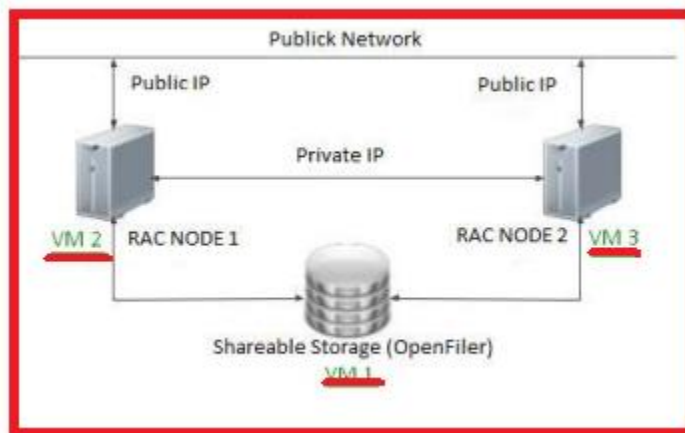


# Oracle 11gR2 RAC Installation on Oracle Linux 6.5 with VMware Workstation 16 pro (Using OPENFILER 2.99)

## Introduction:

One of the biggest obstacles preventing people from setting up test RAC environments is the requirement for shared storage. In a production environment, shared storage is often provided by a SAN or high-end NAS device, but both options are very expensive when all you want to do is get some experience installing and using RAC. A cheaper alternative is to use an open file as shared storage, overcoming the obstacle of expensive shared storage. Now, Using VMware workstation pro you can run multiple Virtual Machines (VMs) on a single server, allowing you to run both RAC nodes on a single machine. I am installing this configuration over my machine which has processor: core i3, Memory: 8GB and SSD 256 GB.



In this article we will be installing 2 node 11gR2 RAC on Oracle Linux 6.5. We will be looking at the steps below.

- Configure Openfiler (VM1)
- Configure Virtual machine for Node 1 (VM2)
- Configure Virtual machine for Node 2 (VM 3)
- OS prerequisites on all nodes
- Setup public & private network
- Configure shared storage
- Oracle Grid Installation
- Oracle RAC software installation
- Create RAC Database

## We need to download Software:

Download the following software for 64 bit.

1. Oracle Linux Server 6.10
  - V37084-01.iso
2. Oracle Database 11g Release 2 (11.2.0.3.0), Grid Infrastructure
  - p10404530\_112030\_Linux-x86-64\_1of7.zip
  - p10404530\_112030\_Linux-x86-64\_2of7.zip
  - p10404530\_112030\_Linux-x86-64\_3of7-Clusterware.zip
3. Open Filer Version 2.99.1
  - openfileresa-2.99.1-x86\_64-disc1.iso
4. RPM's
  - oracleasm-lib-2.0.4-1.el6.x86\_64.rpm
  - elfutils-libelf-devel-static-0.164-2.el6.x86\_64.rpm

## Overview of Linux Servers:

VM Linux Servers are configured as follows

Nodes	RAC NODE 1	RAC NODE 2	OPENFILER(STORAGE)
Hostname	RAC1.domain	RAC2.domain	Openfiler.mydomain
Instance Name	racdb1	racdb2	
Database Name	racdb	racdb	
Operation System	OEL_6.10-(x86-64)	OEL_6.10-(x86-64)	Openfiler-2.99.1-x86-64
Public-IP	IPADDR=192.168.120.11 NETMASK=255.255.255.0 GATEWAY=192.168.120.254 DNS1=8.8.8.8 DNS2=8.8.4.4	IPADDR=192.168.120.12 NETMASK=255.255.255.0 GATEWAY=192.168.120.254 DNS1=8.8.8.8 DNS2=8.8.4.4	IPADDR=192.168.120.10 NETMASK=255.255.255.0 GATEWAY=192.168.120.254 DNS1=8.8.8.8 DNS2=8.8.4.4
Private-IP	IPADDR=10.0.1.11 NETMASK=255.255.255.0 GATEWAY=192.168.120.254 DNS1=8.8.8.8 DNS2=8.8.4.4	IPADDR=10.0.1.11 NETMASK=255.255.255.0 GATEWAY=192.168.120.254 DNS1=8.8.8.8 DNS2=8.8.4.4	
Virtual-IP	192.168.120.13	192.168.120.14	
SCAN-IP	192.168.120.15 192.168.120.16 192.168.120.17	192.168.120.15 192.168.120.16 192.168.120.17	

## Oracle Software Components

Software Component	OS User	Primary Group	Supplementary Groups
Grid Infrastructure	grid	oinstall	asmadmin, asmdba, asmoper
Oracle RAC	oracle	oinstall	dba, oper, asmdba

## Storage Component

Storage Component	File System	Volume Size	ASM Volume Group Name	Openfiler Volume Name
OCR/Voting Disk	ASM	20GB	+CRS	crs
Database Files	ASM	40GB	+DATA	data1
Fast Recovery Area	ASM	25GB	+FRA	fra1

## Installation Steps of Openfiler (VM 1):

This section provides the screens used to install the Openfiler software. For the purpose of this article, I opted to install Openfiler with all default options. The only manual change required was for configuring the local network settings and rest of the configuration using web link with default username is openfiler and password is password.

### 1. Configure Virtual Network Editor IP

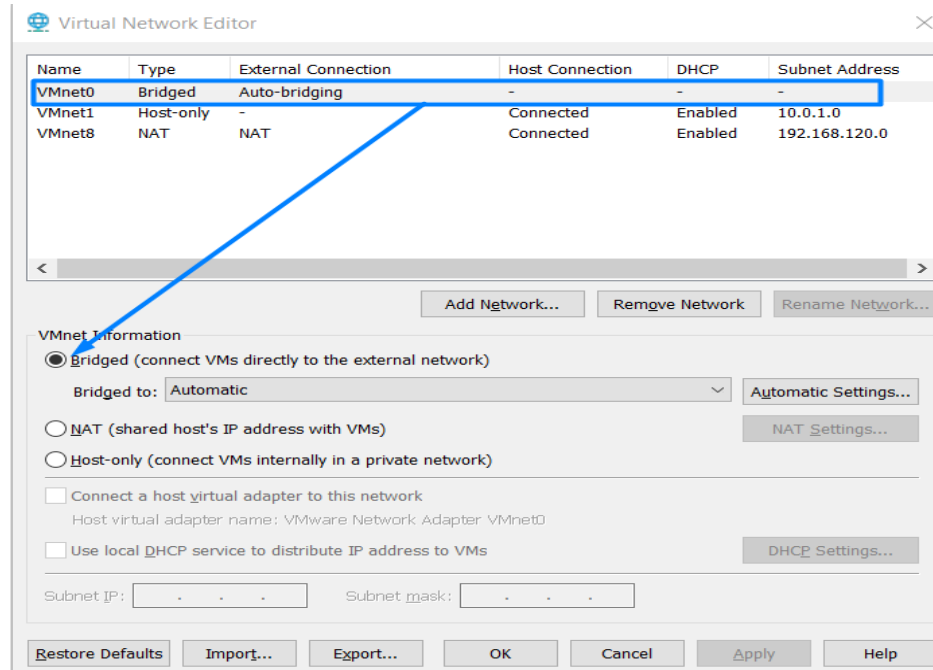
#### 1.1. Edit => Virtual Network Editor



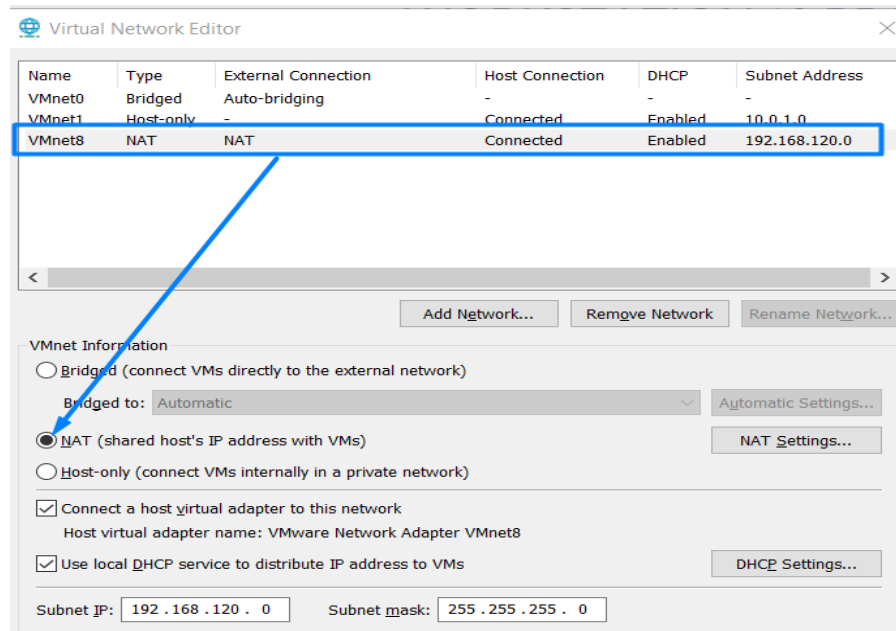
#### 1.2 Initializing virtual networks



### 1.3. VMnet0 => Bridged => Automatic



### 1.4. VMnet8=> NAT => DHCP



### 1.5. VMnet8 => NAT => DHCP Setting

DHCP Settings

Network: vmnet8

Subnet IP: 192.168.120.0

Subnet mask: 255.255.255.0

Starting IP address: 192.168.120.8

Ending IP address: 192.168.120.250

Broadcast address: 192.168.120.255

Days: 0 Hours: 0 Minutes: 30

Default lease time: 0 0 30

Max lease time: 0 2 0

OK Cancel Help

☐ Host-only (connect VMs internally in a private network)

☒ Connect a host virtual adapter to this network  
Host virtual adapter name: VMware Network Adapter VMnet8

☒ Use local DHCP service to distribute IP address to VMs

Subnet IP: 192.168.120.0 Subnet mask: 255.255.255.0

### 1.6. Vmnet1=>Host Only =>DHCP

Virtual Network Editor

Name	Type	External Connection	Host Connection	DHCP	Subnet Address
VMnet0	Bridged	Auto-bridging	-	-	-
VMnet1	Host-only	-	Connected	Enabled	10.0.1.0
VMnet8	NAT	NAT	Connected	Enabled	192.168.87.0

Add Network... Remove Network Rename Network...

VMnet Information

☐ Bridged (connect VMs directly to the external network)  
Bridged to: Automatic Automatic Settings...

☐ NAT (shared host's IP address with VMs)  
NAT Settings...

☒ Host-only (connect VMs internally in a private network)

☒ Connect a host virtual adapter to this network  
Host virtual adapter name: VMware Network Adapter VMnet1

☒ Use local DHCP service to distribute IP address to VMs  
DHCP Settings...

Subnet IP: 10.0.1.0 Subnet mask: 255.255.255.0

Restore Defaults Import... Export... OK Cancel Apply Help

### 1.7. VMnet8 => Host Only => DHCP Setting

Network: vmnet1

Subnet IP: 10.0.1.0

Subnet mask: 255.255.255.0

Starting IP address: 10 . 0 . 1 . 3

Ending IP address: 10 . 0 . 1 . 250

Broadcast address: 10.0.1.255

Default lease time: Days: 0 Hours: 0 Minutes: 30

Max lease time: Days: 0 Hours: 2 Minutes: 0

OK Cancel Help

### 1.8. Finley the Configuration looks like, Virtual Network Editor IP

Name	Type	External Connection	Host Connection	DHCP	Subnet Address
VMnet0	Bridged	Auto-bridging	-	-	-
VMnet1	Host-only	-	Connected	Enabled	10.0.1.0
VMnet8	NAT	NAT	Connected	Enabled	192.168.120.0

Add Network... Remove Network Rename Network...

VMnet Information

☐ Bridged (connect VMs directly to the external network)

Bridged to: Automatic Automatic Settings...

☐ NAT (shared host's IP address with VMs) NAT Settings...

☒ Host-only (connect VMs internally in a private network)

☒ Connect a host virtual adapter to this network

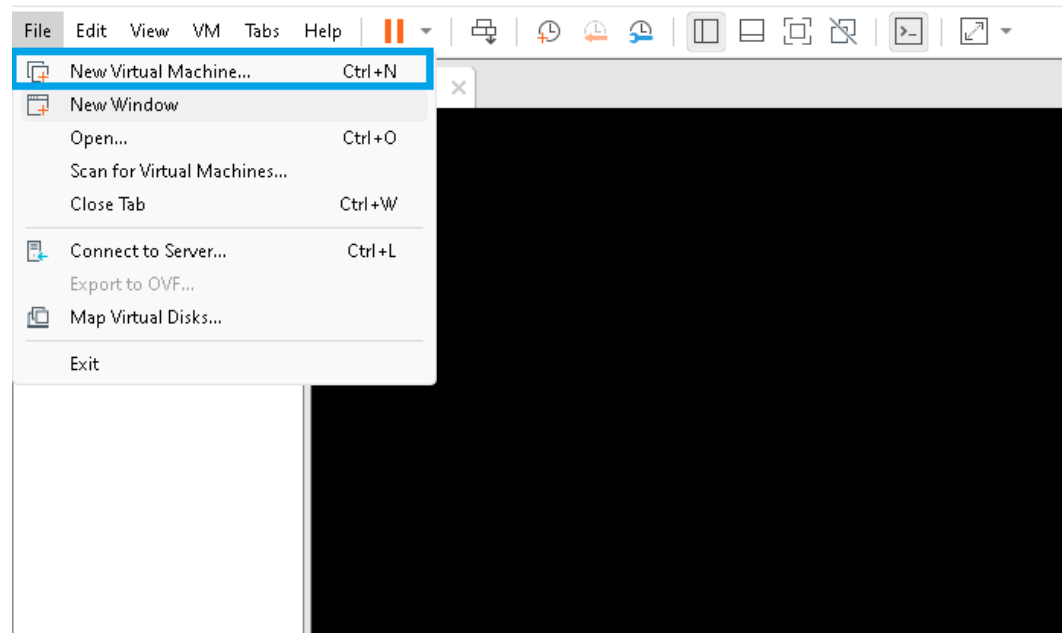
Host virtual adapter name: VMware Network Adapter VMnet1

☒ Use local DHCP service to distribute IP address to VMs DHCP Settings...

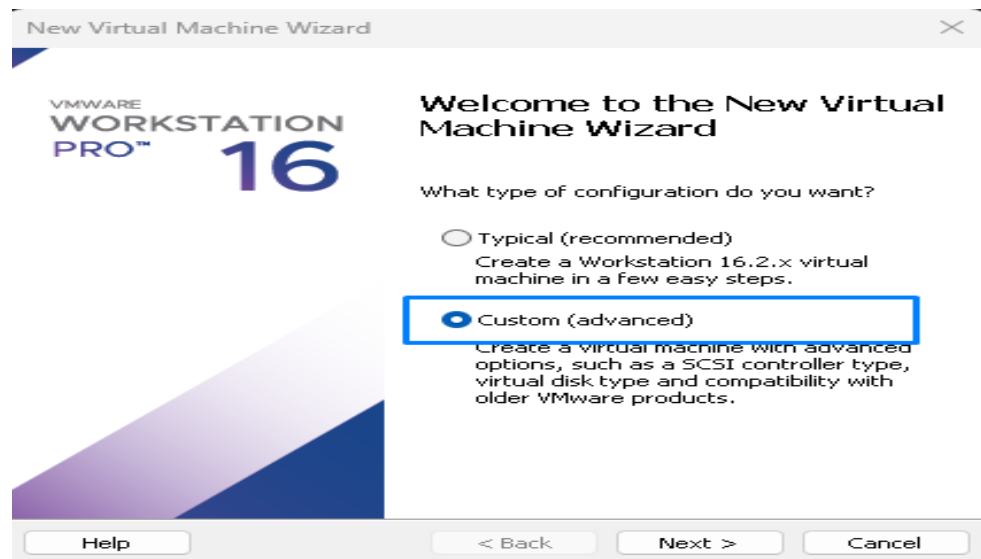
Subnet IP: 10 . 0 . 1 . 0 Subnet mask: 255 . 255 . 255 . 0

## 2. New VM Configuration for Openfiler

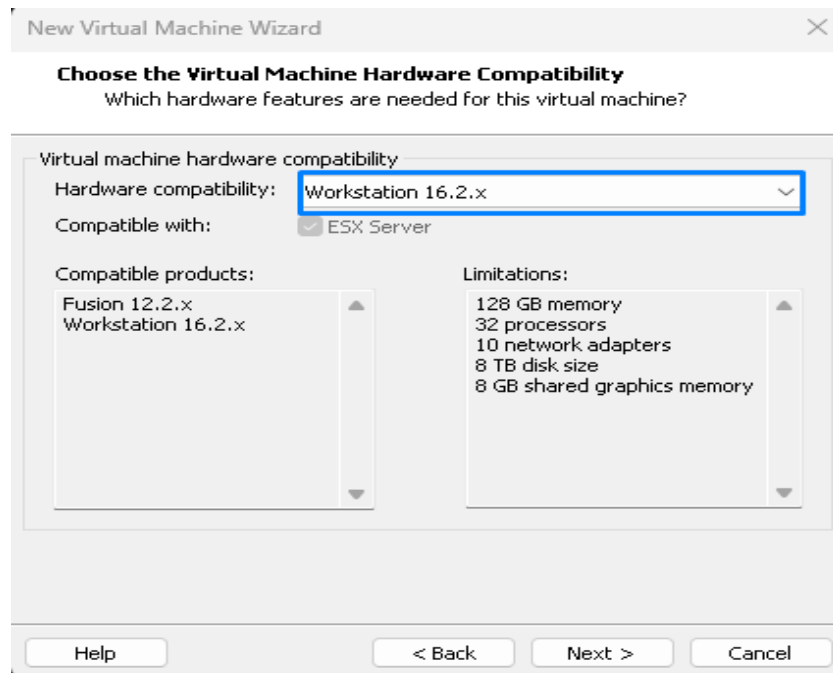
### 2.1. File => New Virtual Machine



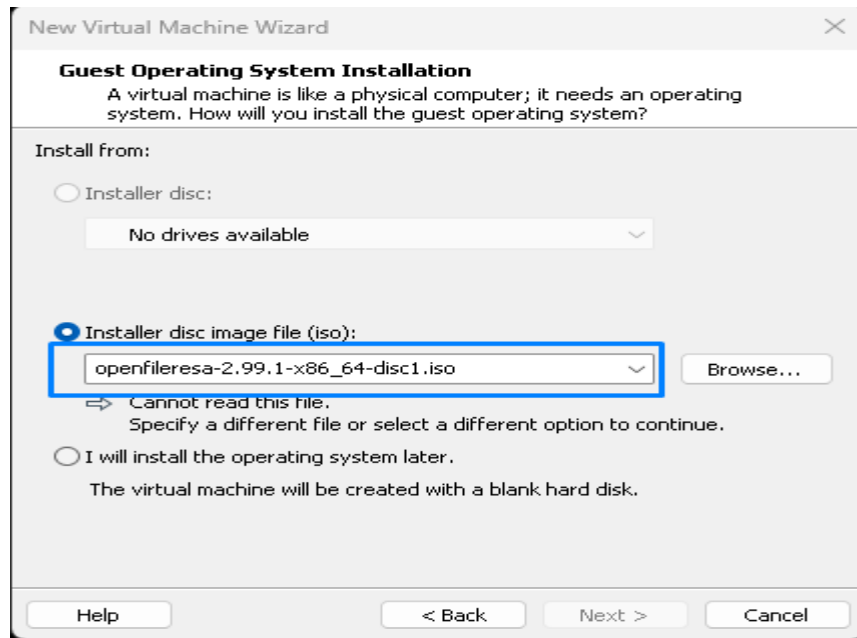
### 2.2. Choose Custom configuration.



### 2.3. Choose default Hardware compatibility

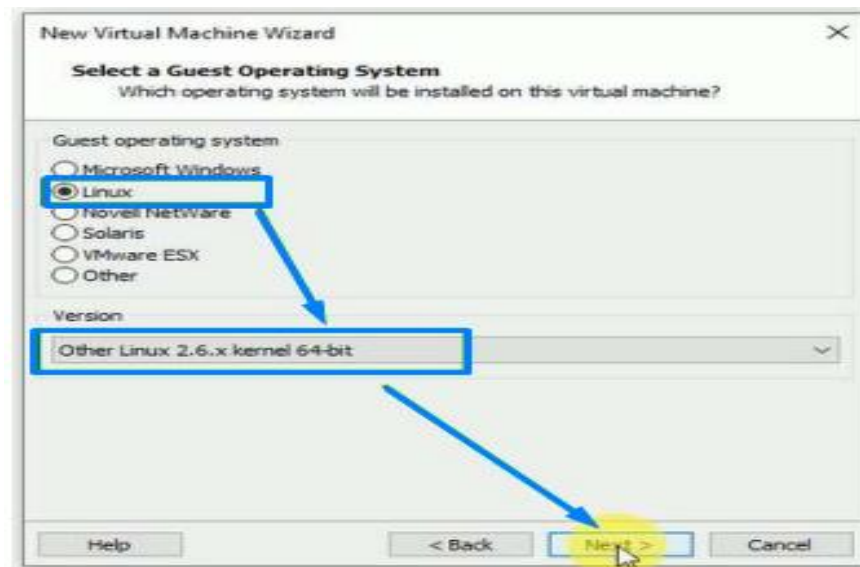


### 2.4. Choose Openfiler iso file (openfileresa-2.99.1-x86\_64-disc1.iso) using Browse

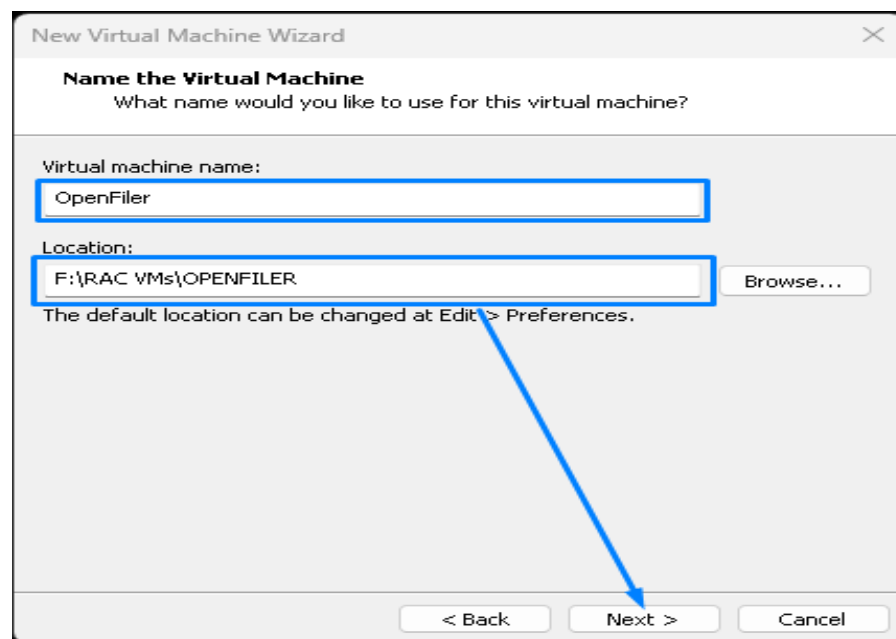




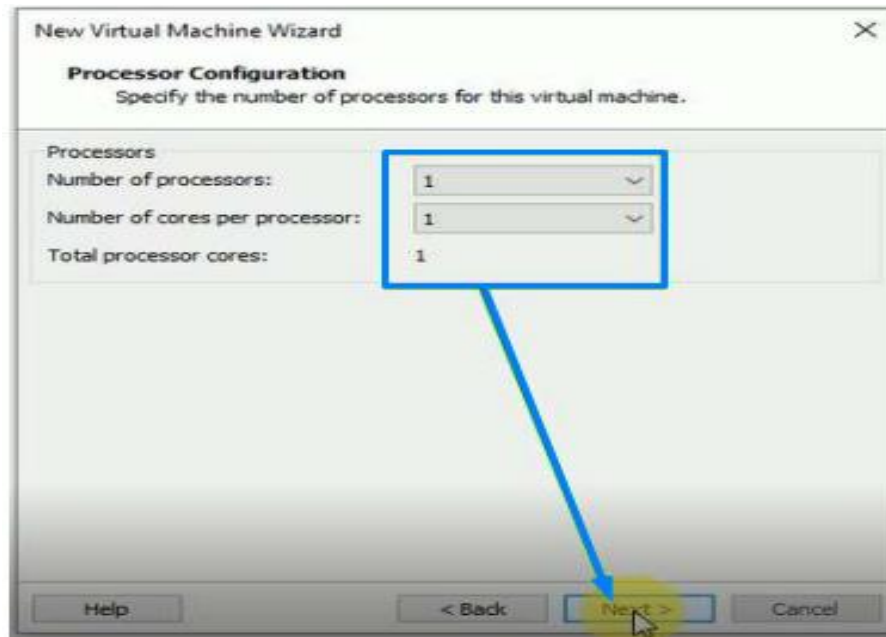
## 2.5. Choose OS and Version



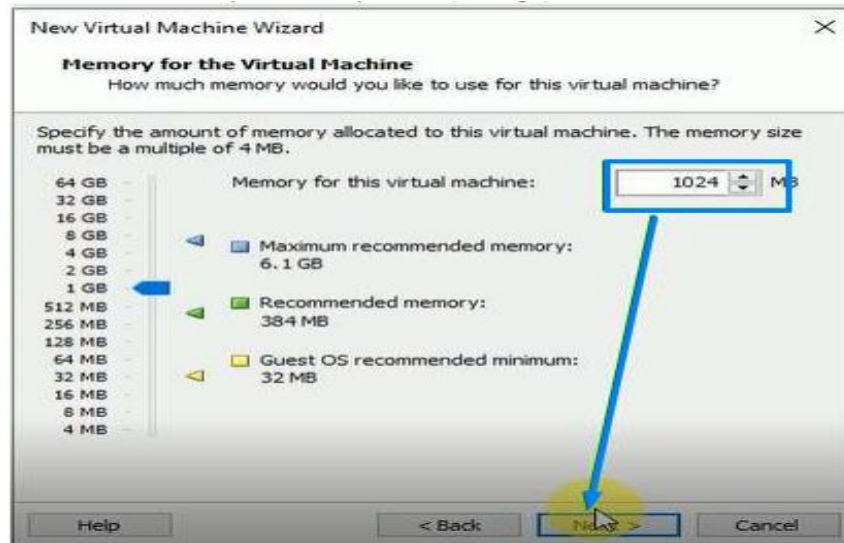
## 2.6. Provide VM Machine name and location where you want to store



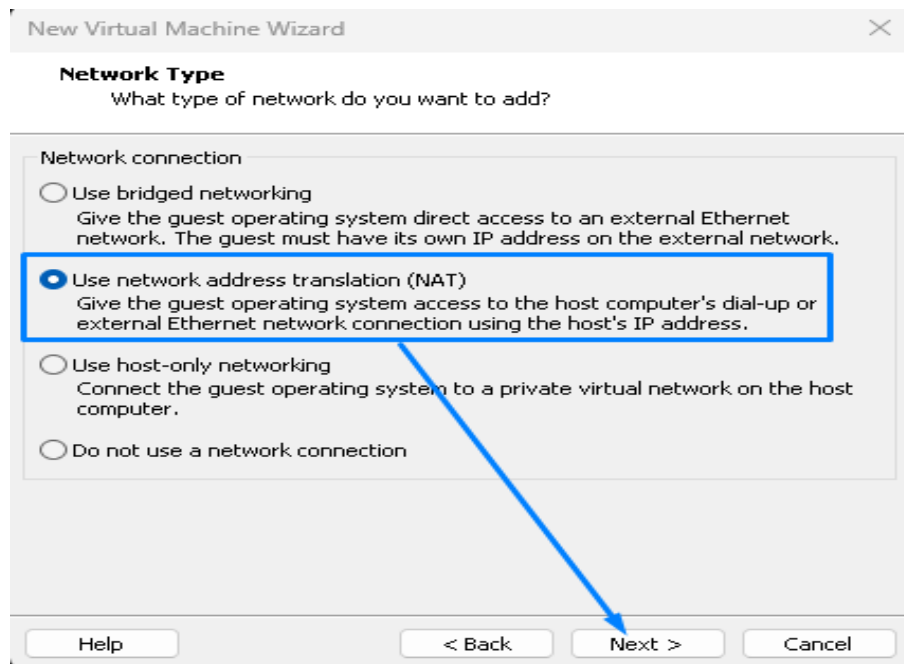
## 2.7. Select the processors and core as your machine



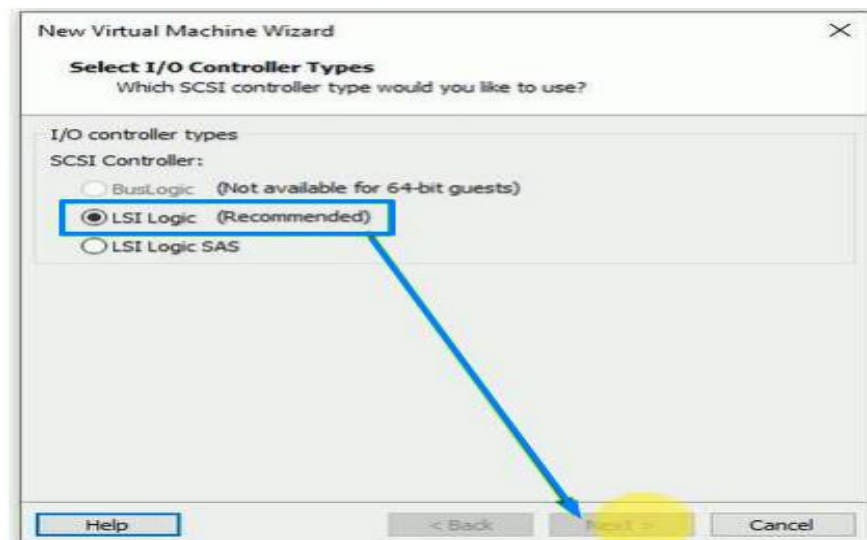
## 2.8. Put the memory 1GB for Openfiler (Storage)



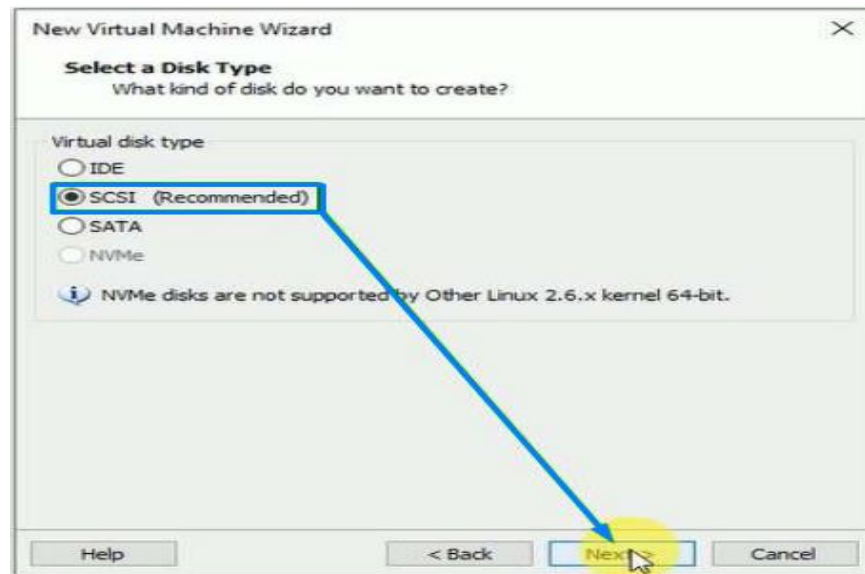
## 2.9. Choose NAT Network Connection



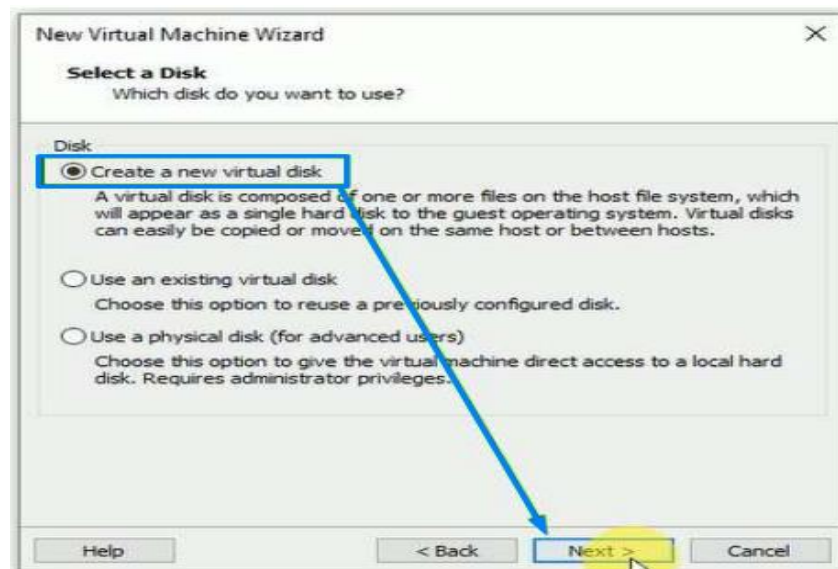
## 2.10. Select I/O Controller Type as LSI Logic



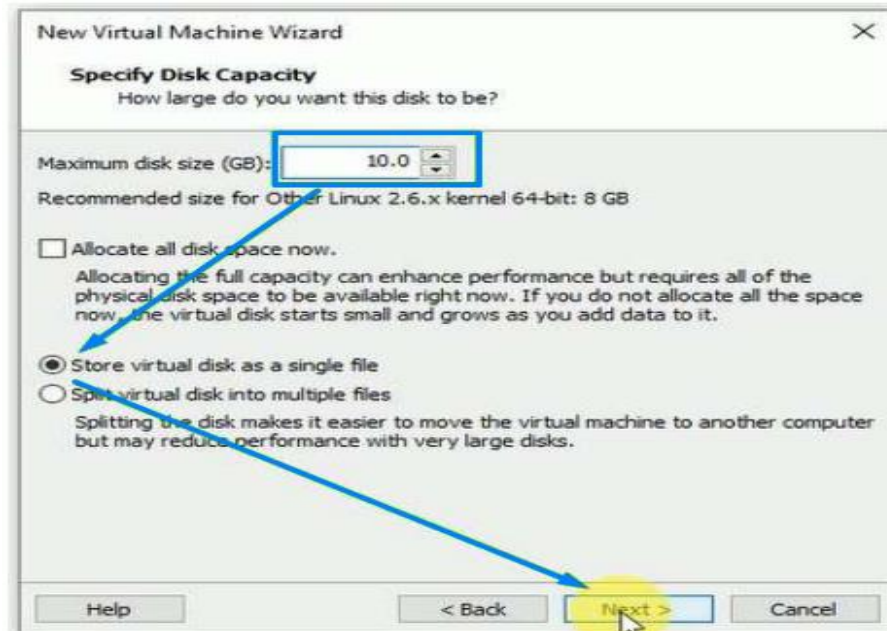
## 2.11. Select Disk Type as SCSI



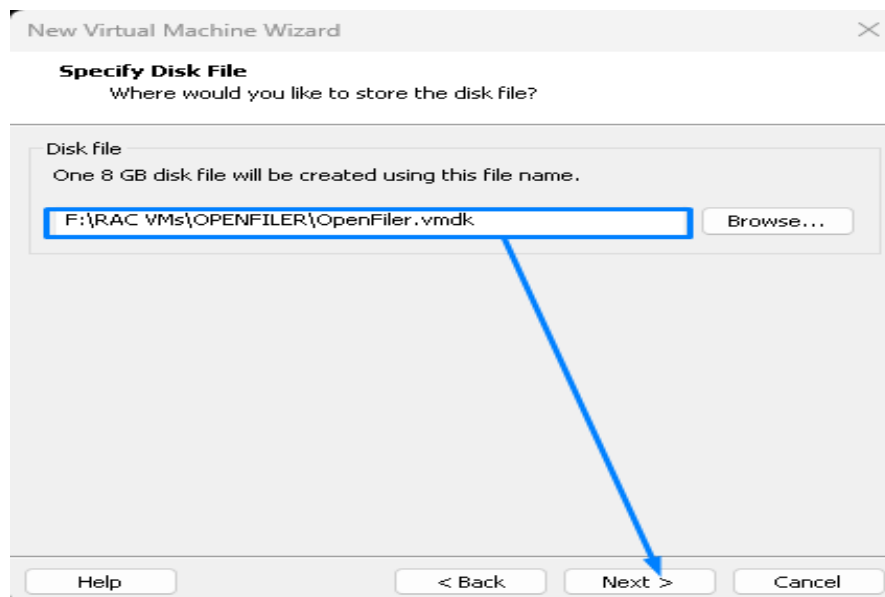
## 2.12. Create Disk to install Openfiler



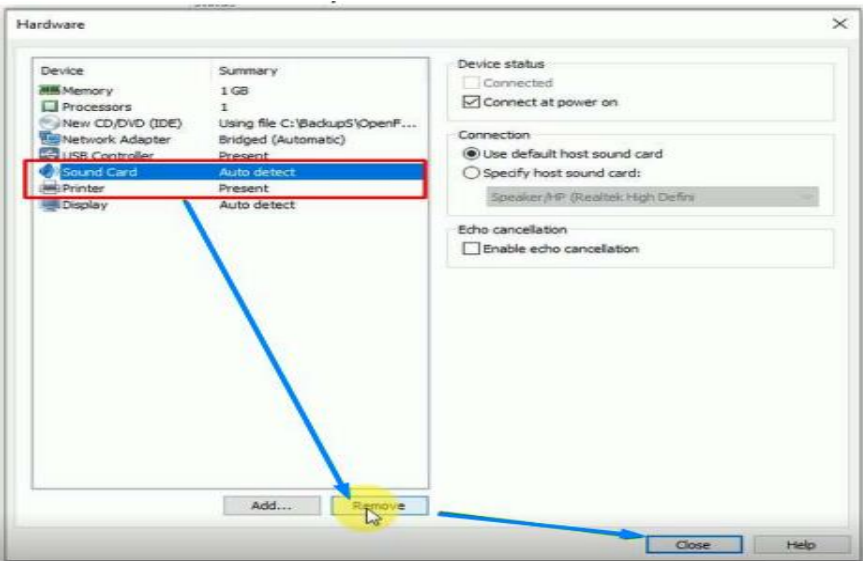
2.13. Put at list 10GB size to install Openfiler



2.14. Provide location of Openfiler disk file



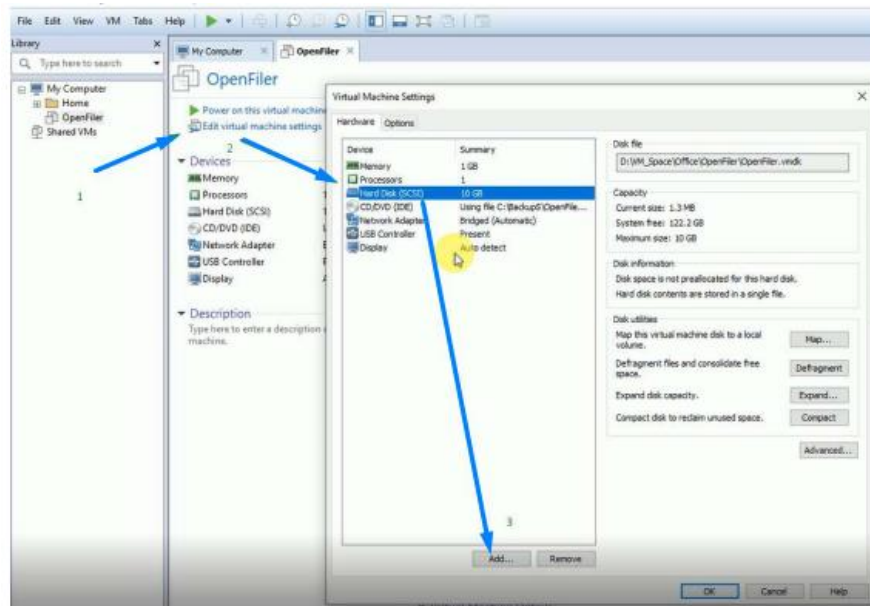
2.15. Remove the unnecessary drivers



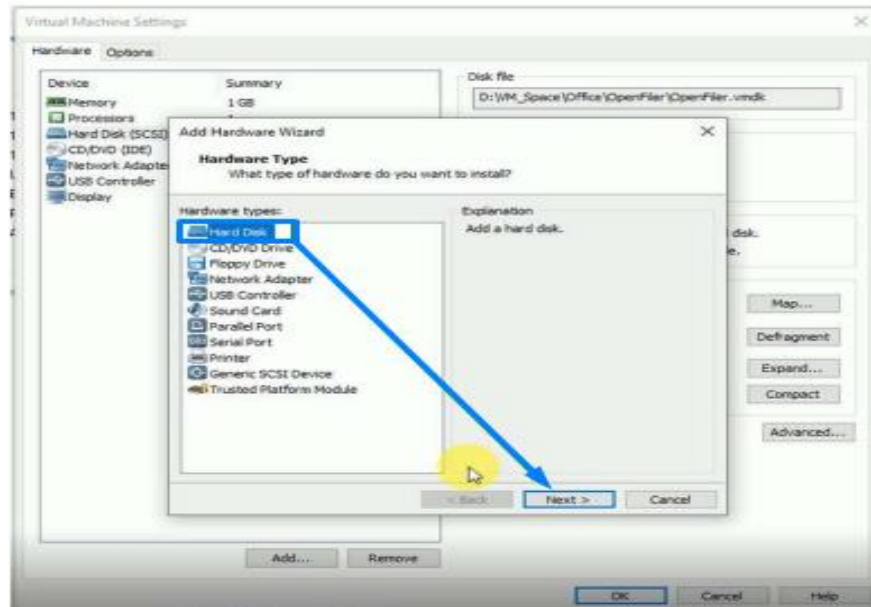
2.16. Verification of new VM machine

Device	Summary
Memory	1 GB
Processors	2
Hard Disk (SCSI)	10 GB
CD/DVD (IDE)	Using file C:\Program Files (x...
Network Adapter 2	NAT
USB Controller	Present
Display	Auto detect

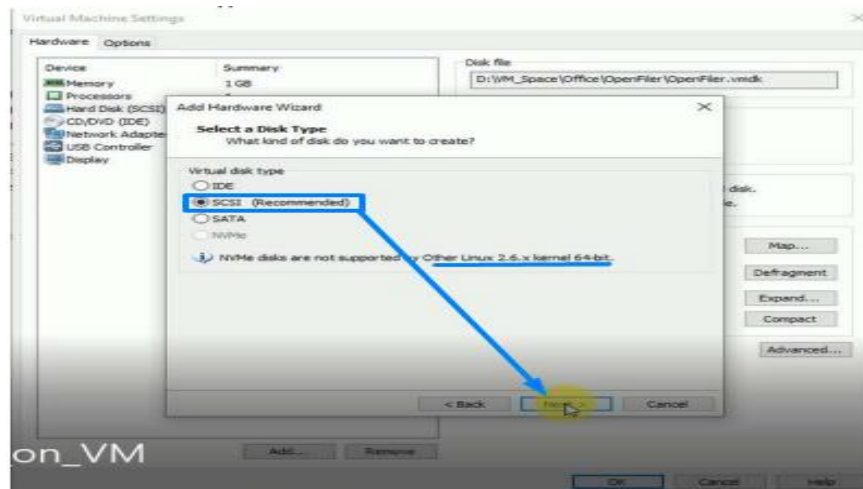
## 2.17. Adding Hard disk space to create OCR, DATA & FRA



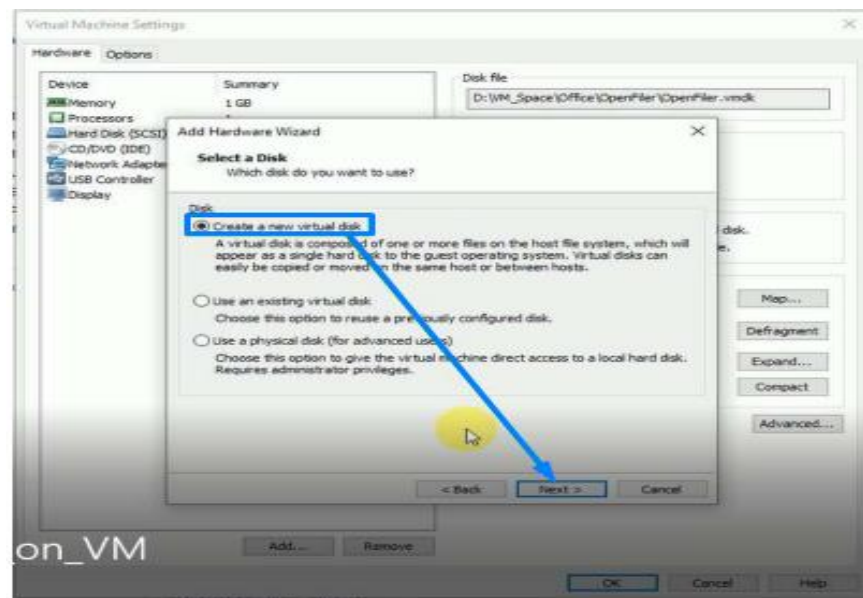
## 2.18. Run the VM Wizard to add hard disk



## 2.19. Select a disk type as SCSI

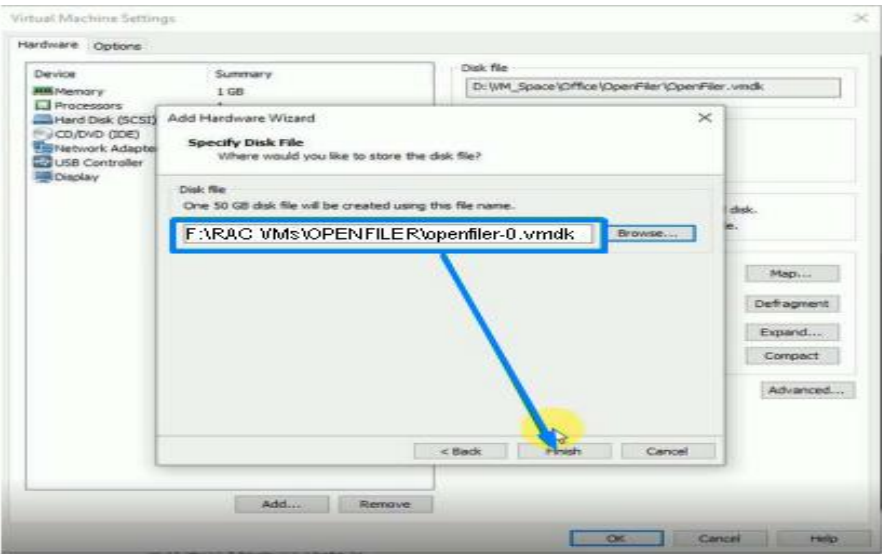


## 2.20. Select to Create a new virtual disk





2.21. Select to Create a new virtual disk 2.24. Provide location to store vm disk.

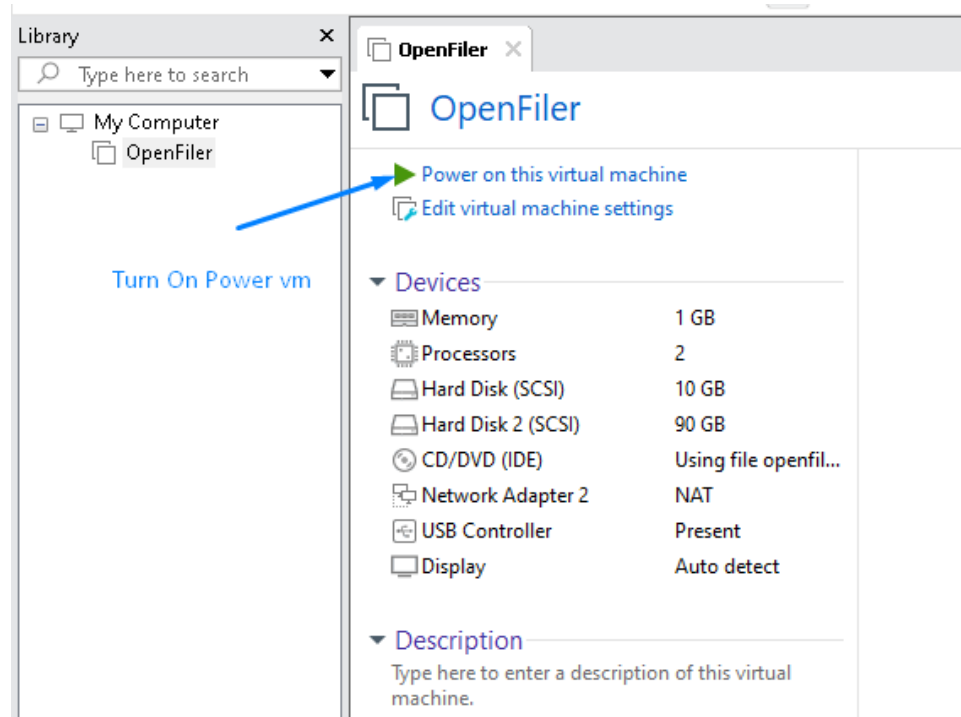


2.22. Verification of Openfiler Configuration

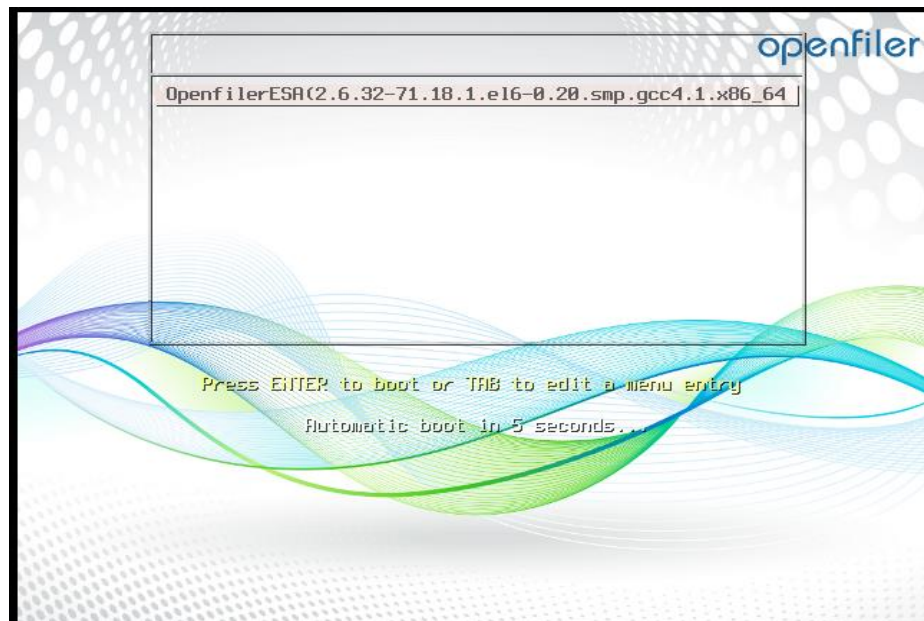
Device	Summary
Memory	1 GB
Processors	2
Hard Disk (SCSI)	10 GB
Hard Disk 2 (SCSI)	90 GB
CD/DVD (IDE)	Using file C:\Program Files (x...
Network Adapter 2	NAT
USB Controller	Present
Display	Auto detect

### 3. Installation of Openfiler over VM machine

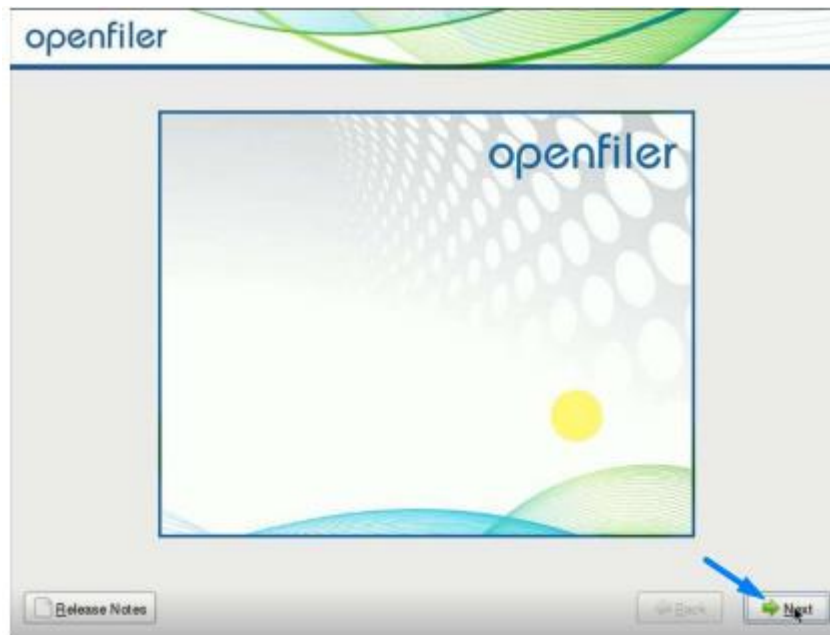
#### 3.1. Power on the Openfiler VM machine to install



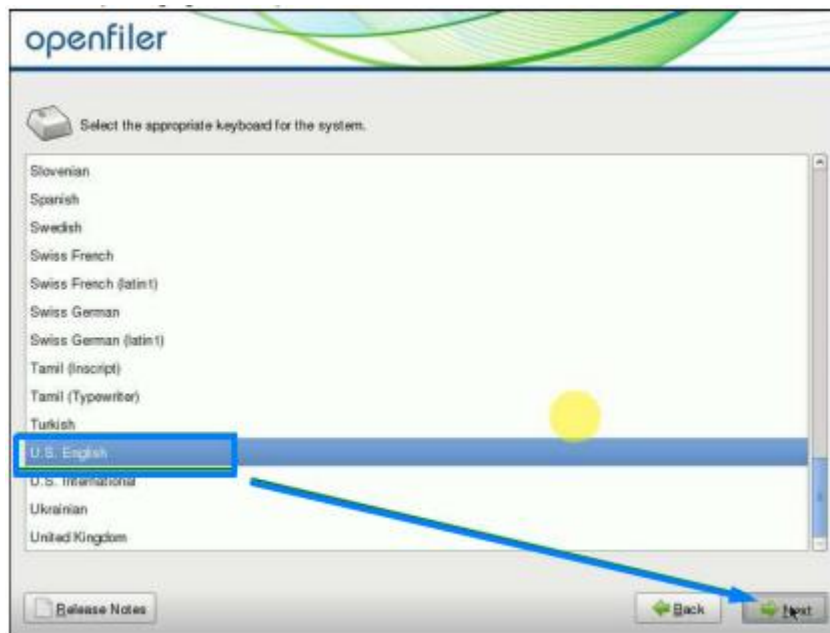
#### 3.2. Proceed to install openfiler by hitting Enter Key



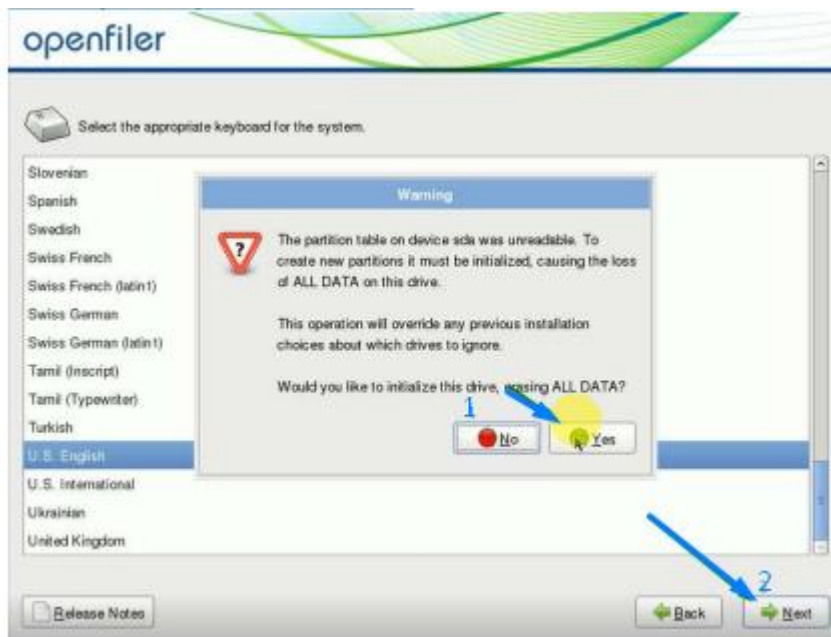
### 3.3. Proceed to Enter Next Button



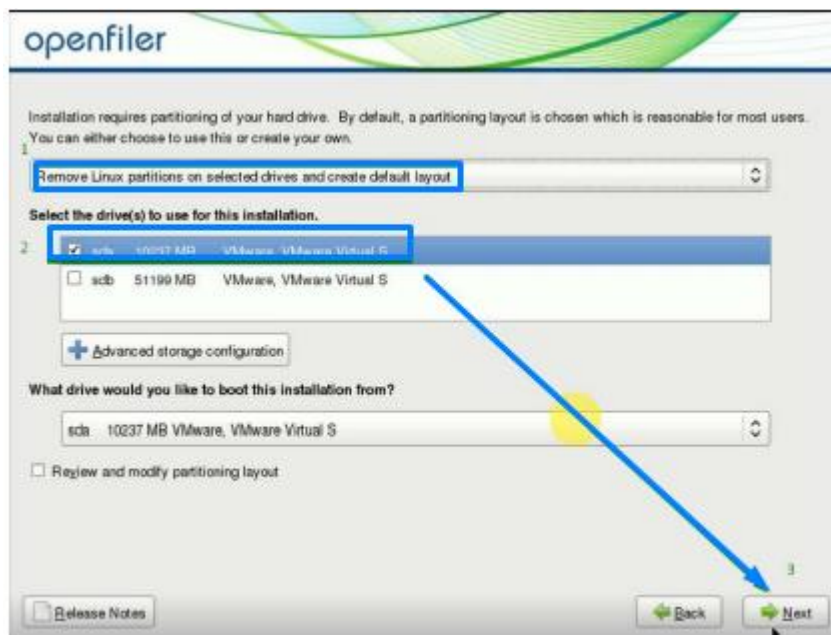
### 3.4. Choose your language and then proceed to Enter Next Button



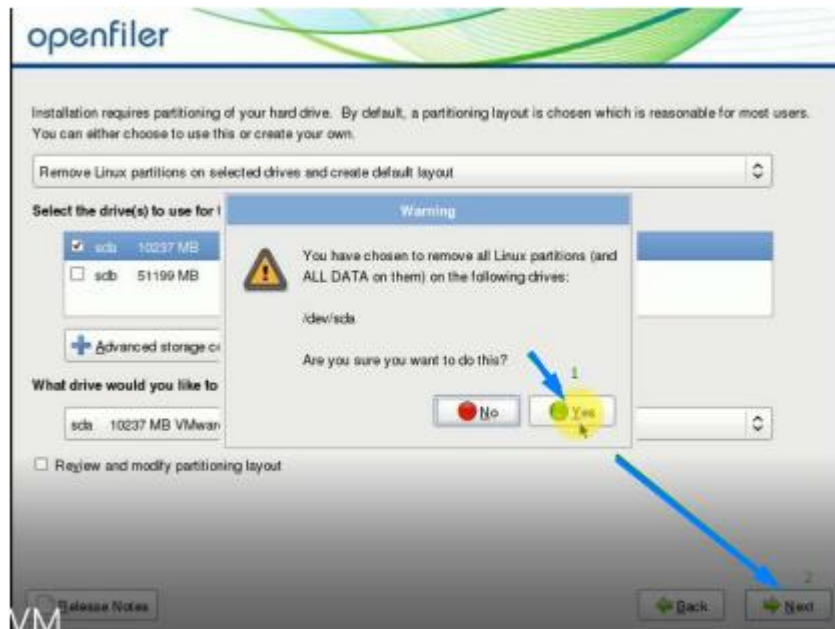
3.5. Click on yes and then proceed to Enter Next Button



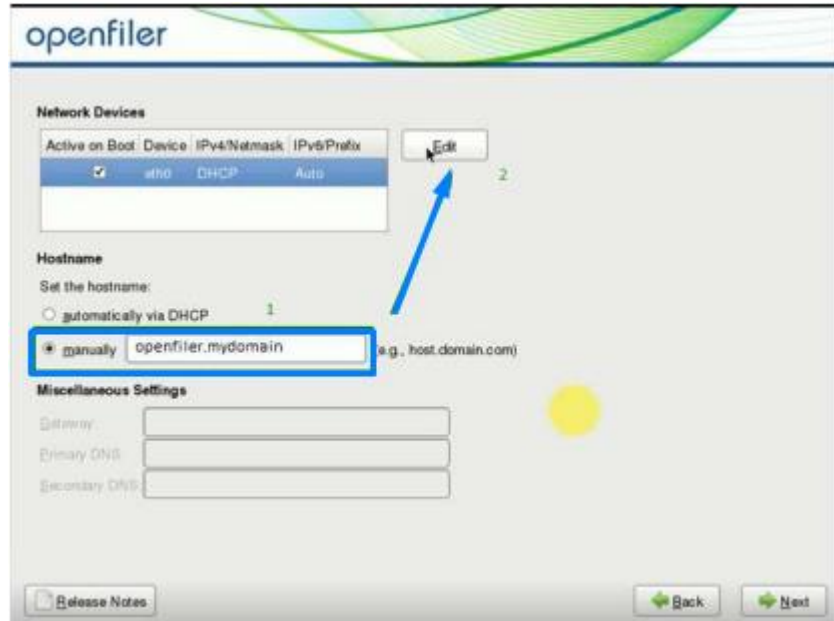
3.6. Choose storage, format option and then proceed to Enter Next Button



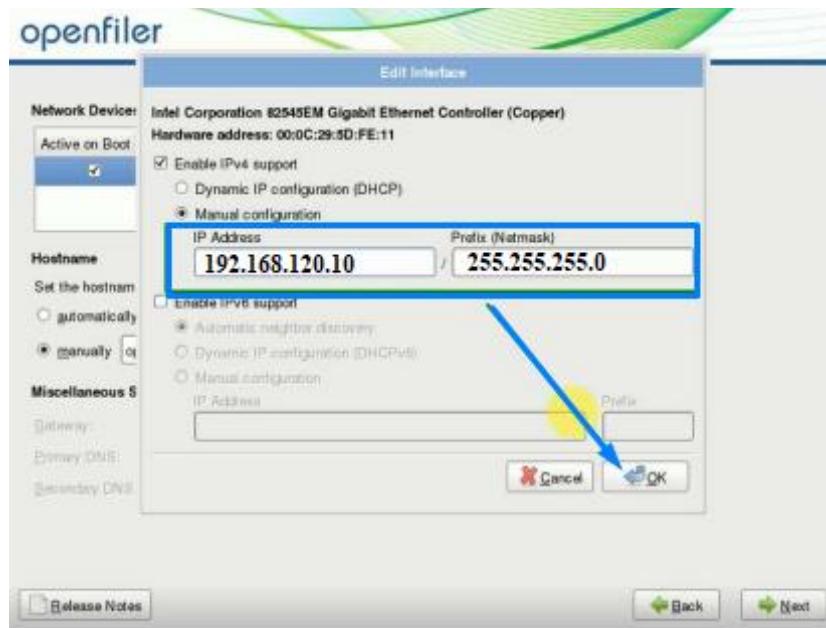
### 3.7. Click on yes button and then proceed to Enter Next Button



### 3.8. Enter your hostname and click on edit button to set your network



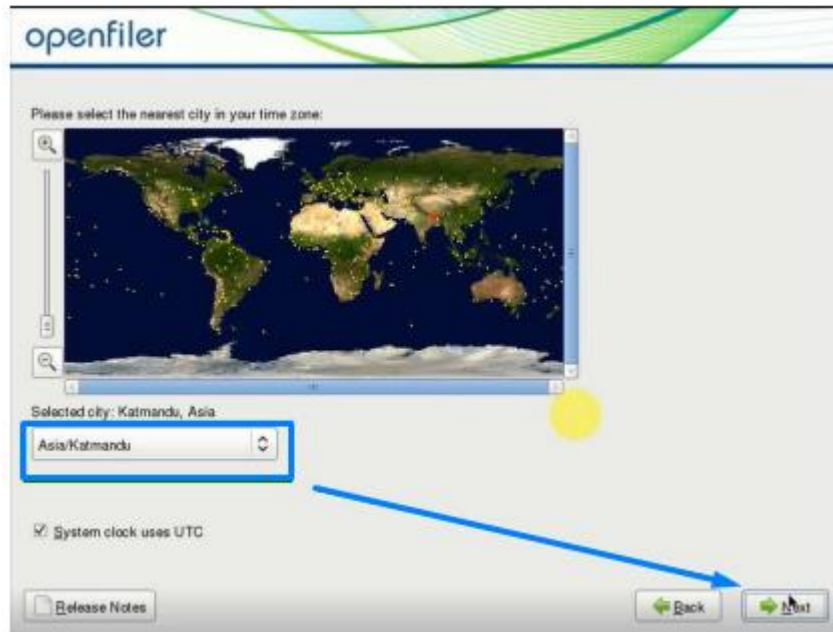
### 3.9. Set eth0 manual IP and then enter ok button



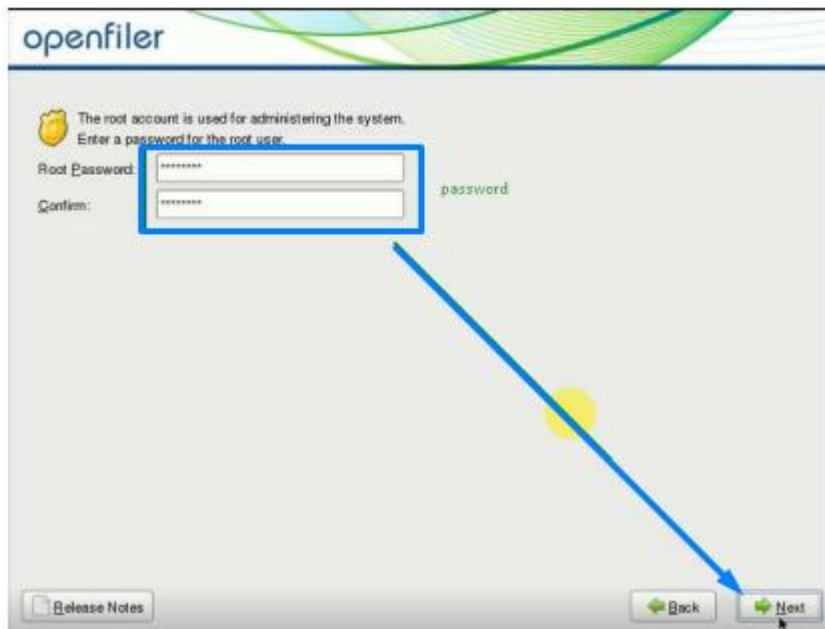
### 3.10. Skip when Gateway, Primary DNS and Secondary DNS IP asked and then enter ok button



3.11. Choose your city and then enter ok button

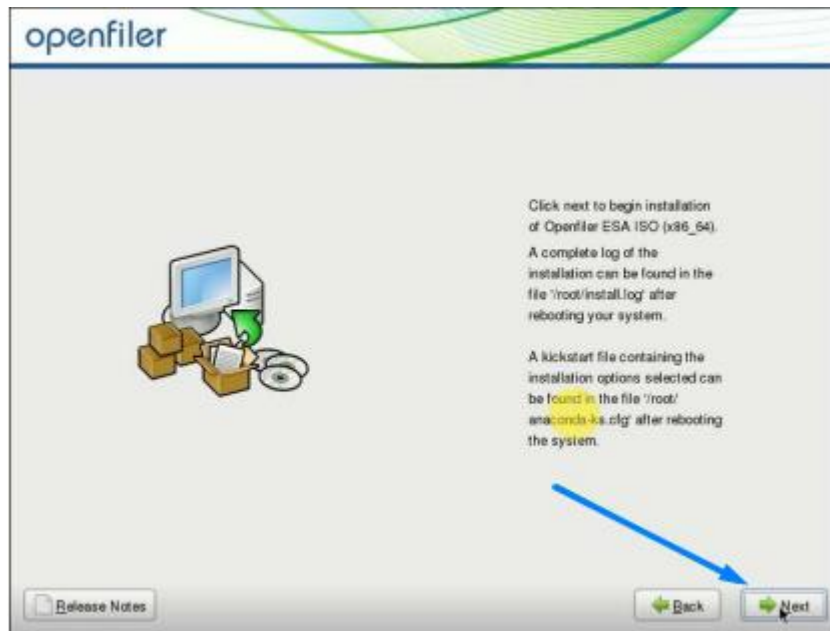


3.12. Set your root password for openfiler and then enter ok button





### 3.13. Proceed to enter ok button

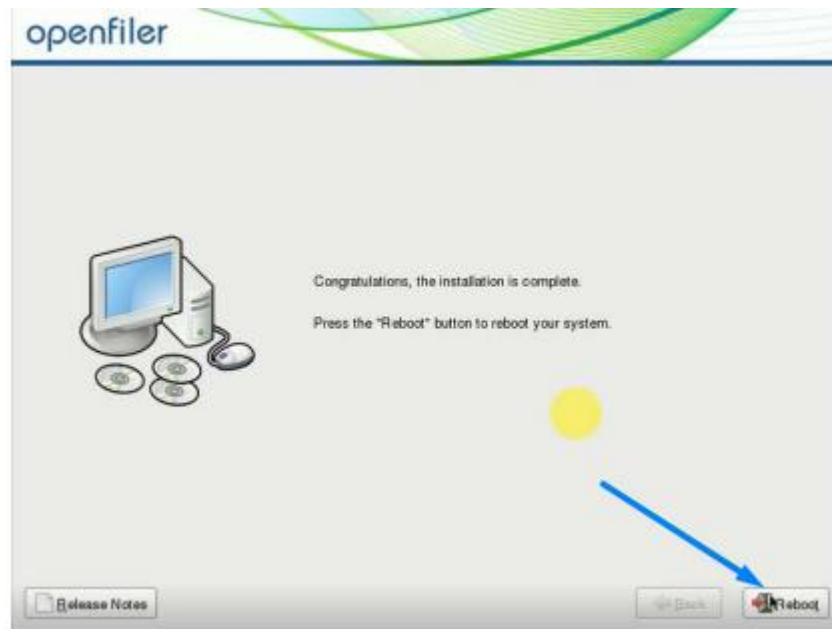


### 3.14. Wait for progress status of openfiler

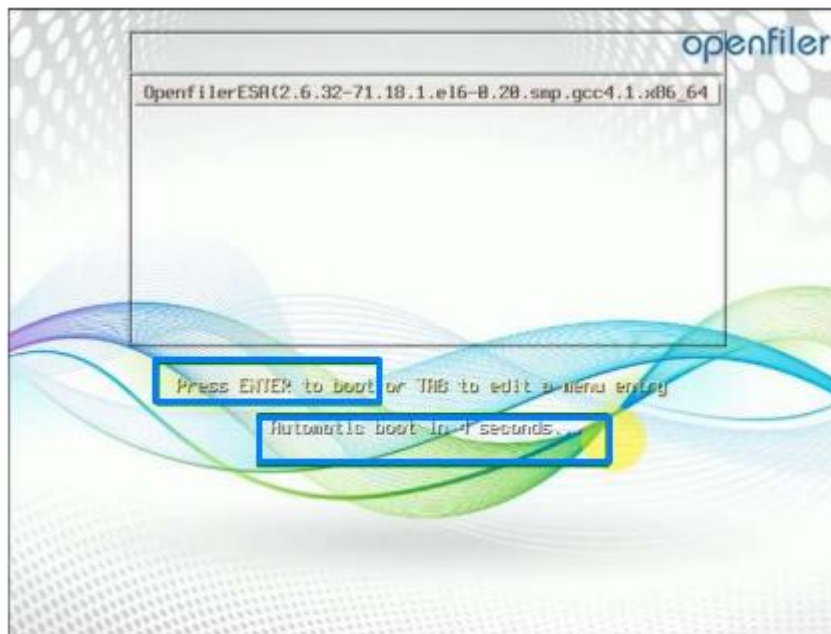




### 3.15. Proceed to enter Reboot button



### 3.16. Proceed to enter from Key board



3.17. Openfiler provide us url as <https://192.168.120.10:446/>

```

      _/_/  _/_/  _/_/  _/  _/  _/  _/  _/  _/_/  _/
      _/
      _/

-----
:      Commercial Support: http://www.openfiler.com/support/      :
: Administrator Guide: http://www.openfiler.com/buy/administrator-guide :
: Community Support: http://www.openfiler.com/community/forums/   :
: Internet Relay Chat: server: irc.freenode.net   channel: #openfiler :
-----
:      (C) 2001-2011 Openfiler. All Rights Reserved.             :
: Openfiler is licensed under the terms of the GNU GPL, version 2  :
: http://www.gnu.org/licenses/gpl-2.0.html                       :
-----

Welcome to Openfiler ESA, version 2.99.1

Web administration GUI: https://192.168.120.10:446/

openfiler login: _
```

4. Change the parameter files of Openfiler using root user

4.1. Login as root use

```

      _/_/
      _/

-----
:      Commercial Support: http://www.openfiler.com/support/      :
: Administrator Guide: http://www.openfiler.com/buy/administrator-guide :
: Community Support: http://www.openfiler.com/community/forums/   :
: Internet Relay Chat: server: irc.freenode.net   channel: #openfiler :
-----
:      (C) 2001-2011 Openfiler. All Rights Reserved.             :
: Openfiler is licensed under the terms of the GNU GPL, version 2  :
: http://www.gnu.org/licenses/gpl-2.0.html                       :
-----

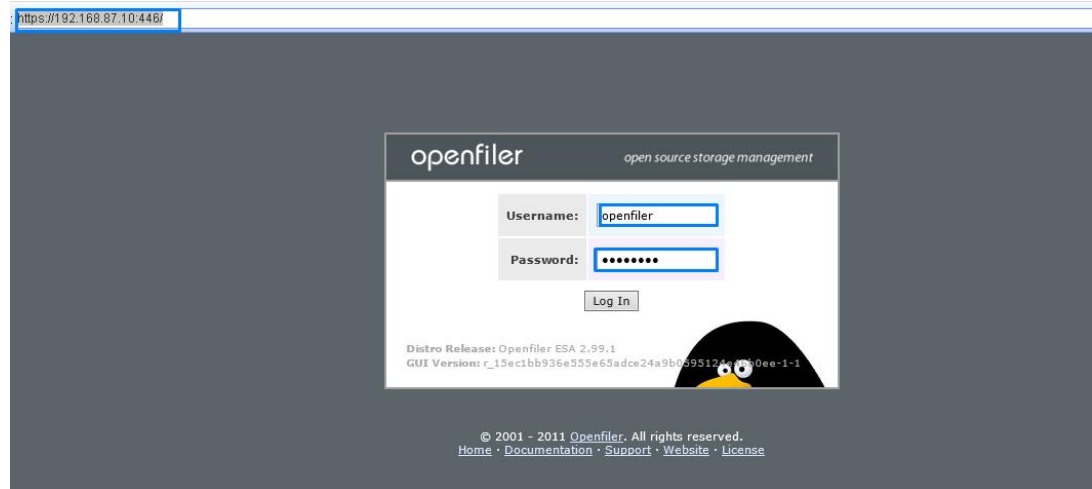
Welcome to Openfiler ESA, version 2.99.1

Web administration GUI: https://192.168.120.10:446/

openfiler login: root
Password:
Last login: Wed Jul 12 21:28:37 on tty1
[root@openfiler ~]#
```

5. Configure Openfiler using URL <https://192.168.120.10:446/>

5.1. Login as user openfiler with password is password.



5.2. First click on Services tab then Enable and Start the iSCSI Target services



### Manage Services

Service	Boot Status	Modify Boot	Current Status	Start / Stop
CIFS Server	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
NFS Server	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
RSync Server	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
HTTP/Dav Server	Disabled	<a href="#">Enable</a>	Running	<a href="#">Stop</a>
LDAP Container	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
FTP Server	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
iSCSI Target	Enabled	<a href="#">Disable</a>	Running	<a href="#">Stop</a>
UPS Manager	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
UPS Monitor	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>
iSCSI Initiator	Disabled	<a href="#">Enable</a>	Stopped	<a href="#">Start</a>

5.3. First click on System tab then go to Network Interface Configuration section then add rac1 and rac2 name and IP details, meanwhile click on update button.

### Network Configuration

Hostname:	<input type="text" value="openfiler.mydomain"/>
Primary DNS:	<input type="text" value="8.8.8.8"/>
Secondary DNS:	<input type="text" value="8.8.4.4"/>
Gateway:	<input type="text"/>

### Network Interface Configuration

Interface	Boot Protocol	IP Address	Network Mask	Speed	MTU	Link	Edit
eth0	Static	192.168.120.10	255.255.255.0	1000Mb/s	1500	Yes	Configure

[Create bonded interface](#)

### Network Access Configuration

Delete	Name	Network/Host	Netmask	Type
<input type="checkbox"/>	RAC1	192.168.120.11	255.255.255.255	Share
<input type="checkbox"/>	RAC2	192.168.120.12	255.255.255.255	Share

5.4. First click on Volumes tab then go to Create a new volume group section then click on create new physical volumes link.

Status
System
Volumes
Cluster
Quota
Shares
Services
Accounts

### Volume Group Management

Volume Group Name	Size	Allocated	Free	Members	Add physical storage	Delete VG
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### Create a new volume group

No existing physical volumes were found, or all existing physical volumes are used. You can [create new physical volumes](#).

**Volun**

M

V

B

A

I

S

**Supp**

R

G

F

A

5.5. You have chosen the proper partition to create OCR, DATA and FRA disks and click over link (/dev/sdb).


### Block Device Management

Edit Disk	Type	Description	Size	Label type	Partitions
<a href="#">/dev/sdb</a>	SCSI	VMware, VMware Virtual S	89.99 GB	msdos	0 ( <a href="#">view</a> )
<a href="#">/dev/sda</a>	SCSI	VMware, VMware Virtual S	10.00 GB	msdos	3 ( <a href="#">view</a> )

5.6. Go to create a partition in /dev/sdb section and select partition type as Physical volume then click on create button.

### Edit partitions in /dev/sdb (6527 cylinders with "msdos" label)

Device	Type	Number	Start cyl	End cyl	Blocks	Size	Type	Delete
--------	------	--------	-----------	---------	--------	------	------	--------



Free  
(100%)

[Back to the list of physical storage devices](#)

### Create a partition in /dev/sdb

You can use ranges within the following extents:

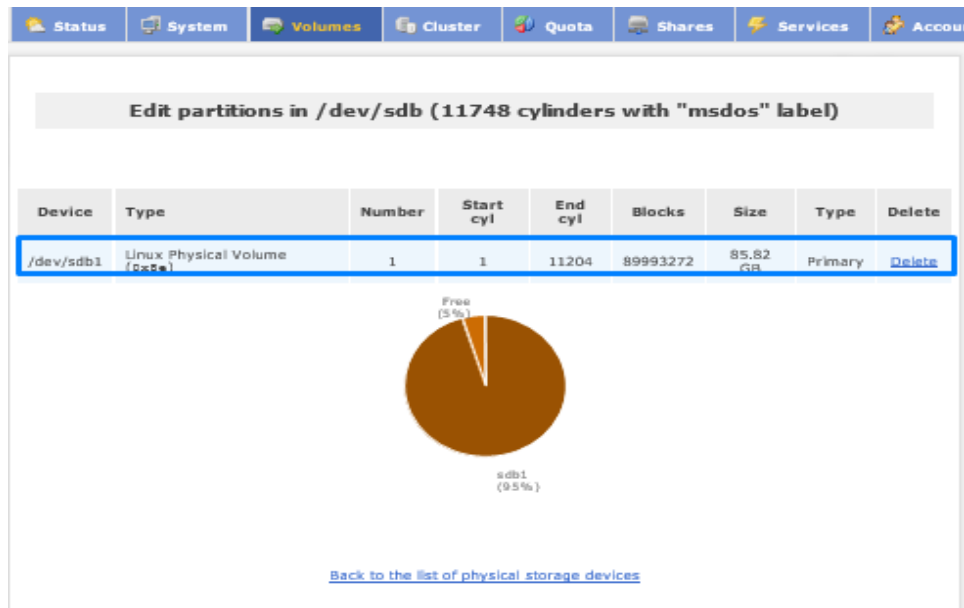
Mode	Starting cylinder	Ending cylinder	Space
Primary	1	6527	90.00 GB

Step 1

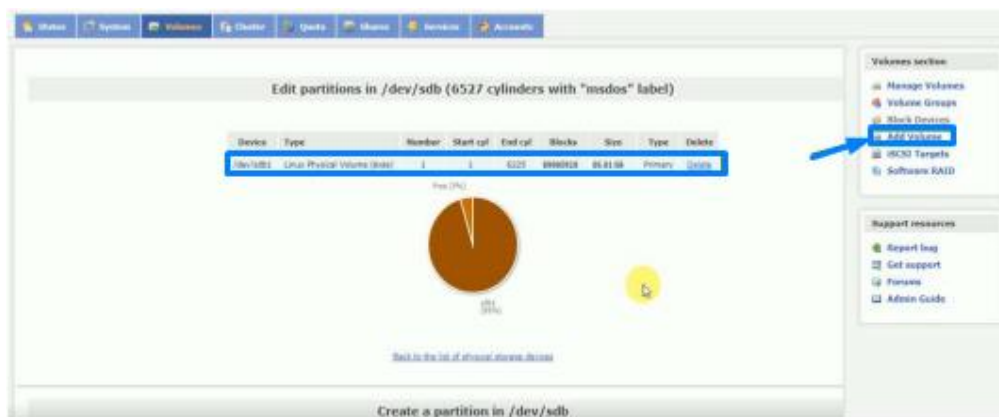
Mode	Partition Type	Starting cylinder	Ending cylinder	Size	Create	Reset
Primary	Physical volume	1	6527	90 GB	Create	Reset

Step 2

5.7. Now your Physical volume looks like.



5.8. Now you have to click over Add Volume link.



5.9. Go to Create a new volume group section and provide group name select the partition name and then click on Add volume group button.

**Volume Group Management**

Volume Group Name	Size	Allocated	Free	Members	Add physical storage	Delete VG
racstore	85.81 GB	0 bytes	85.81 GB	<a href="#">View member PVs</a>	All PVs are used	<a href="#">Delete</a>

**Create a new volume group**

Valid characters for volume group name: A-Z a-z 0-9 \_ + -

Volume group name (no spaces)

Step 1 → racstore

Select physical volumes to add

Step 2 → ☒ /dev/sdb1 85.81 GB

Step 3 → Add volume group

5.10. Go to Volumes section and click on Add volume button.

**Cluster** **Quota** **Gluster** **Services** **Accounts**

**Volume Group Management**

Volume Group Name	Size	Allocated	Free	Members	Add physical storage	Delete VG
racstore	85.81 GB	0 bytes	85.81 GB	<a href="#">View member PVs</a>	All PVs are used	<a href="#">Delete</a>

**Create a new volume group**

No existing physical volumes were found, or all existing physical volumes are used. You can [create new physical volumes](#).

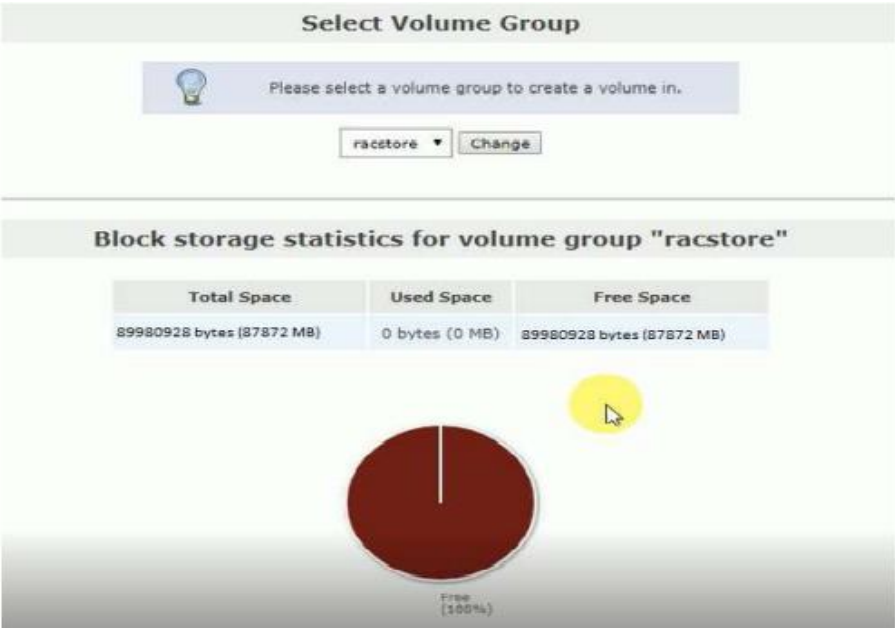
**Volumes section**

- Manage Volumes
- Volume Groups
- Block Devices
- Add volume**
- LUN Targets
- Software RAID

**Support resources**

- Report bug
- Get support
- Forums
- Admin Guide

5.11. Then it looks like.



5.12. Go to Create a volume is "racstore" section and create storage for OCR/Voting Disks.

**Select Volume Group**

Please select a volume group to create a volume in.

racstore ▼ Change

---

**Block storage statistics for volume group "racstore"**

Total Space	Used Space	Free Space
89980928 bytes (87872 MB)	0 bytes (0 MB)	89980928 bytes (87872 MB)

Free (100%)

---

**Create a volume in "racstore"**

Volume Name ("no spaces", valid characters [a-z,A-Z,0-9]):

Volume Description:

Required Space (MB):  Size in MB

Filesystem / Volume type:

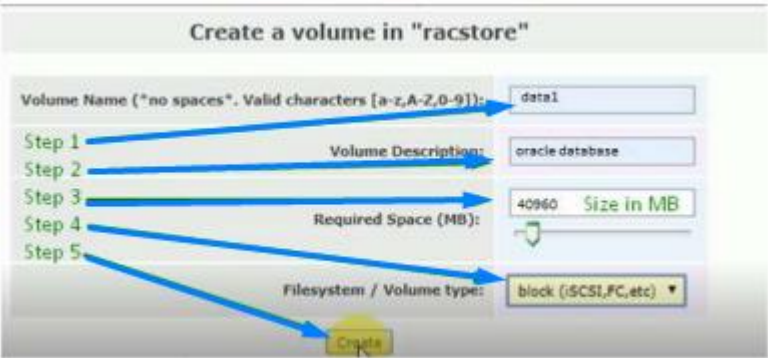
Step 1 → Step 2 → Step 3 → Step 4 → Step 5 → Create



5.13. Now OCR/Voting disk look like and proceed to create storage for DATA Disks click on Add Volume.



5.14. Go to Create a volume is "racstore" section and create storage for DATA Disks.



5.15. Now DATA disk look like and proceed to create storage for FRA Disks click on Add Volume.



5.16. Go to Create a volume is “racstore” section and create storage for FRA Disks.

**Create a volume in "racstore"**

Volume Name (\*no spaces\*. Valid characters [a-z,A-Z,0-9]):

Step 1 → Volume Description:

Step 2 →

Step 3 → Required Space (MB):  Size in MB

Step 4 →

Step 5 → Filesystem / Volume type:

5.17. Finally, “racstore” looks like.

**Select Volume Group**

Please select a volume group to display:

**Volumes in volume group "racstore" (87872 MB)**

Volume name	Volume description	Volume size	File system type	File system size	FS used space	FS free space	Delete	Properties	Snapshot
ora	oracle cluster registry	20480 MB	(SCSI)	Not applicable	Not applicable	Not applicable	In use	<a href="#">Edit</a>	<a href="#">Create</a>
data1	oracle database	40960 MB	(SCSI)	Not applicable	Not applicable	Not applicable	In use	<a href="#">Edit</a>	<a href="#">Create</a>
fra1	oracle fast recovery area	25024 MB	(SCSI)	Not applicable	Not applicable	Not applicable	In use	<a href="#">Edit</a>	<a href="#">Create</a>

0 MB allocated to snapshots

34808 MB of free space left

5.18. Configure iSCSI Targets

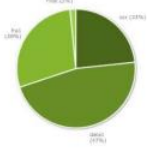
Select Volume Group

Please select a volume group to display:

racstore Change

Step 1

Volumes in volume group "racstore" (87872 MB)



Volume name	Volume description	Volume size	File system type	File system size	FS used space	FS free space	Delete	Properties	Snapshots
ocr	oracle cluster registry	20480 MB	OCFS2	Not applicable	Not applicable	Not applicable	In use	Set	Create
data1	oracle database	40960 MB	OCFS2	Not applicable	Not applicable	Not applicable	In use	Set	Create
fra1	oracle fast recovery area	26024 MB	OCFS2	Not applicable	Not applicable	Not applicable	In use	Set	Create

0 MB allocated to snapshots  
1 608 MB of free space left

Manage Volumes  
Volume Groups  
Block Devices  
Add Volume  
iSCSI Targets  
Software RAID

Support resources  
Report bug  
Get support  
Forum  
Admin Guide

5.19. Configure iSCSI Target IQN

Target Configuration LUN Mapping Network ACL CHAP Authentication

Add new iSCSI Target

Target IQN Add

iqn.2006-01.com.openfiler:tn-240819943 Add

Change is as iqn.openfiler:ocr

Manage Volumes  
Volume Groups  
Block Devices  
Add Volume  
iSCSI Targets  
Software RAID

Support resources  
Report bug

5.20. Configure iSCSI Target IQN for OCR

Target Configuration LUN Mapping Network ACL CHAP Authentication

Add new iSCSI Target

Target IQN Add

iqn.openfiler:ocr Add

5.21. Go to Select iSCSI Target section choose IQN for OCR and click on Change button and then click on Network ACL tab.

The screenshot shows the 'Network ACL' tab in the iSCSI configuration interface. At the top, there are four tabs: 'Target Configuration', 'LUN Mapping', 'Network ACL', and 'CHAP Authentication'. Below the tabs is a section titled 'Add new iSCSI Target' with a 'Target IQN' input field containing 'iqn.2006-01.com.openfiler:tsn.6a656dd76c81' and an 'Add' button. Below this is a section titled 'Select iSCSI Target' with a message 'Please select an iSCSI target to display and/or edit.' and a dropdown menu showing 'iqn.openfiler:orcl' and a 'Change' button. Blue arrows indicate the sequence of actions: clicking the 'Add' button in the 'Add new iSCSI Target' section, then clicking the 'Change' button in the 'Select iSCSI Target' section.

5.22. Configure Network ACL configuration (Change Access columns status, Deny to Allow) for OCR and click on Update button then click on Target Configuration tab.

The screenshot shows the 'Network ACL' tab in the iSCSI configuration interface. At the top, there are four tabs: 'Target Configuration', 'LUN Mapping', 'Network ACL', and 'CHAP Authentication'. Below the tabs is a section titled 'iSCSI host access configuration for target "iqn.openfiler:orcl"'. On the left, there is a 'Step 4' label. In the center, there is a table with columns: 'Name', 'Network/Host', 'Netmask', and 'Access'. The table contains two rows: 'rac1' with '192.168.129.105' and '255.255.255.255' and 'rac2' with '192.168.129.106' and '255.255.255.255'. Both rows have 'Allow' in the 'Access' column. Blue arrows indicate the sequence of actions: clicking the 'Update' button, then clicking the 'Access' dropdown for 'rac1', then clicking the 'Access' dropdown for 'rac2', and finally clicking the 'Update' button again. A yellow circle highlights the 'Update' button.

5.23. Configure iSCSI Target IQN for DATA

The screenshot shows the 'Add new iSCSI Target' section in the iSCSI configuration interface. At the top, there are four tabs: 'Target Configuration', 'LUN Mapping', 'Network ACL', and 'CHAP Authentication'. Below the tabs is a section titled 'Add new iSCSI Target' with a 'Target IQN' input field containing 'iqn.openfiler:tsn.09f2eddeeb' and an 'Add' button. A blue arrow points to the 'Add' button, labeled 'Step 1'. Another blue arrow points to the 'Add' button, labeled 'Step 2'. A green arrow points to the 'Add' button, labeled 'Change it as iqn.openfiler:data1'.

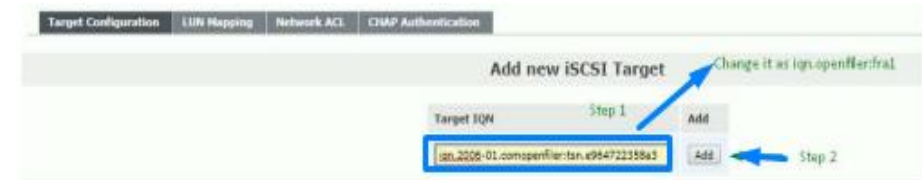
5.24. Go to Select iSCSI Target section choose IQN for DATA and click on Change button and then click on Network ACL tab.



5.25. Configure Network ACL configuration (Change Access columns status, Deny to Allow) for DATA and click on Update button then click on Target Configuration tab.



5.26. Configure iSCSI Target IQN for FRA.



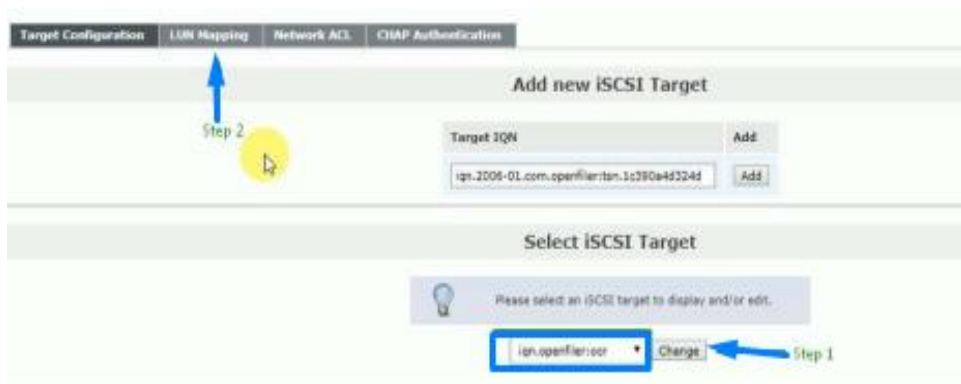
5.27. Go to Select iSCSI Target section choose IQN for FRA and click on Change button and then click on Network ACL tab.



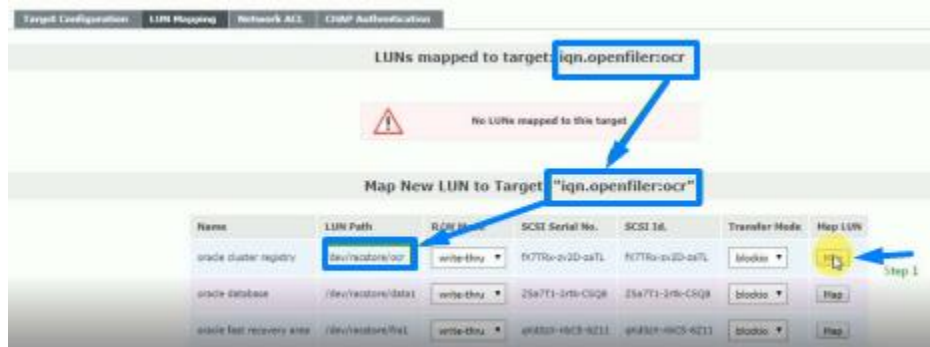
5.28. Configure Network ACL configuration (Change Access columns status, Deny to Allow) for FRA and click on Update button then click on Target Configuration tab.



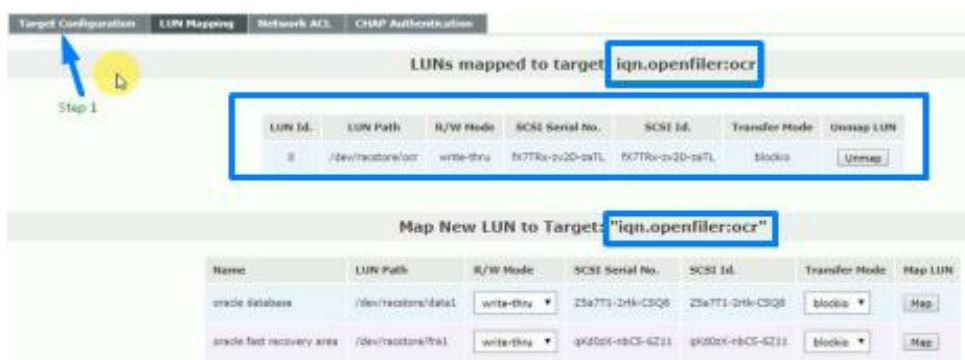
5.29. Go to Select iSCSI Target section choose OCR and click on Change button then click on LUN Mapping tab.



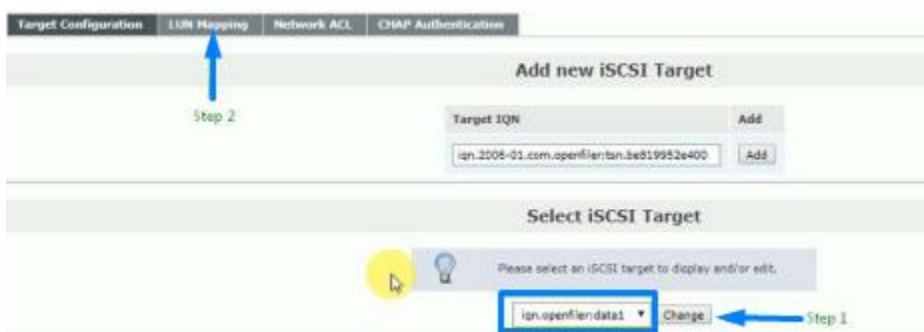
5.30. Verify the iqn for OCR and click on Map button.



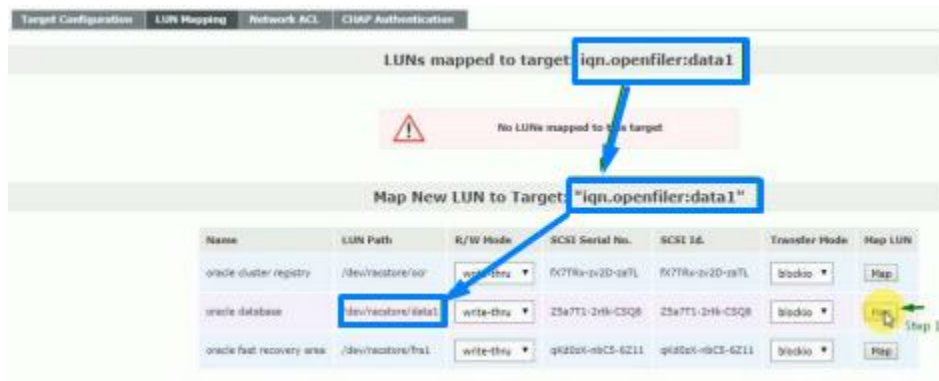
5.31. Verify the iqn for OCR and click on Target Configuration tab.



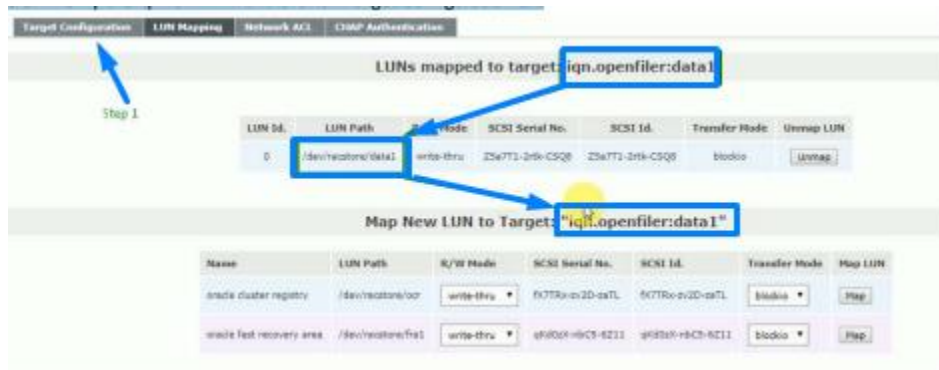
5.32. Go to Select iSCSI Target section choose DATA and click on Change button then click on LUN Mapping tab.



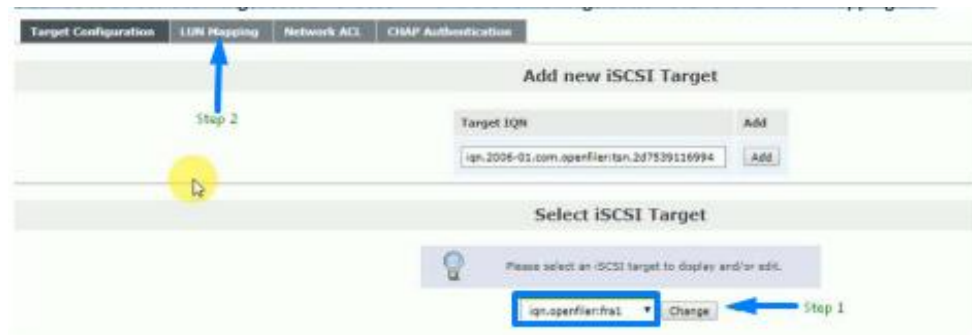
5.33. Verify the iqn for DATA and click on Map button.



5.34. Verify the iqn for DATA and click on Target Configuration tab.

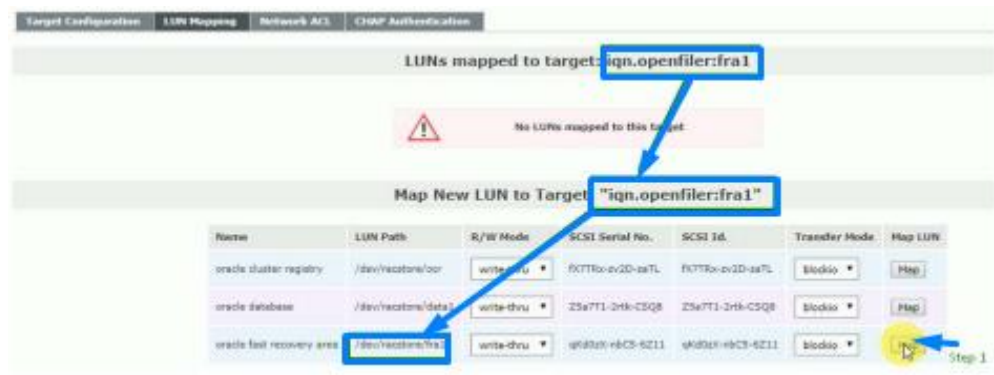


5.35. Go to Select iSCSI Target section choose FRA and click on Change button then click on LUN Mapping tab.

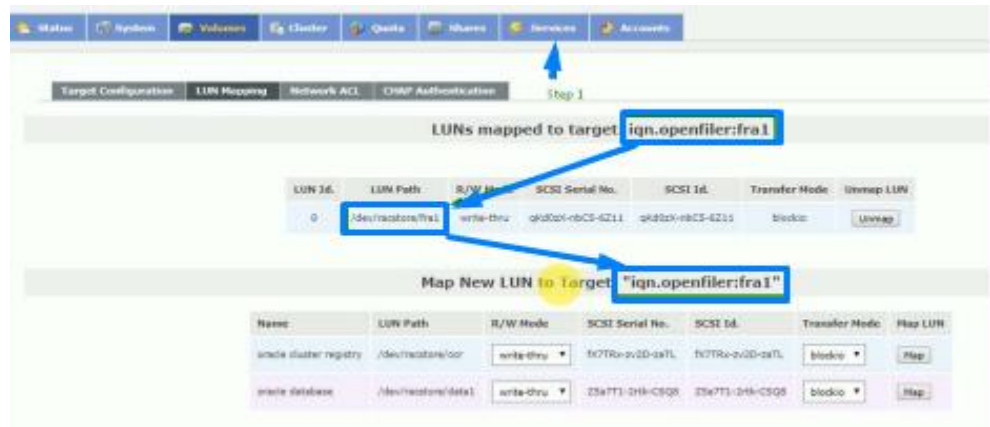




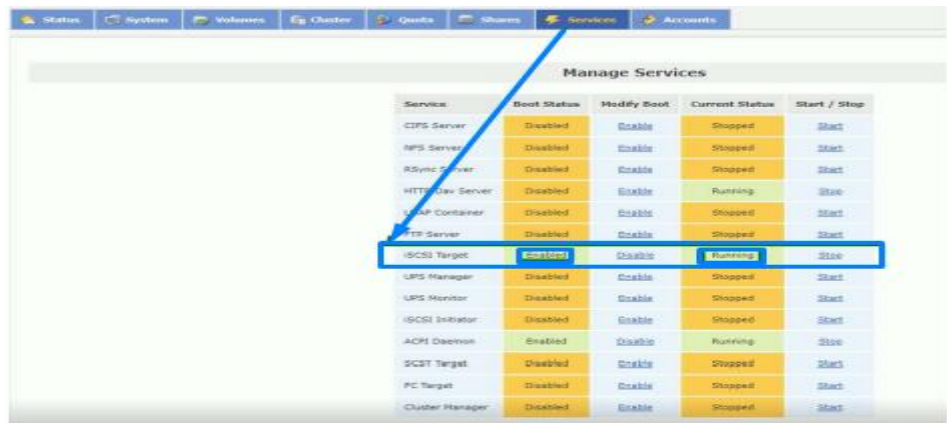
5.36. Verify the iqn for FRA and click on Map button.



5.37. Verify the iqn for FRA and click on Target Configuration tab.



5.38. Verify the iSCSI service.

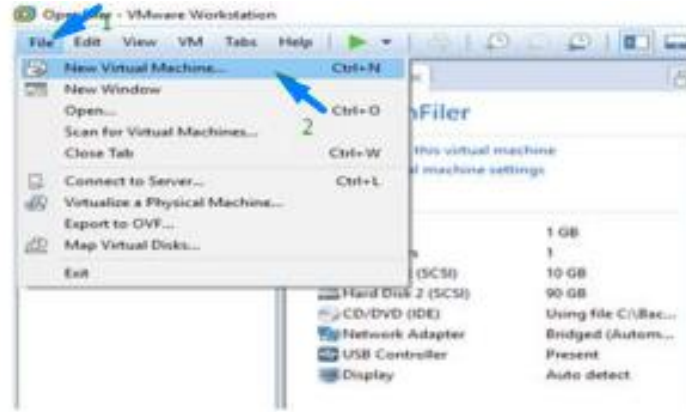


## Installation Steps of Oracle Linux Server 6.10:

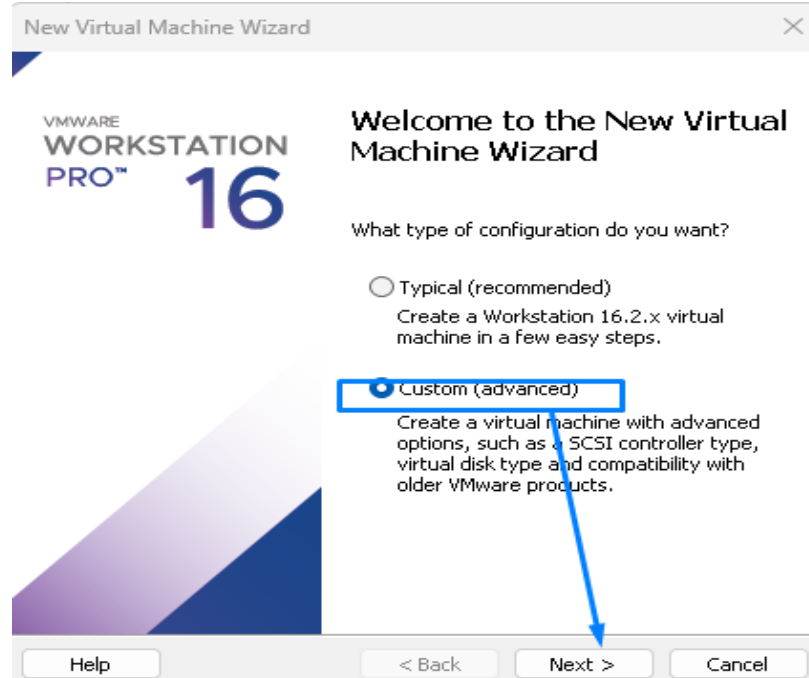
This section provides the screens used to install the Oracle Linux Server 6.10 to create rac1 (VM 2) and rac2 (VM 3) OS over VMware Workstation Pro.

### 6. OS Installation for RAC1 (VM 2)

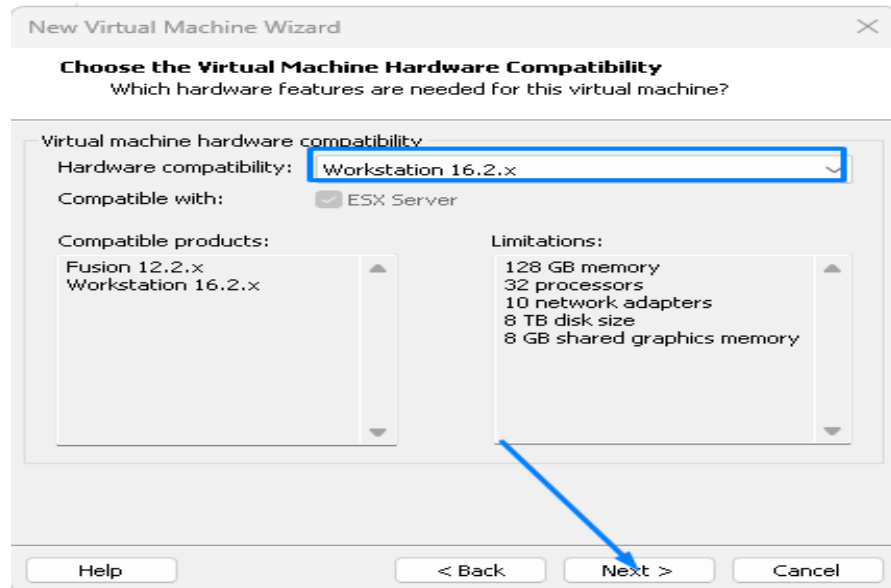
#### 6.1. New Virtual machine setup



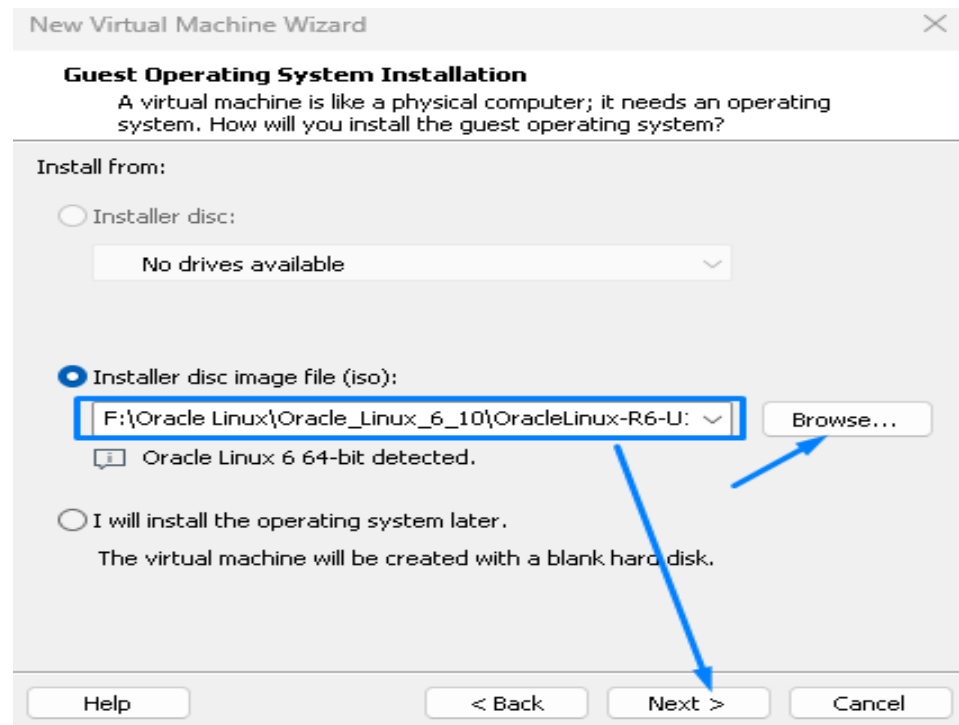
#### 6.2. Choose Custom setting then click on Next button



6.3. Choose Hardware default compatibility then click on Next button



6.4. Choose Oracle Linux Server 6.10 iso file (V37084-01.iso) then click on Next button



6.5. Put your machine named as RAC1 and provide a location where you want to store/create VM space then click on Next button

The screenshot shows the 'New Virtual Machine Wizard' dialog box. The title bar says 'New Virtual Machine Wizard'. The main heading is 'Name the Virtual Machine' with the subtitle 'What name would you like to use for this virtual machine?'. There are two text input fields: 'Virtual machine name:' containing 'RAC1' and 'Location:' containing 'F:\RAC VMs\RAC1'. A 'Browse...' button is to the right of the location field. Below the location field, it says 'The default location can be changed at Edit > Preferences.' At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'. A blue arrow points from the 'Next >' button to the instruction text above it.

Virtual machine name: RAC1

Location: F:\RAC VMs\RAC1

The default location can be changed at Edit > Preferences.

< Back Next > Cancel

6.6. Select Number of processors then click on Next button

The screenshot shows the 'New Virtual Machine Wizard' dialog box, Step 2: Processor Configuration. The title bar says 'New Virtual Machine Wizard'. The main heading is 'Processor Configuration' with the subtitle 'Specify the number of processors for this virtual machine.' There are two dropdown menus: 'Number of processors:' set to '2' and 'Number of cores per processor:' set to '1'. Below these, it says 'Total processor cores: 2'. At the bottom are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'. A blue arrow points from the 'Next >' button to the instruction text above it.

Processors

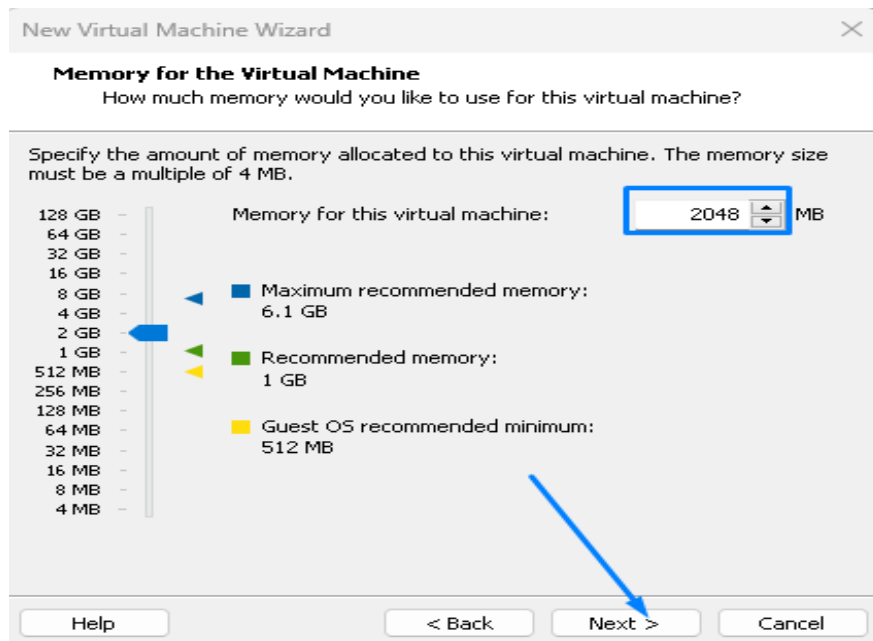
Number of processors: 2

Number of cores per processor: 1

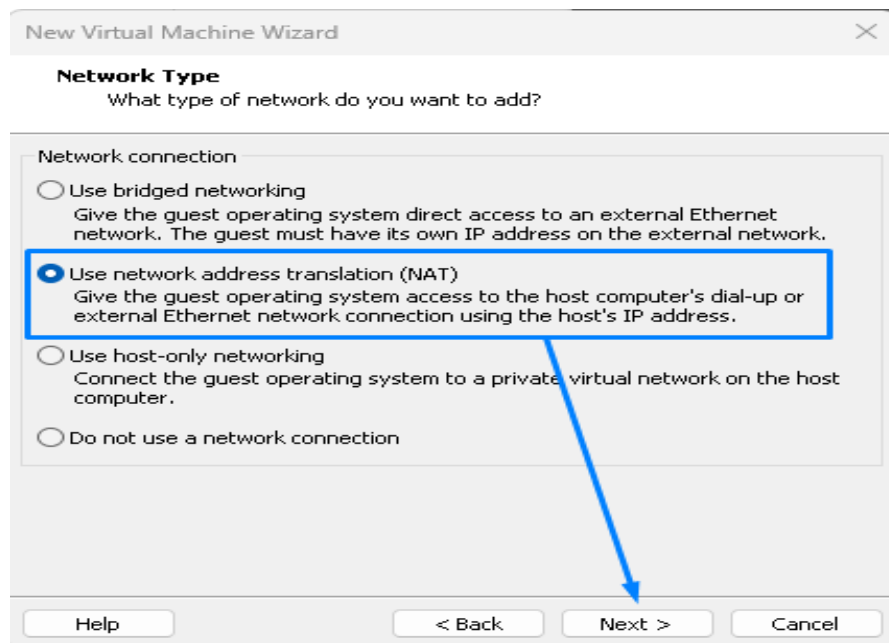
Total processor cores: 2

Help < Back Next > Cancel

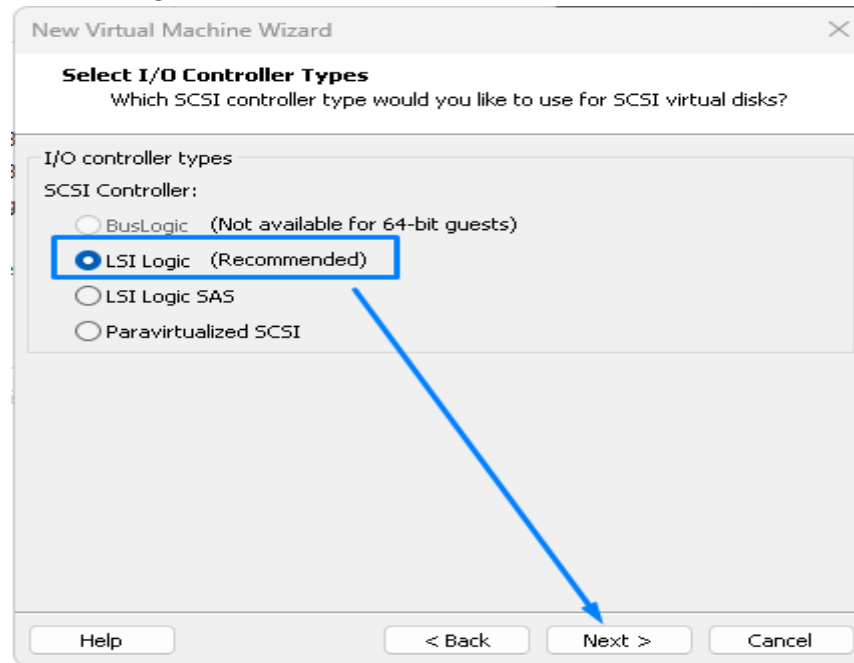
6.7. Put Memory as RAM 2GB then click on Next button.



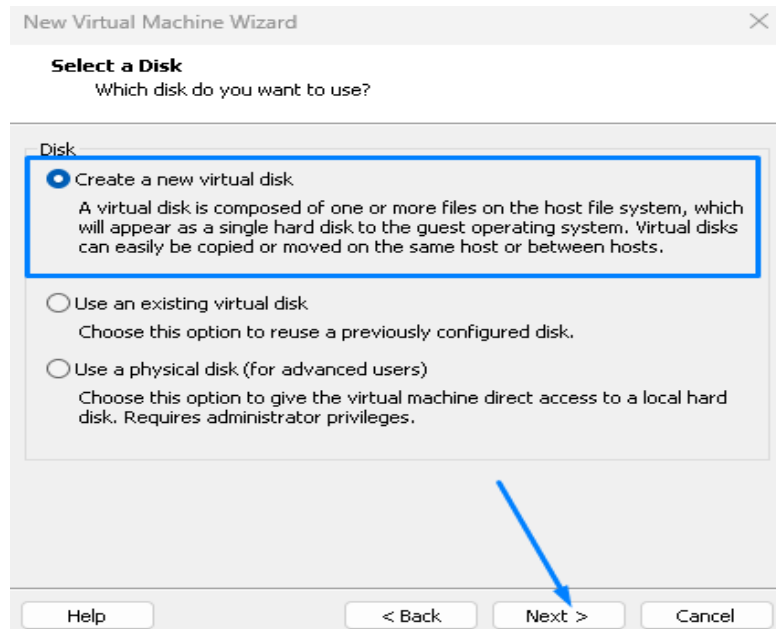
6.8. Select Network connection as bridge then click on Next button.



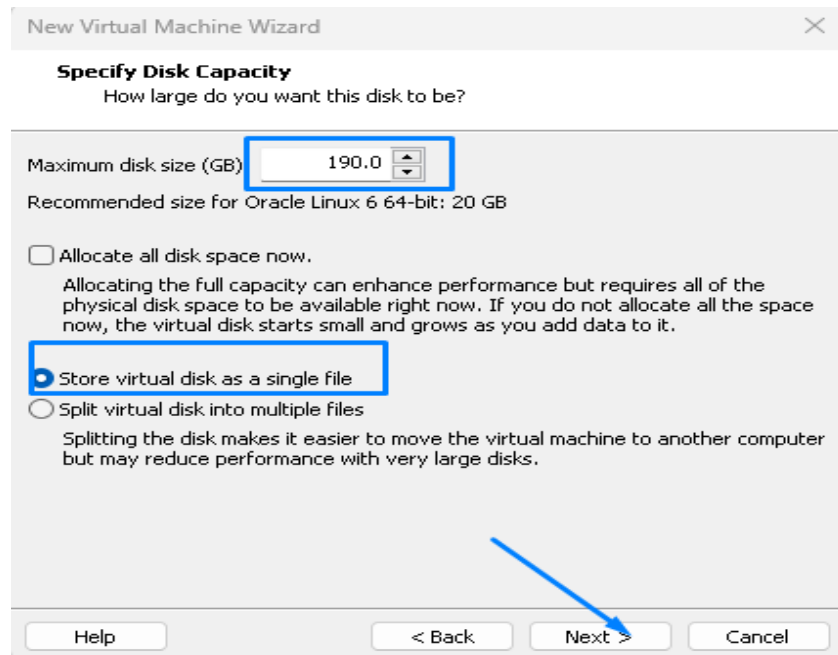
6.9. Select LSI Logic then click on Next button. 1.10. Select SCSI then click on Next button.



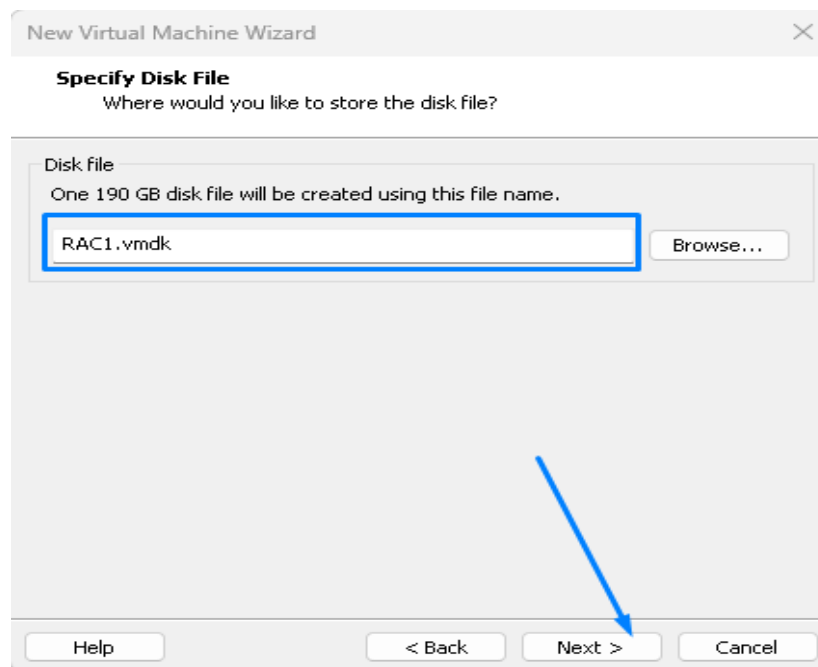
6.10. Select create a new virtual disk then click on Next button



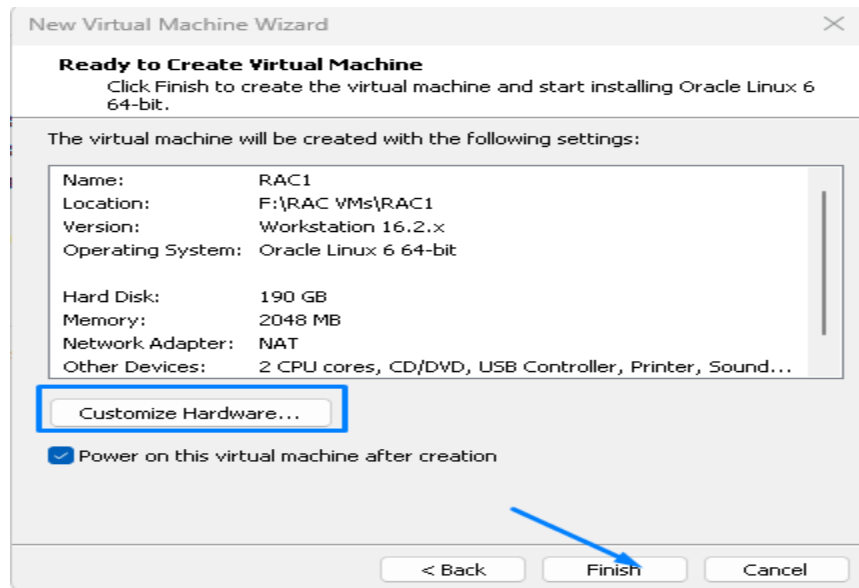
6.11. Put storage as Hard Disk 190GB and select Store virtual disk as a single file then click on Next button.



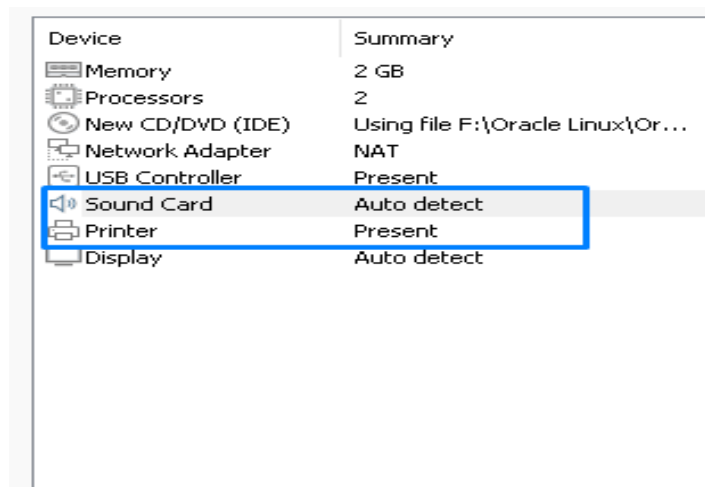
6.12. Select location to Store virtual disk as a single file then click on Next button



6.13. Click on Customize hardware.

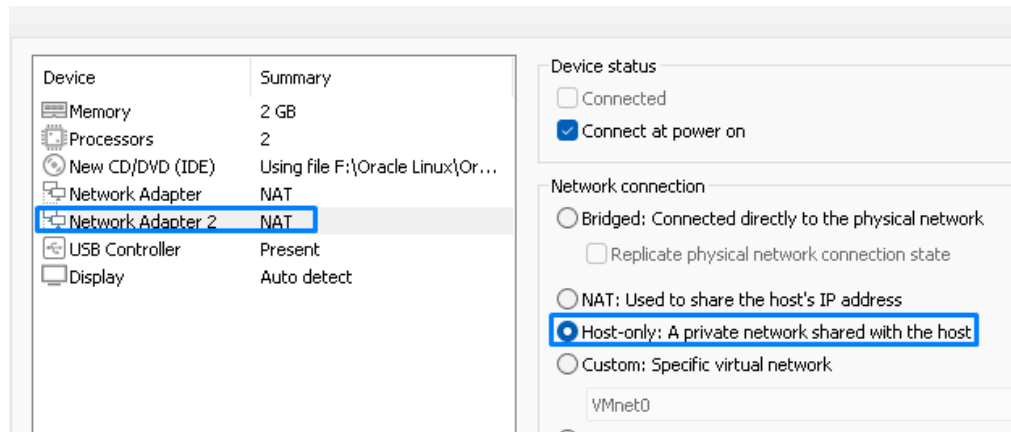


6.14. Remove the unnecessary hardware's.

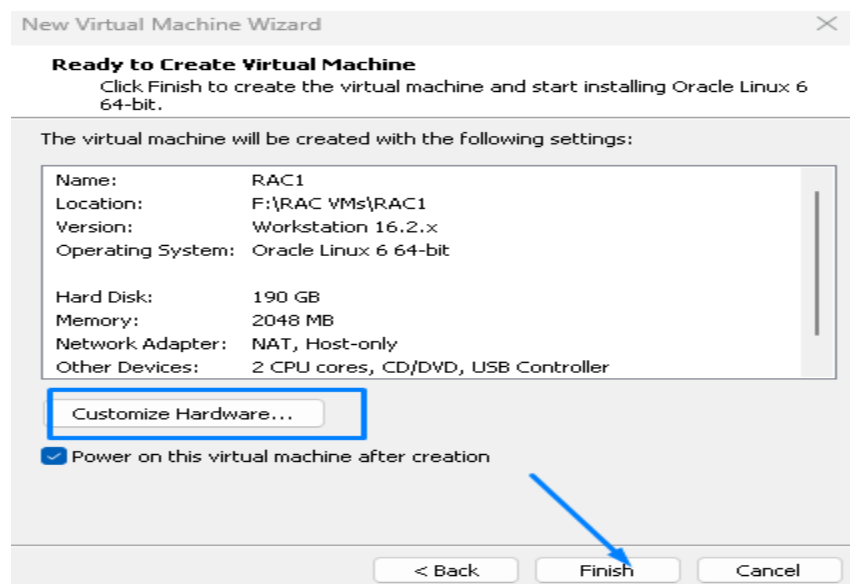




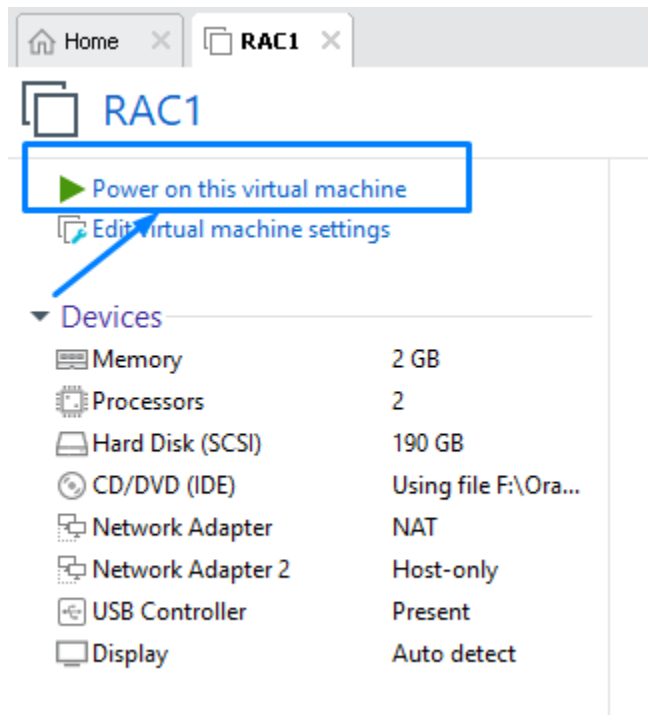
6.15. Add Network Adapter and Select network Adaptor then change the Network connection as Bridge then click on Close button..



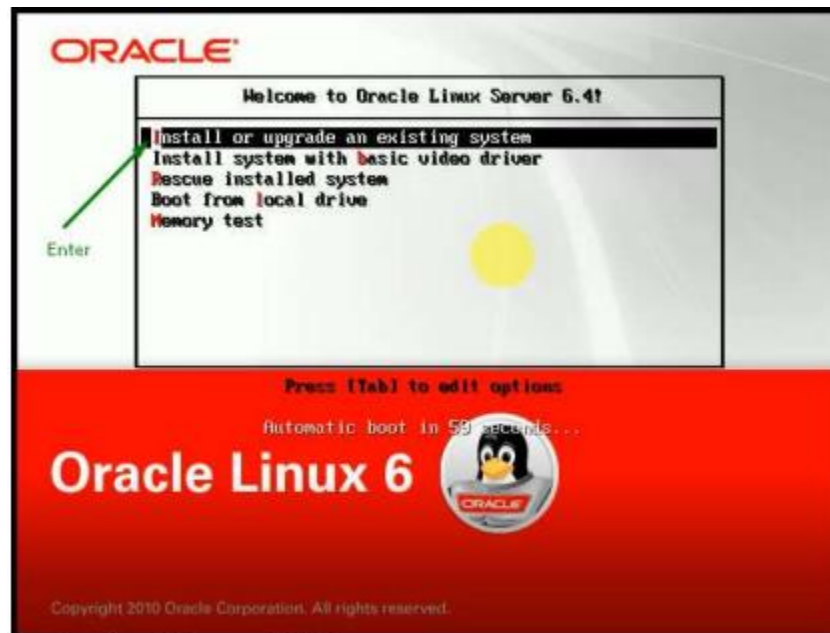
6.16. Click on Finish button



6.17. Click on the Power on button.



6.18. Install Oracle Linux Server.



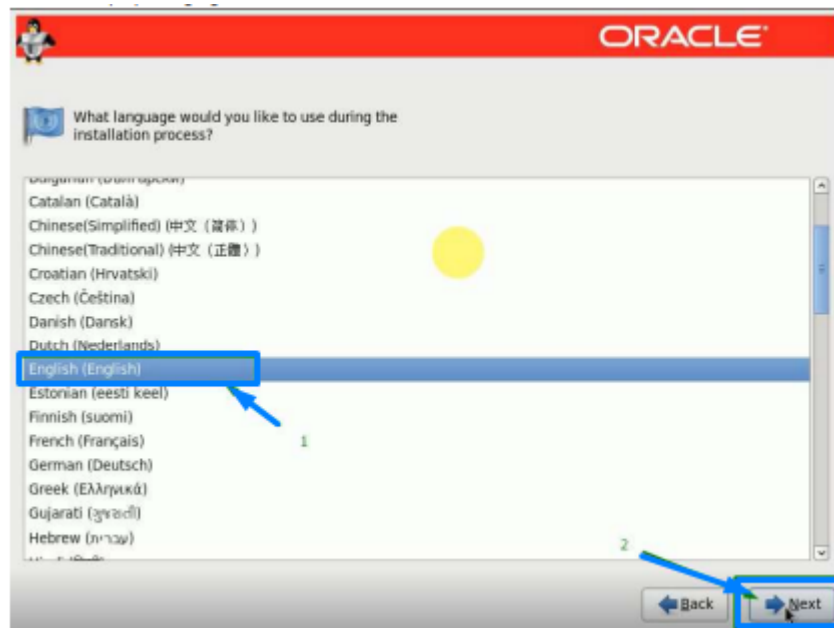
6.19. Click on Skip tab using Keyboard.



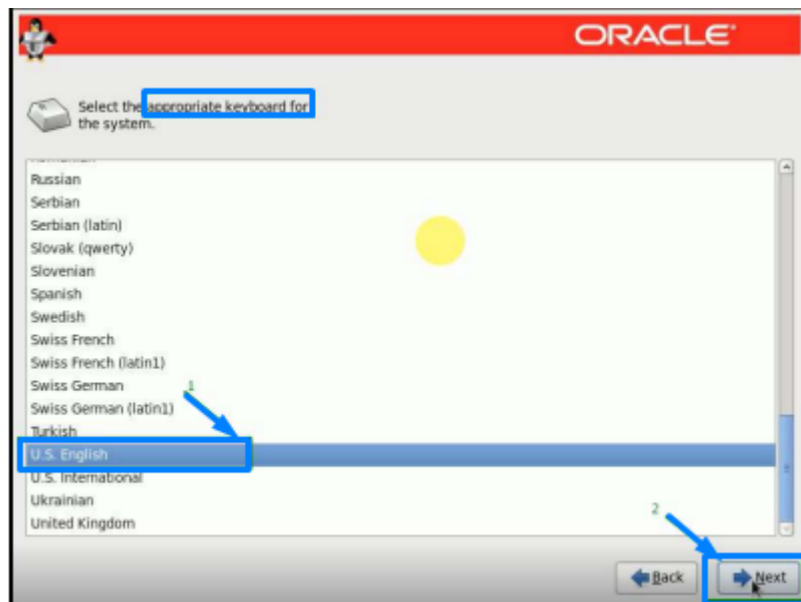
6.20. Click on the Next button.



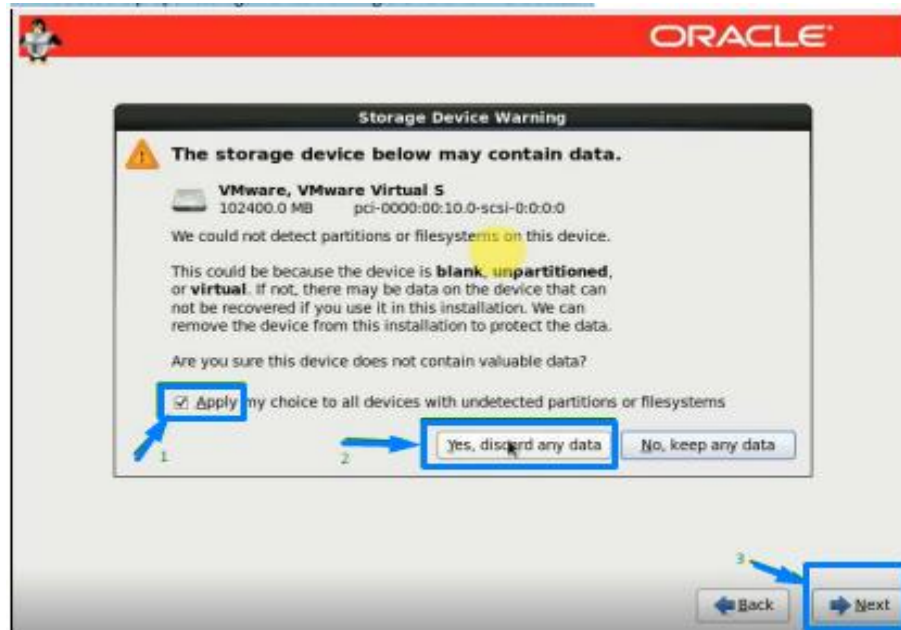
6.21 Choose proper language then Click on Next button.



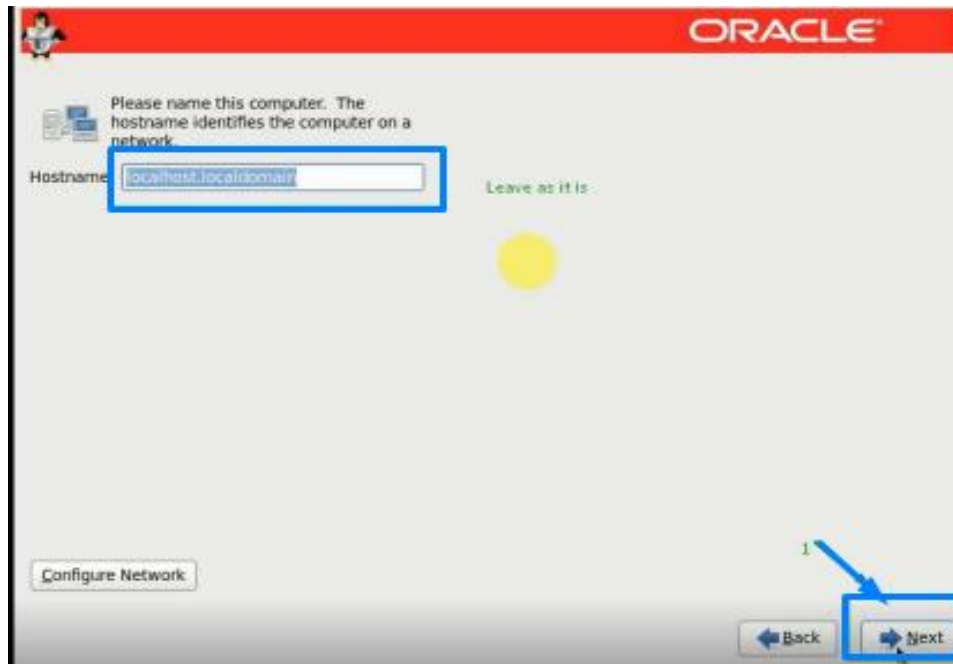
6.22 Choose proper keyboard then Click on Next button.



6.23 Select the proper Storage Device Warning Then Click on Next button.



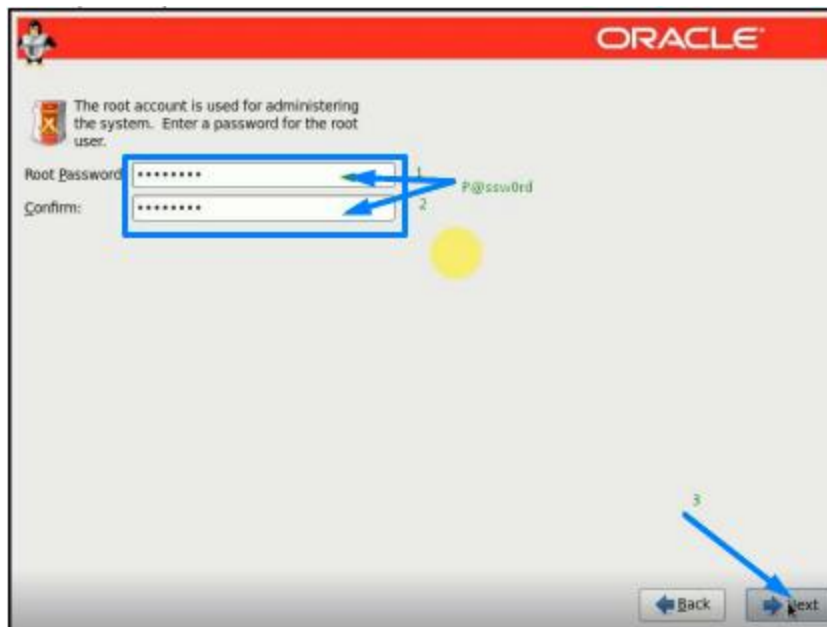
6.24 Click on the Next button.



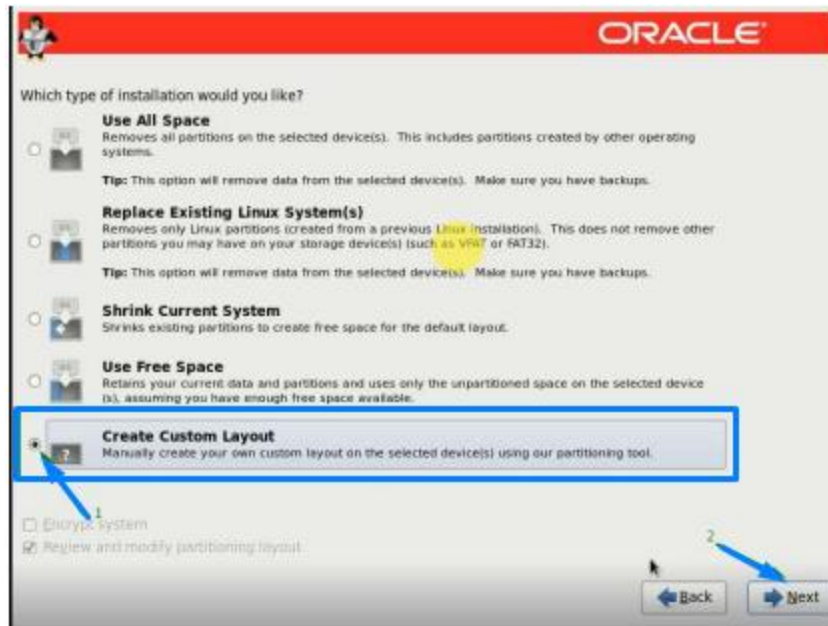
6.25 Select proper city then Click on Next button.



6.26 Put your "root" password the Click on Next button.



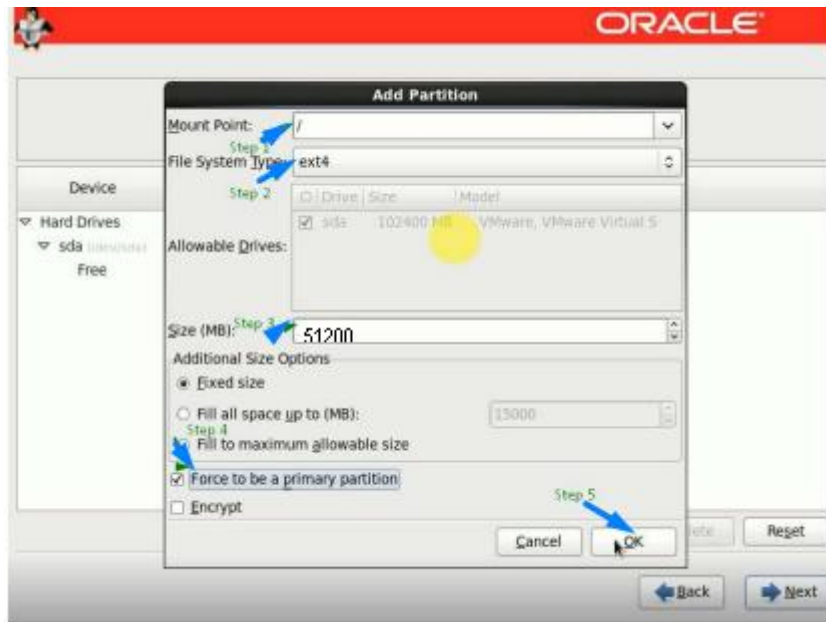
6.27 Select Create Custom Layout option then Click on Next tab.



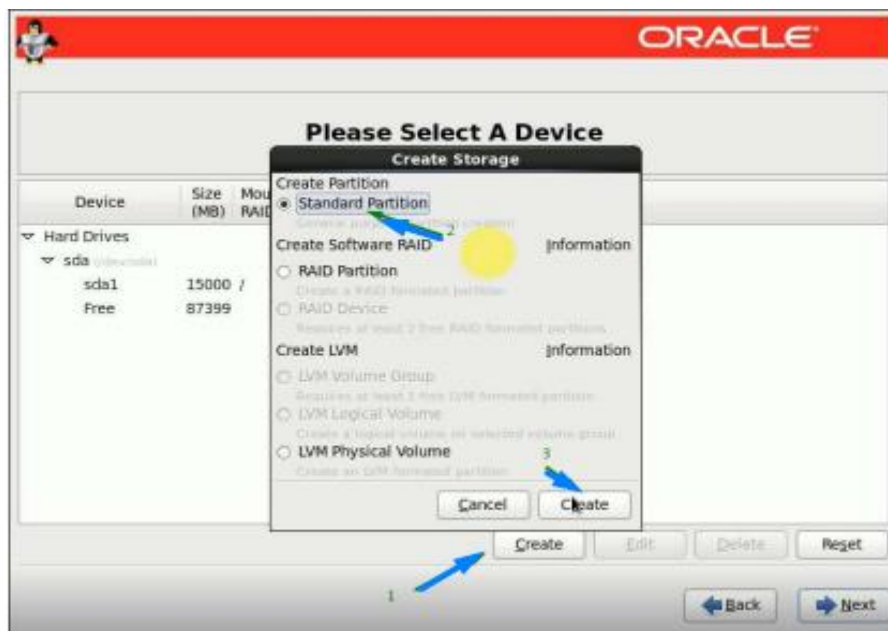
6.28 Proceed to create partition of OS Drive



### 6.29 Create "/" root partition as Force to be a primary partition

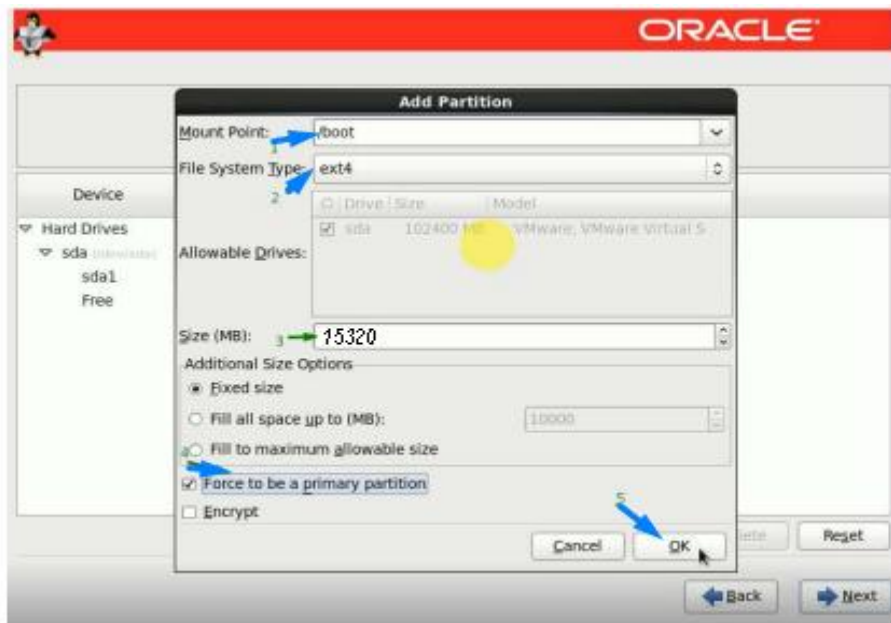


### 6.30 Proceed to create a new partition.





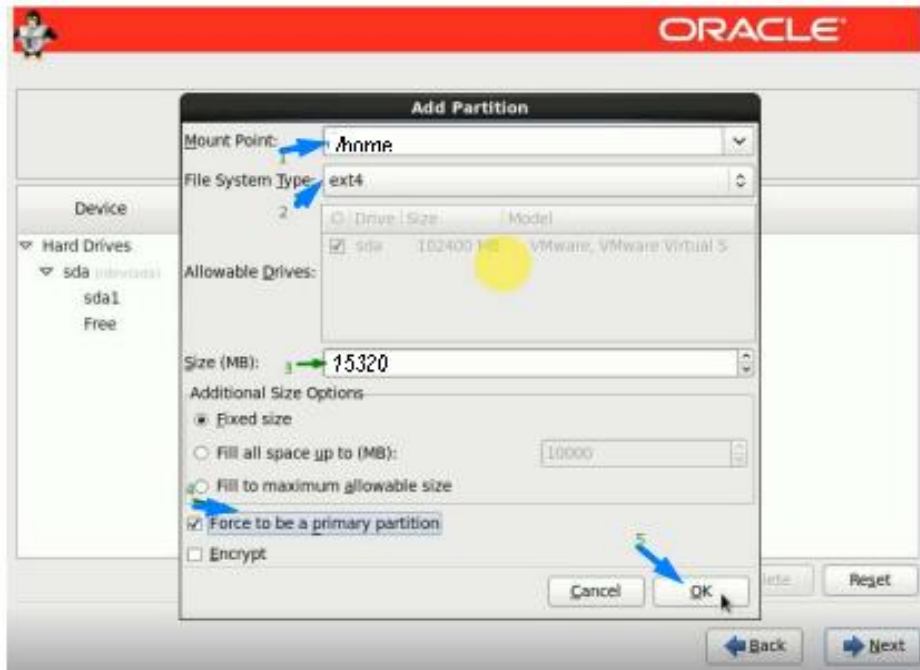
6.31 Create “/boot” partition as Force to be a primary partition.



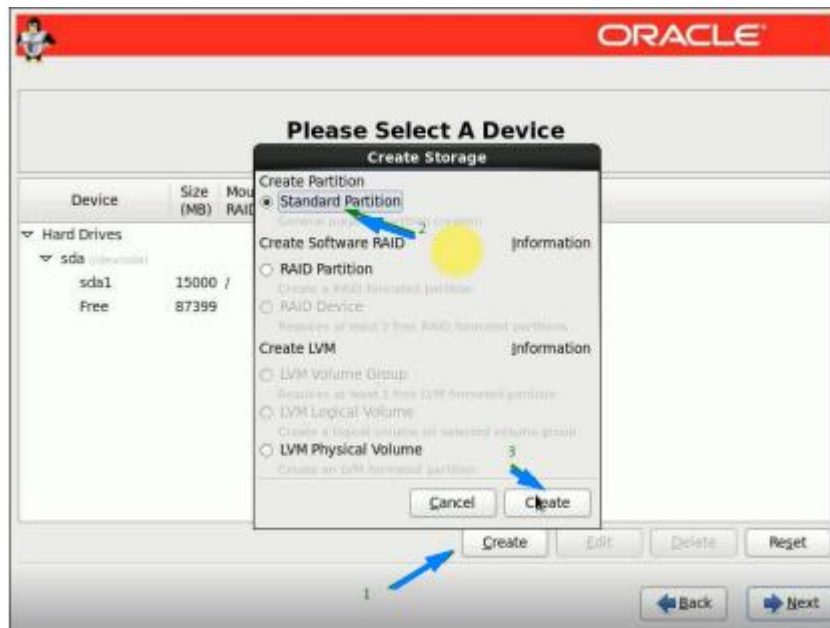
6.32 Proceed to create a new partition.



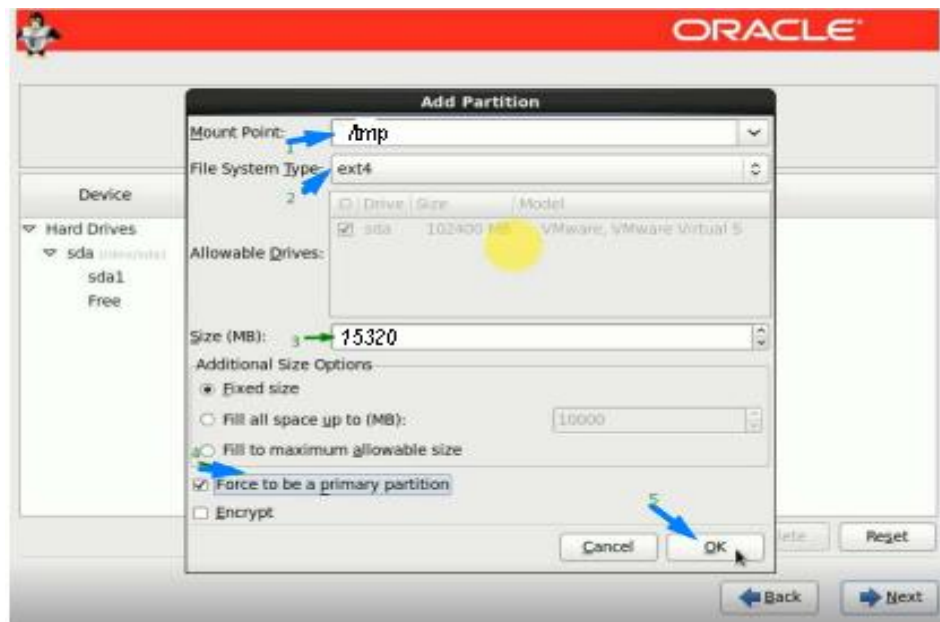
### 6.33 Create “/home” partition.



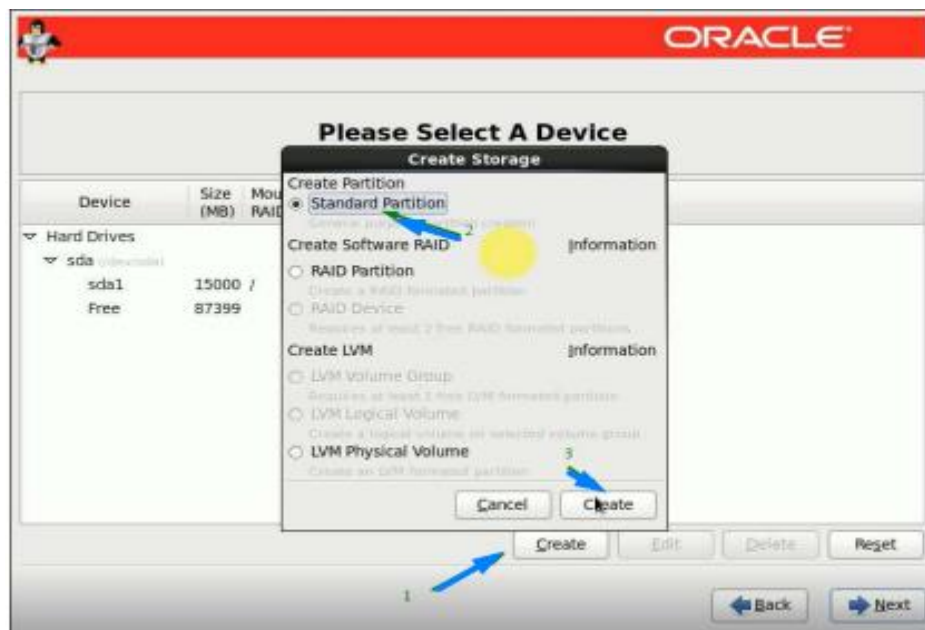
Proceed to create a new partition.



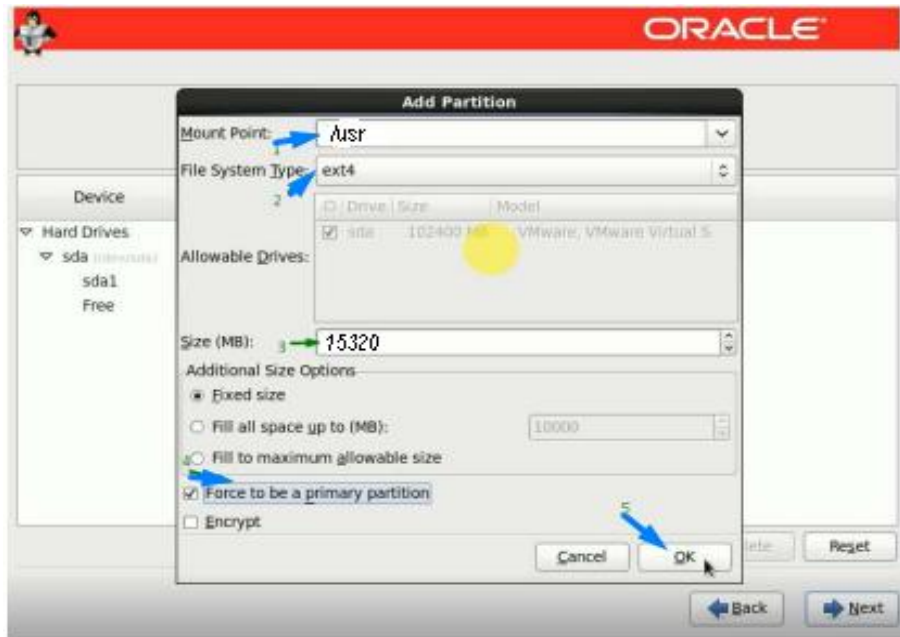
### 6.34 Create “/tmp” partition



### 6.35 Proceed to create a new partition.



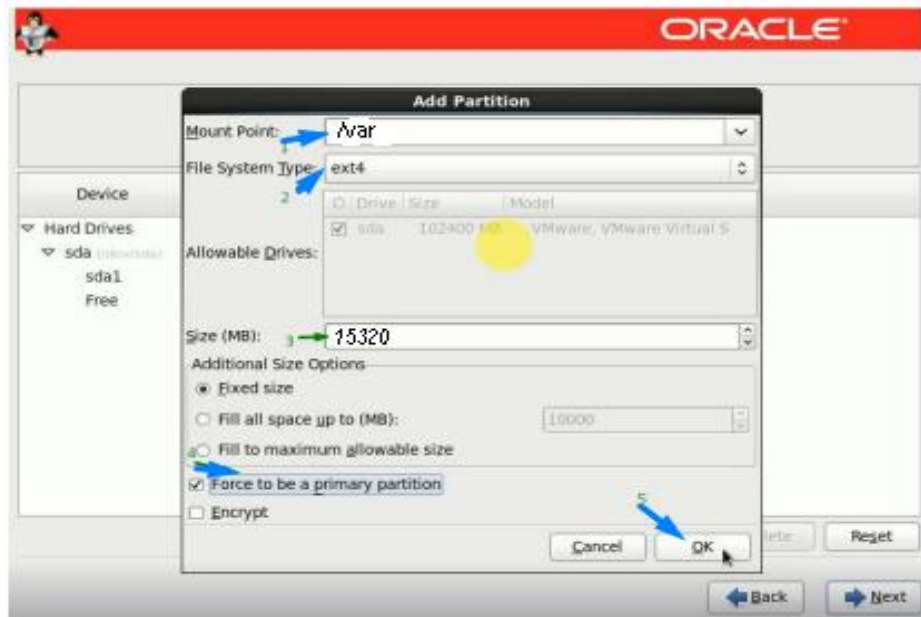
6.36 Create “/usr” partition



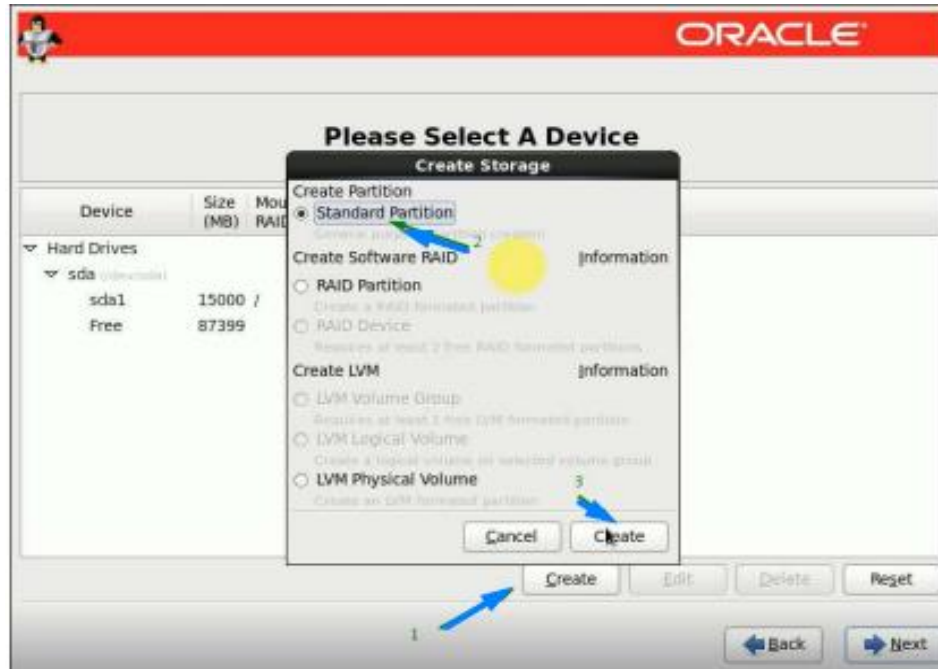
6.37 Proceed to create a new partition.



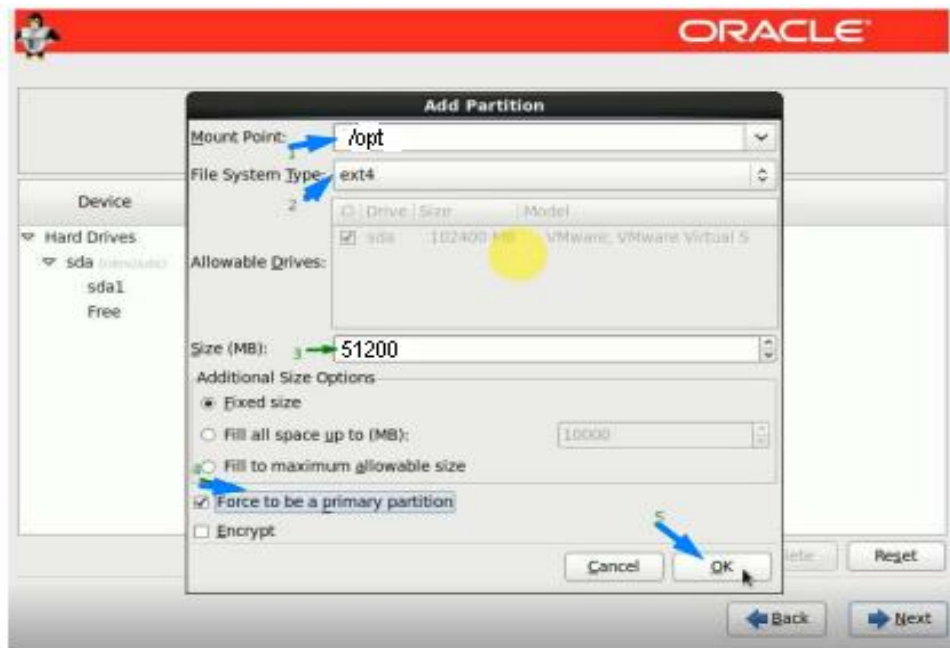
### 6.38 Create “/var” partition



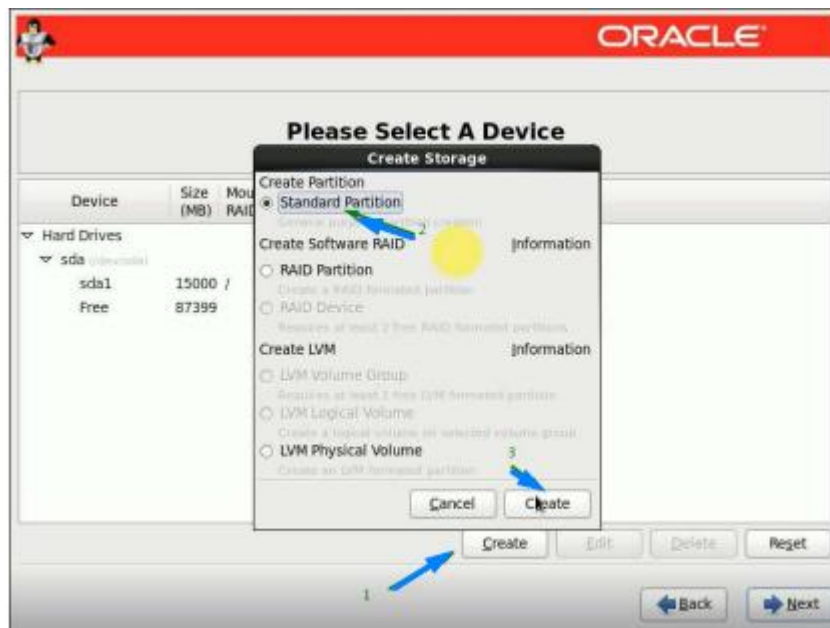
### 6.39 Proceed to create a new partition



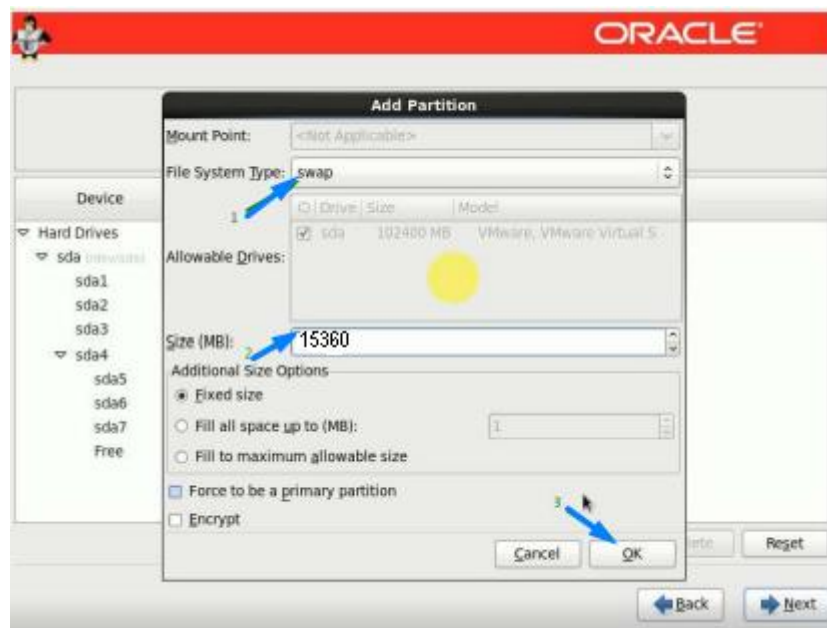
6.40 Create “/opt” a partition.



6.41 Proceed to create new partition



#### 6.42 Create “swap” partition



#### 6.43 Finally, our partition looks like and then click on Next button.



6.44 Proceed to erase our partitions, click on Format button.

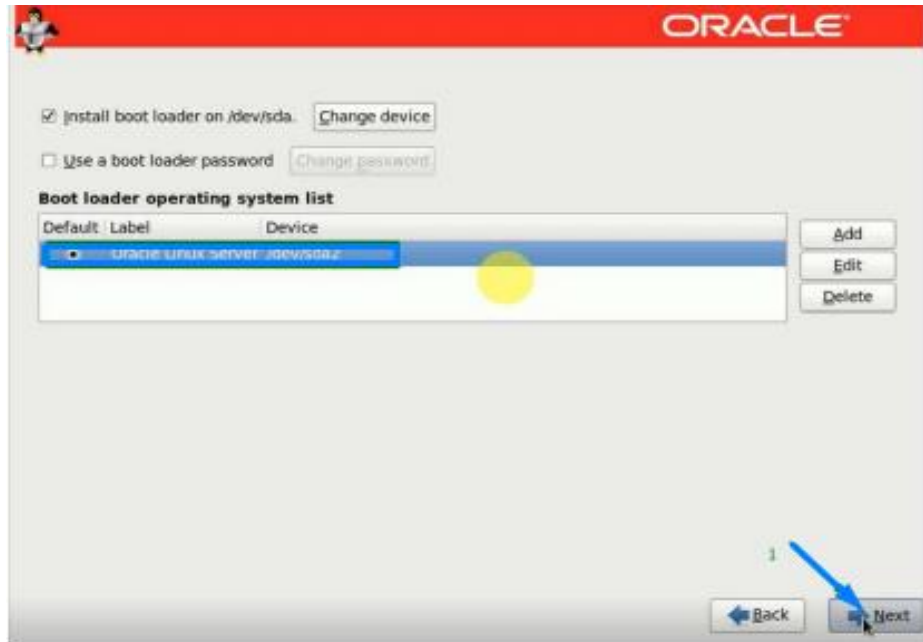


6.44. Click on Write changes to disk button





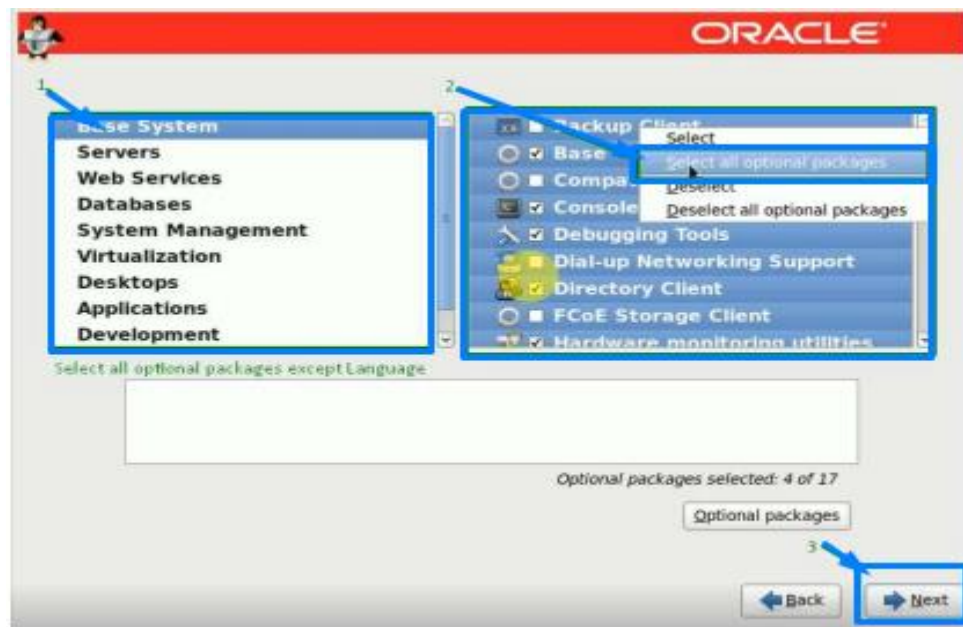
6.45 Select Boot loader operating system then Click on Next button.



6.46 Choose Customize now option then Click on Next button.



6.47 Choose all optional packages for relevant options except languages option then Click on Next button



6.48 Progress looks like.

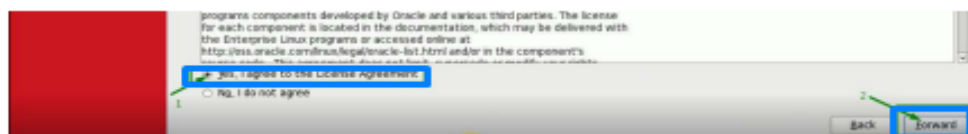


6.49  
Click  
on

Forward button.



6.49. Accept the License Agreement then click on Forward button.



6.50 Choose No, I prefer to register at a later time option then click on Forward button.



6.51 Click on the Reboot button.



6.52 Click on No thanks, I'll connect later button.



6.52. Click on the Forward button.



6.53 Create a user named as "oracle" then Click on Forward button.



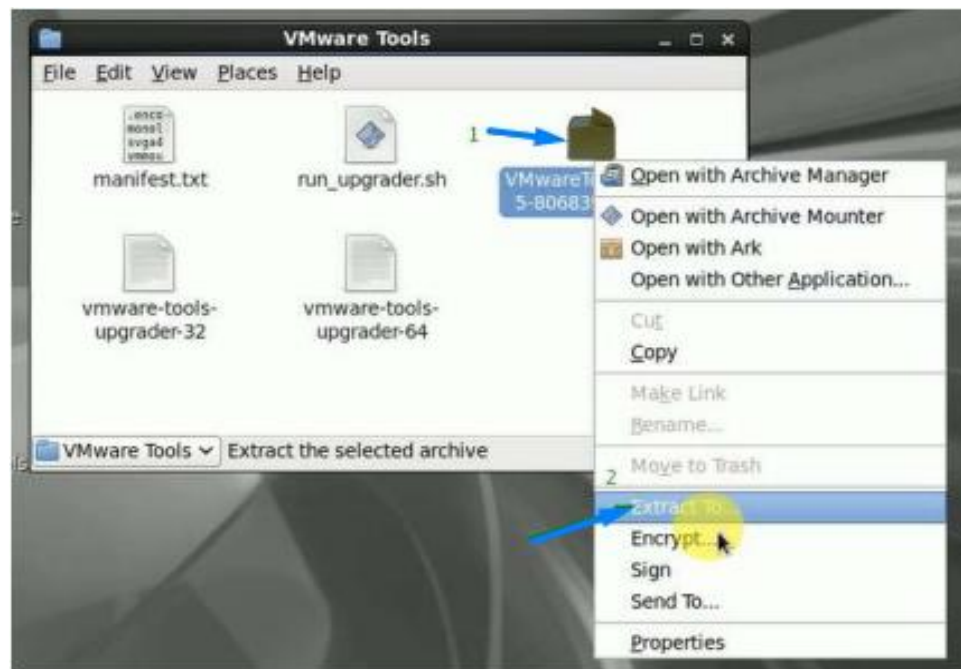
6.53. Login as “root” user with previously password then click on Log In button.



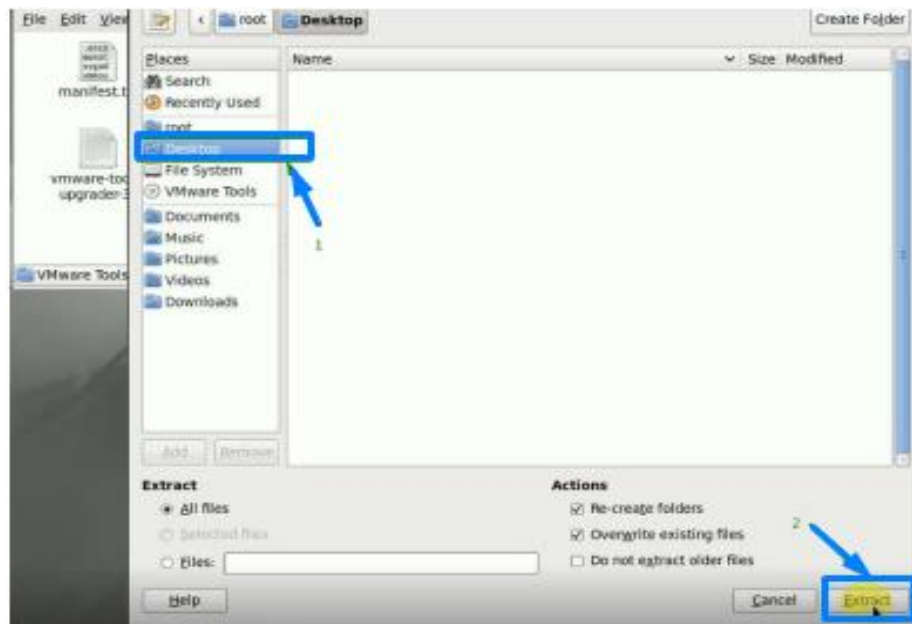
6.54. Go to VM menu then click on “Install VMware Tools”.



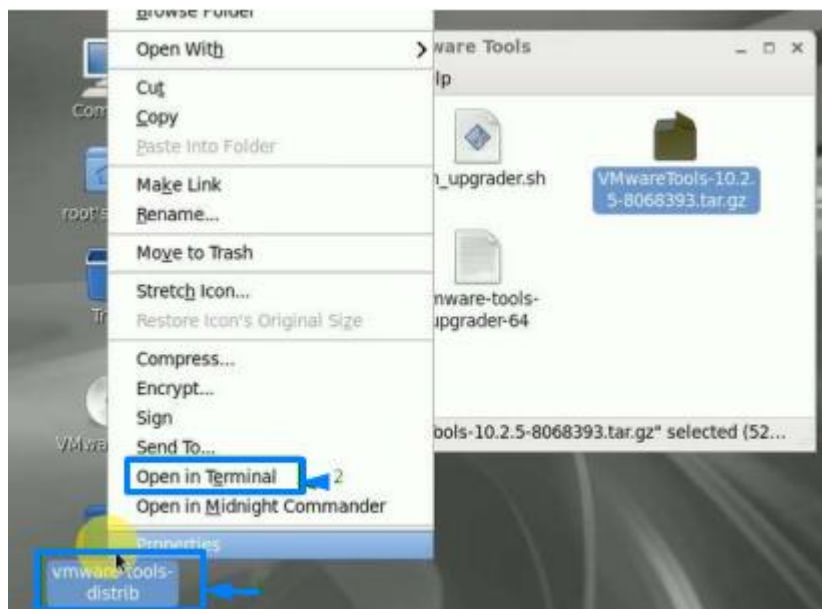
6.55. After step “1.64” there is a terminal with “VMwareTools-10.2.5-8068393.tar.gz” directory appeared then right click on directory and click on “Extract To”



6.56. Choose the proper location where you want to extract.

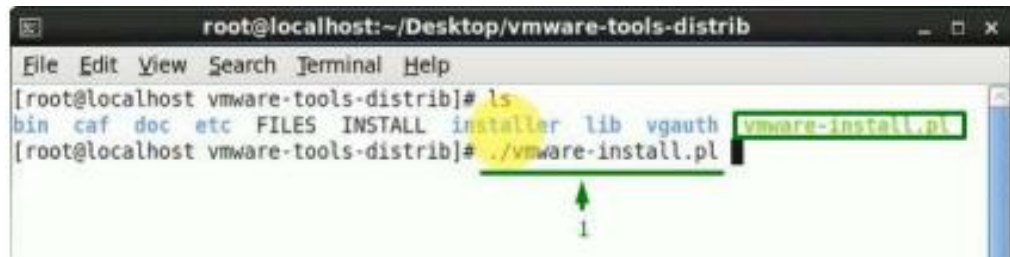


6.57. Right Click on extracted folder named as “vmwaretools-distrib” then click on “Open in Terminal”.



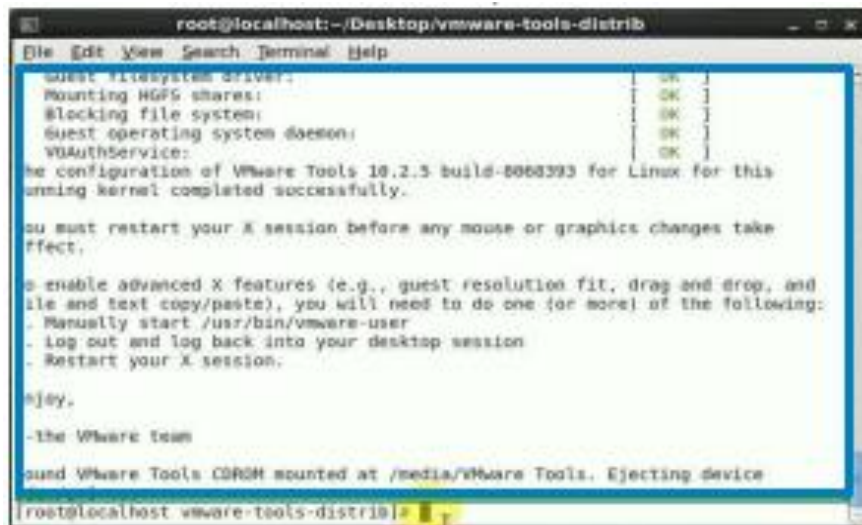


6.57. Run Pearl file (vmware-install.pl) to install VM tools in your OS with every asked option proceed to Enter from keypad to set default option.



```
root@localhost: ~/Desktop/vmware-tools-distrib
File Edit View Search Terminal Help
[root@localhost vmware-tools-distrib]# ls
bin  caf  doc  etc  FILES  INSTALL  installer  lib  vgauth  vmware-install.pl
[root@localhost vmware-tools-distrib]# ./vmware-install.pl
1
```

6.58. After successful installation of vm tools your terminal looks like



```
root@localhost: ~/Desktop/vmware-tools-distrib
File Edit View Search Terminal Help
Guest filesystem driver: [ OK ]
Mounting HGFS shares: [ OK ]
Blocking file system: [ OK ]
Guest operating system daemon: [ OK ]
VMAuthService: [ OK ]
The configuration of VMware Tools 10.2.5 build-8068393 for Linux for this
running kernel completed successfully.

You must restart your X session before any mouse or graphics changes take
effect.


To enable advanced X features (e.g., guest resolution fit, drag and drop, and
file and text copy/paste), you will need to do one (or more) of the following:
- Manually start /usr/bin/vmware-user
- Log out and log back into your desktop session
- Restart your X session.

Enjoy.

-the VMware team

Unmounted VMware Tools CDROM mounted at /media/VMware Tools. Ejecting device
[root@localhost vmware-tools-distrib]#
```

6.59.Type “init 0” to shut down your VM machine.



```
root@localhost:~/Desktop/vmware-tools-distrib
File Edit View Search Terminal Help
Guest filesystem driver: [ OK ]
Mounting HGFS shares: [ OK ]
Blocking file system: [ OK ]
Guest operating system daemon: [ OK ]
VGAAuthService: [ OK ]
The configuration of VMware Tools 10.2.5 build-8068393 for Linux for this
running kernel completed successfully.

You must restart your X session before any mouse or graphics changes take
effect.

To enable advanced X features (e.g., guest resolution fit, drag and drop, an
file and text copy/paste), you will need to do one (or more) of the followin
:
1. Manually start /usr/bin/vmware-user
2. Log out and log back into your desktop session
3. Restart your X session.

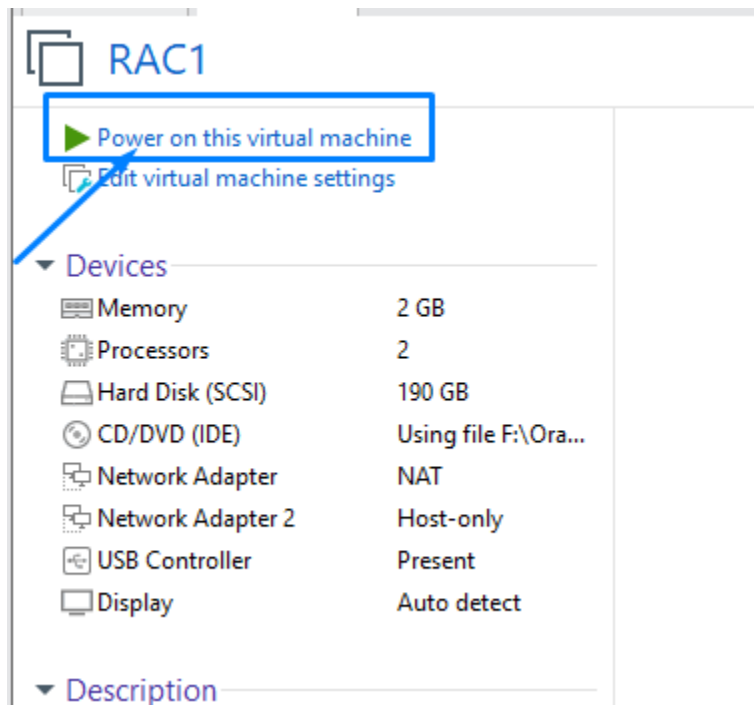
Enjoy,

--the VMware team

Found VMware Tools CDRROM mounted at /media/VMware Tools. Ejecting device
/dev/sr0 ...
[root@localhost vmware-tools-distrib]# init 0
```

Step 1

6.60. Power on your machine.



6.61. Login as “root” user with previous password then click on Log In button.



Notes:

**7. I am using clone method for preparation RAC2 node from RAC1 node in VM Workstations. All steps are the same as Node 1.**

7.1. Power on your machine

