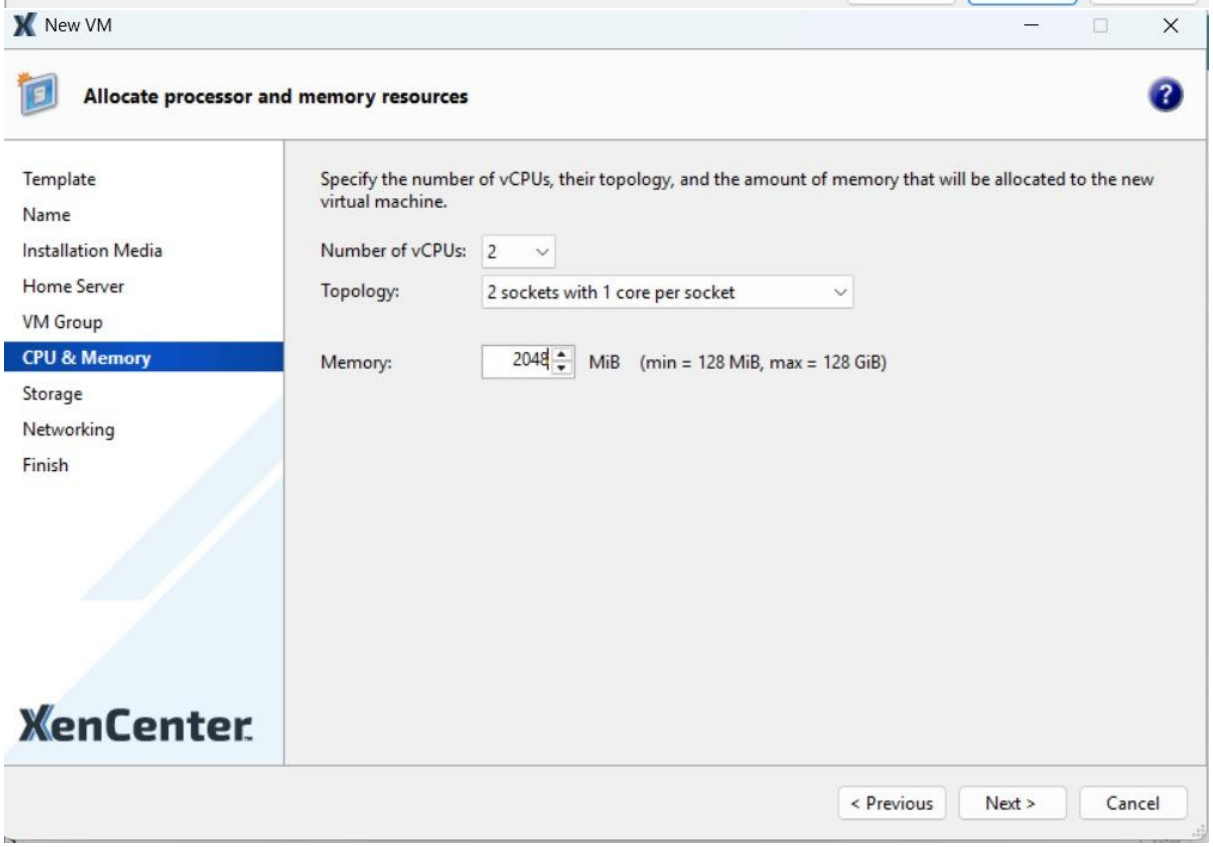

XenCenter
File View Pool Server VM Storage Templates Tools Help
Back Forward Add New Server New Pool New Storage New VM Shut Down Reboot Suspend
xenserver (Licensed with XenServer Trial Edition)
Logged in as: Local root account
XenCenter
xenserver
Other install media (3)
DVD drives
Local storage
Removable storage
General Memory Storage Networking NICs GPU Console Performance Users PVS Search
Server General P
Properties
General
Name:
Description:
Tags:
Folder:
Status:
System manufact
System model:
Certificate Verific
iSCSI IQN:
Log destination:
Server uptime:
Toolstack uptime:
UUID:
Certificates
License Detail
Version Details
Updates
Infrastructure
Objects
Organization Views
Saved Searches
Notifications 10
New VM
Select a VM template
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
Search...
Name
Category
Red Hat Enterprise Linux 9 Red Hat
Red Hat Enterprise Linux 8 Red Hat
Red Hat Enterprise Linux 7 Red Hat
Rocky Linux 9 Rocky
Rocky Linux 8 Rocky
Scientific Linux 7 Scientific Linux
SUSE Linux Enterprise Server 12 SP5 (64-bit) SUSE
SUSE Linux Enterprise 15 (64-bit) SUSE
Ubuntu Noble Numbat 24.04 (preview) Ubuntu
Ubuntu Jammy Jellyfish 22.04 Ubuntu
Ubuntu Focal Fossa 20.04 Ubuntu
Other install media Misc
Template details
If the operating system you plan to use is not listed, you may be able to install it by selecting this template. We recommend that only advanced users attempt to use this template, and you should note that our products have been tested running only the supported distributions and specific versions covered by the standard supplied templates.
Copy host BIOS strings to VM
XenCenter
< Previous Next > Cancel

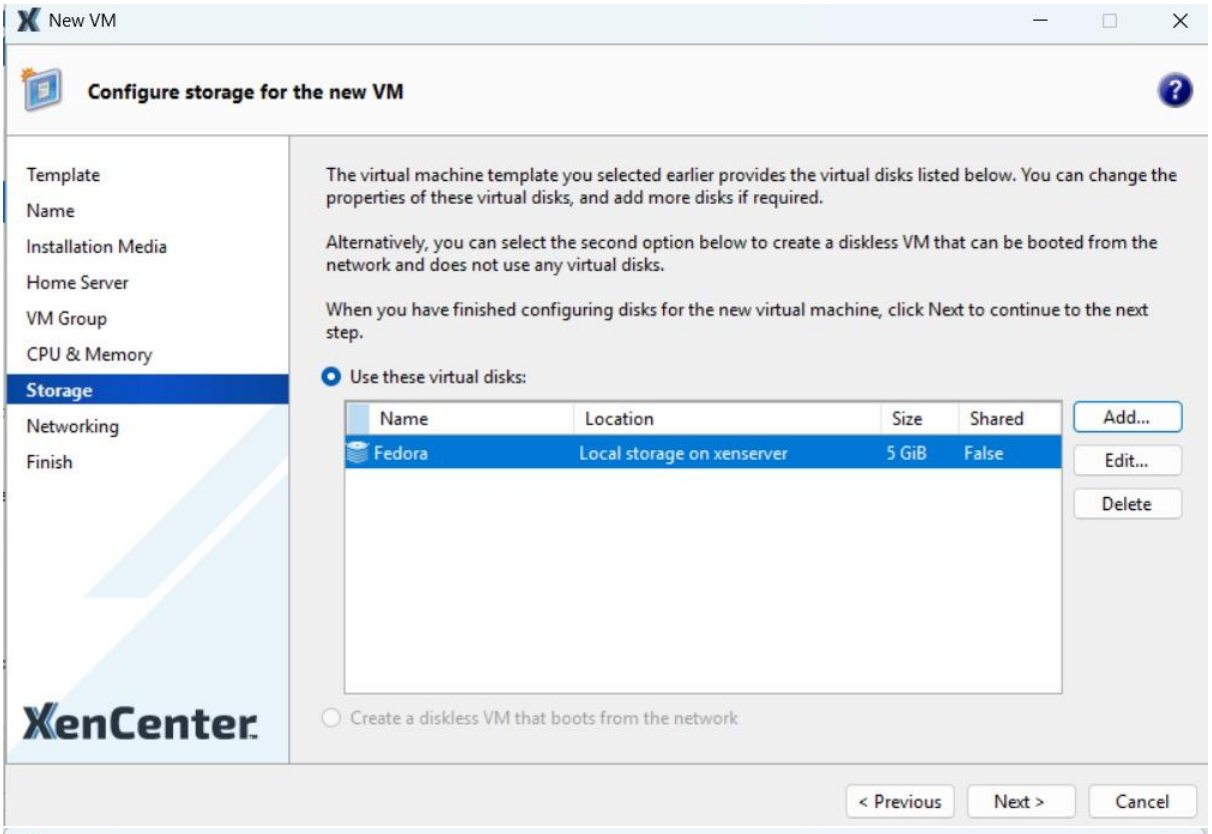
File View Pool Server VM Storage Templates Tools Help
Back Forward Add New Server New Pool New Storage New VM Shut Down Reboot Suspend
xenserver (Licensed with XenServer Trial Edition)
Logged in as: Local root account
New VM
Name the new virtual machine
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
Enter a name that will help you to identify the virtual machine later. This could be a name that describes its software and hardware such as RHEL DHCP Server. This name will also be displayed in XenCenter's Resources pane and can be changed later.
You can also add a more detailed description of the VM, if you want.
Name: Fedora
Description:
XenCenter
< Previous Next > Cancel

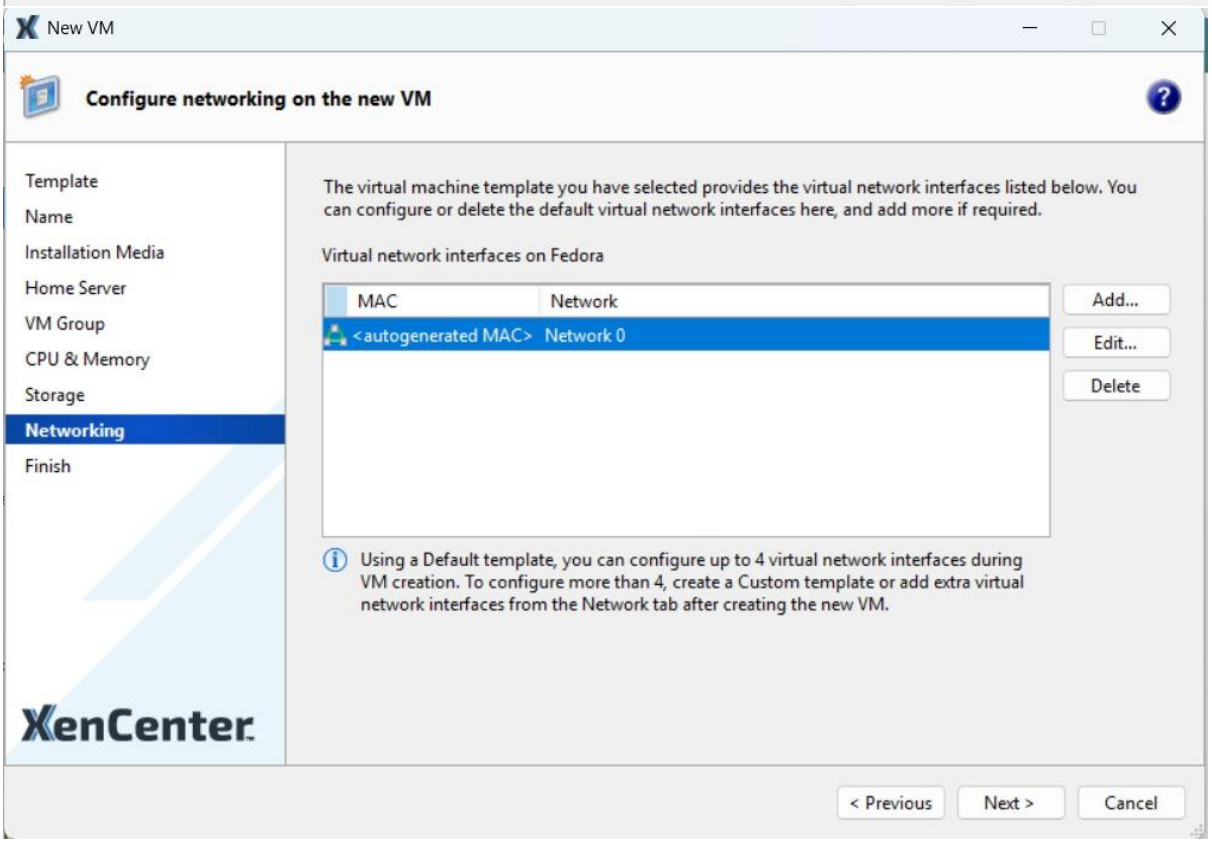

New VM
Locate the operating system installation media
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
Select the installation method for the operating system software you want to install on the new VM.
Install from ISO library or DVD drive:
DVD drive 0 on xenserver
New ISO library...
Boot from network
Boot Mode
BIOS Boot
UEFI Boot
UEFI Secure Boot
Device Security
Create and attach a new vTPM
TPM is supported only for VMs using the UEFI or UEFI secure boot modes.
XenCenter
< Previous
Next >
Cancel

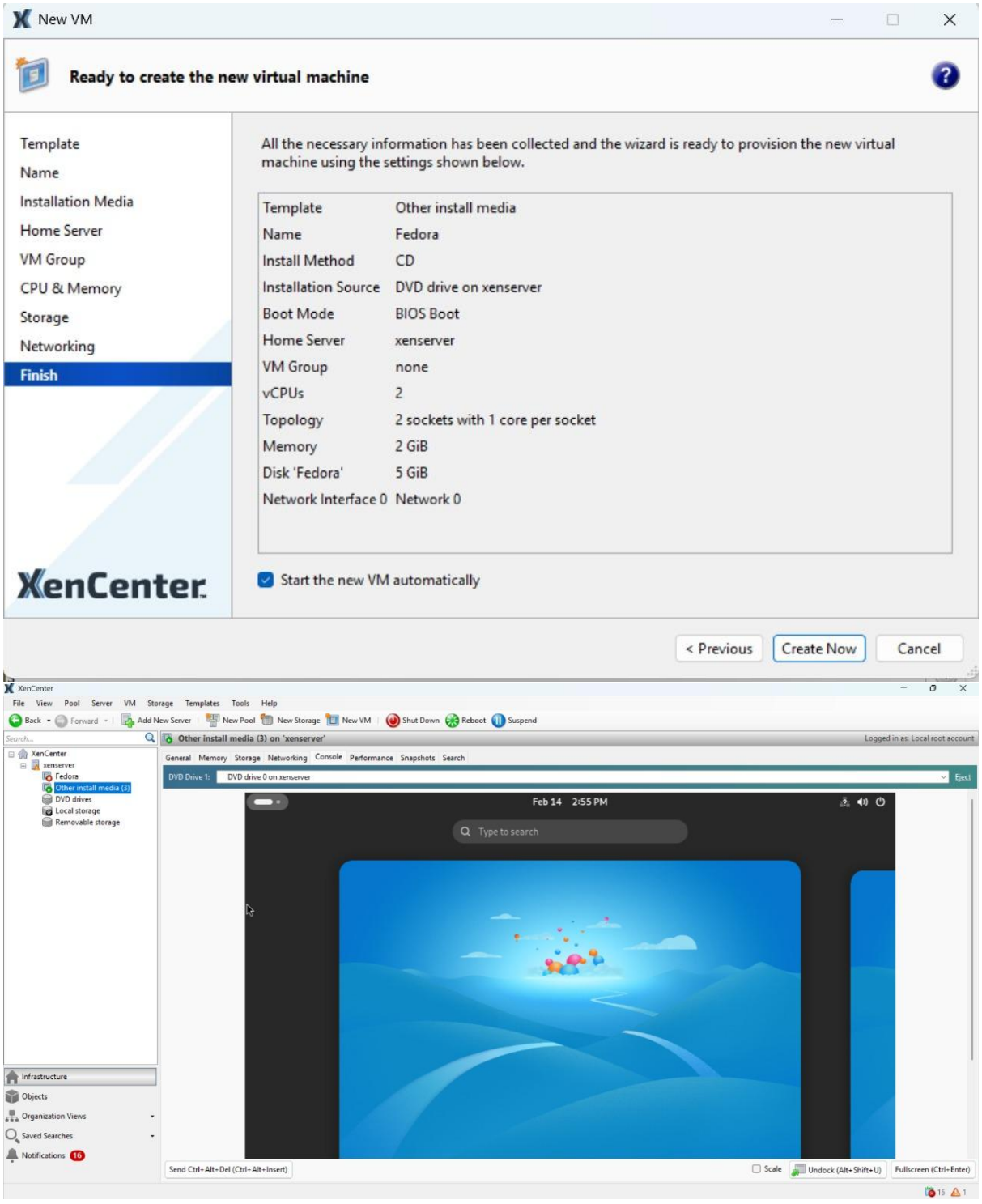

New VM
Select a home server
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
When you nominate a home server for a virtual machine, the virtual machine will always be started up on that server if it is available. If this is not possible, then an alternate server within the same pool will be selected automatically.
Don't assign this VM a home server. The VM will be started on any server with the necessary resources. (Shared storage required).
Place the VM on this server:
Host Name
Notes
xenserver
2.7 GiB RAM available (4.2 GiB total)
XenCenter
< Previous
Next >
Cancel


New VM
Select a VM group
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
When you nominate a VM group for a virtual machine, virtual machines in the same group will be subject to the same placement policy across the pool servers.
Don't assign this VM a group.
Place the VM in this group:
Name
Placement
New VM group...
XenCenter
< Previous
Next >
Cancel


New VM
Allocate processor and memory resources
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
Specify the number of vCPUs, their topology, and the amount of memory that will be allocated to the new virtual machine.
Number of vCPUs:
2
Topology:
2 sockets with 1 core per socket
Memory:
2048
MiB
(min = 128 MiB, max = 128 GiB)
XenCenter
< Previous
Next >
Cancel


New VM
Configure storage for the new VM
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
The virtual machine template you selected earlier provides the virtual disks listed below. You can change the properties of these virtual disks, and add more disks if required.
Alternatively, you can select the second option below to create a diskless VM that can be booted from the network and does not use any virtual disks.
When you have finished configuring disks for the new virtual machine, click Next to continue to the next step.
Use these virtual disks:
Name
Location
Size
Shared
Fedora
Local storage on xenserver
5 GiB
False
Add...
Edit...
Delete
Create a diskless VM that boots from the network
XenCenter
< Previous
Next >
Cancel


New VM
Configure networking on the new VM
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
The virtual machine template you have selected provides the virtual network interfaces listed below. You can configure or delete the default virtual network interfaces here, and add more if required.
Virtual network interfaces on Fedora
MAC
Network
<autogenerated MAC>
Network 0
Add...
Edit...
Delete
Using a Default template, you can configure up to 4 virtual network interfaces during VM creation. To configure more than 4, create a Custom template or add extra virtual network interfaces from the Network tab after creating the new VM.
XenCenter
< Previous
Next >
Cancel


New VM
Ready to create the new virtual machine
Template
Name
Installation Media
Home Server
VM Group
CPU & Memory
Storage
Networking
Finish
All the necessary information has been collected and the wizard is ready to provision the new virtual machine using the settings shown below.
Template Other install media
Name Fedora
Install Method CD
Installation Source DVD drive on xenserver
Boot Mode BIOS Boot
Home Server xenserver
VM Group none
vCPUs 2
Topology 2 sockets with 1 core per socket
Memory 2 GiB
Disk 'Fedora' 5 GiB
Network Interface 0 Network 0
XenCenter
Start the new VM automatically
< Previous
Create Now
Cancel
Feb 14 2:55 PM
Type to search

9913 Mark Lopes
TE comps A

Exp 2 - Postlab.

Q.1

→ Importance of VM isolation:-

1. Security:-
Prevents 1 VM from accessing or interfering with another.
If an attacks happens on 1 VM, it wont escape that VM

2. Stability:-
A crash in one VM does not impact other VM's.

3. Data privacy:-
Ensures data privacy between VM's.

How isolation is achieved:-

1. Hypervisor:-
The hypervisor isolates VM memory, CPU.

2. Network segmentation:-
Virtual LAN's (VLANs) also isolate VM traffic.

Q.2

1. Server Virtualization :-

i) Primary function :-
Abstracts physical servers into multiple VM's running on a single host.

ii) Benefits :-
Higher resource utilization
Cost savings on hardware
Simplifies disaster recovery.

iii) Common use cases :-
Cloud computing (AWS, Azure)
Data centers

2. Network virtualization :-

i) Primary function :-
Abstracts network resources to create virtual networks independent of physical hardware.

ii) Benefits :-
Greater flexibility and scalability.
Enhanced security with segmentation.
Optimized traffic management.

iii) Common - use cases :-
SDN, VPN.

3. Storage virtualization:-

i) Primary Function:-
Combines multiple storage devices into a single storage pool.

ii) Benefits:-
Better storage utilization.
Disaster recovery.
Simplifies management.

iii) Common use case.
Cloud storage (Amazon S3)
Storage Area network (SAN)

4. Desktop virtualization:-

i) Primary Function:-
Runs user desktop as VM's on a central server and can be accessible remotely.

ii) Benefits:-
Centralized management
Remote access.

iii) Common use cases:-
Remote work environments.