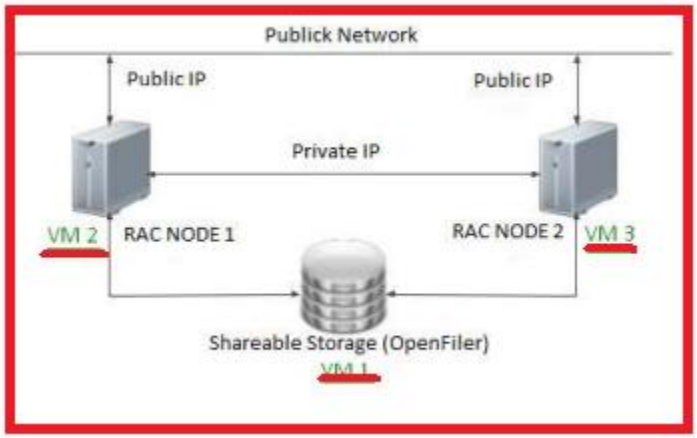
Oracle 11gR2 RAC Installation on Oracle Linux 6.5 with VMware Workstation 16 pro (Using OPENFILER 2.99)

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 filer 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
   - oracleasmlib-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

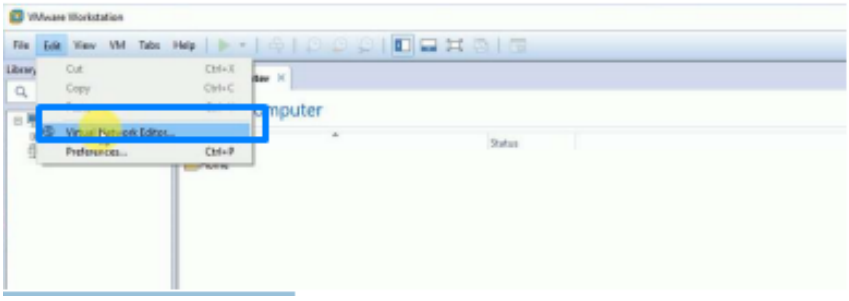
Storage Component	File System	Volume Size	ASM Volume Group Name	Openfiler Volume Name
OCR/Voting Disk	ASM	20GB	+CRS	crs
Database Files	ASM	40GB	+DATA	data1
Fast Recovery Area	ASM	25GB	+FRA	fra1

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.

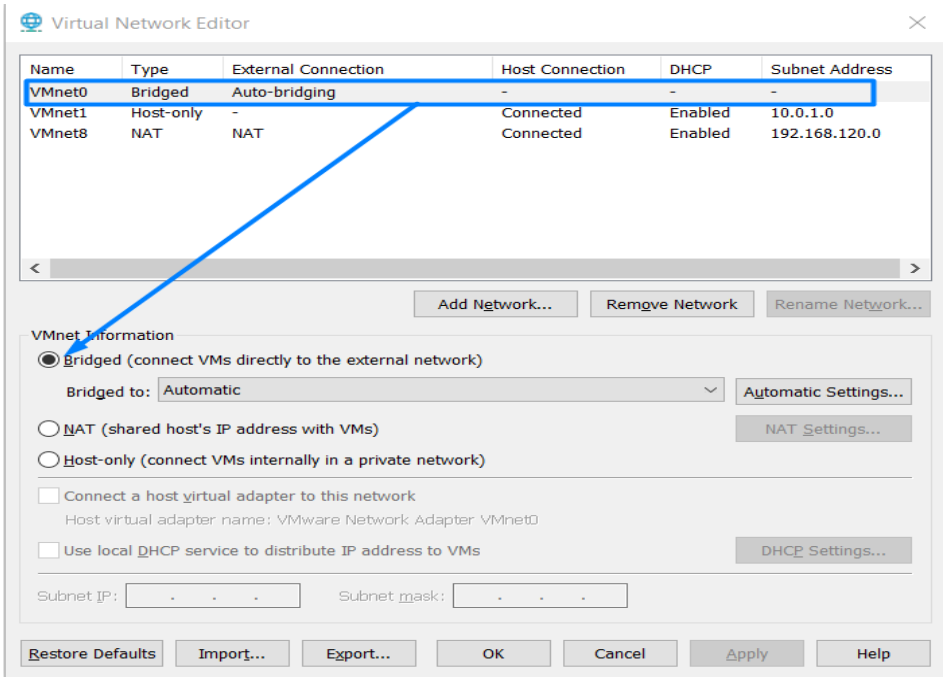
1. Configure Virtual Network Editor IP

1.1. Edit => Virtual Network Editor

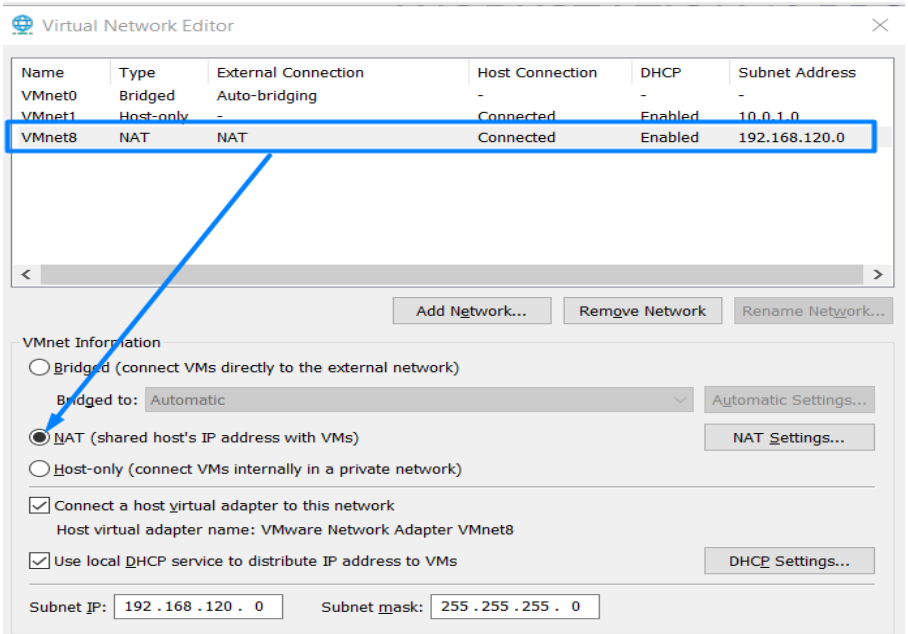


1.2 Initializing virtual networks

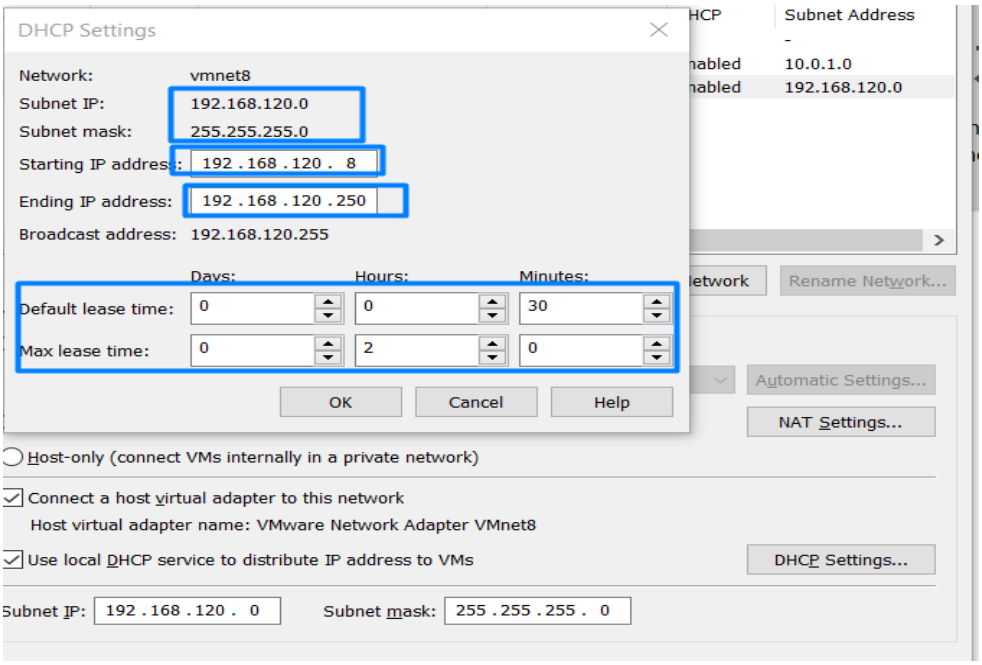
1.3. VMnet0 => Bridged => Automatic



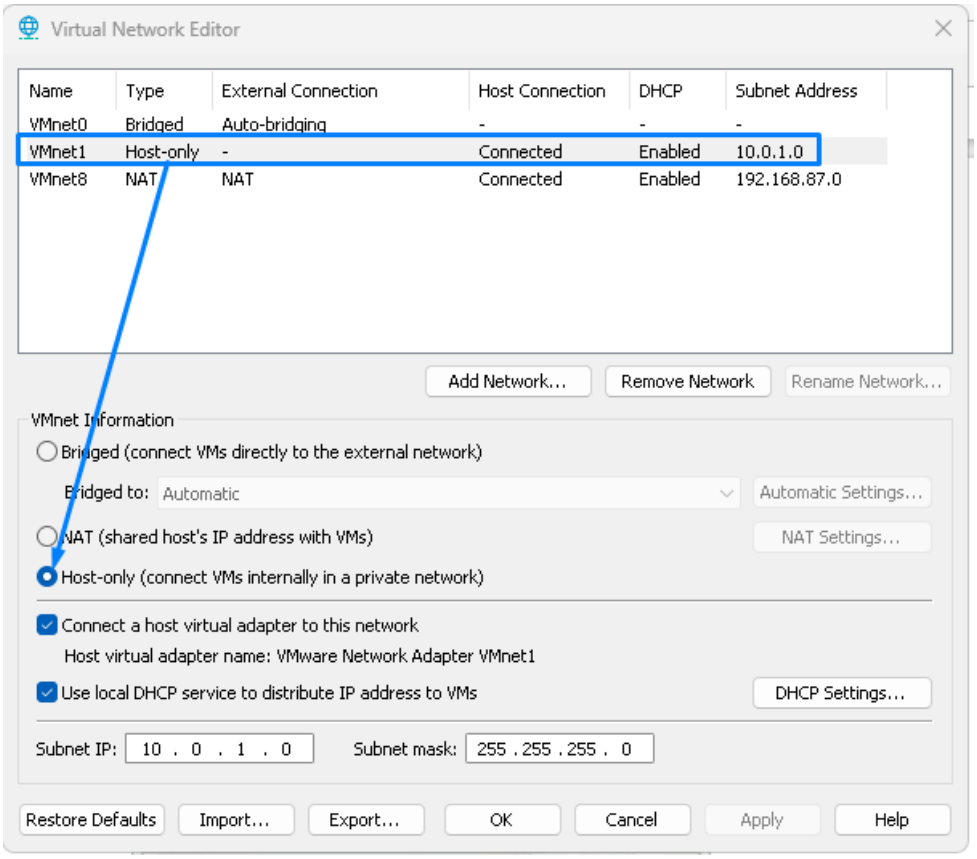
1.4. VMnet8=> NAT => DHCP



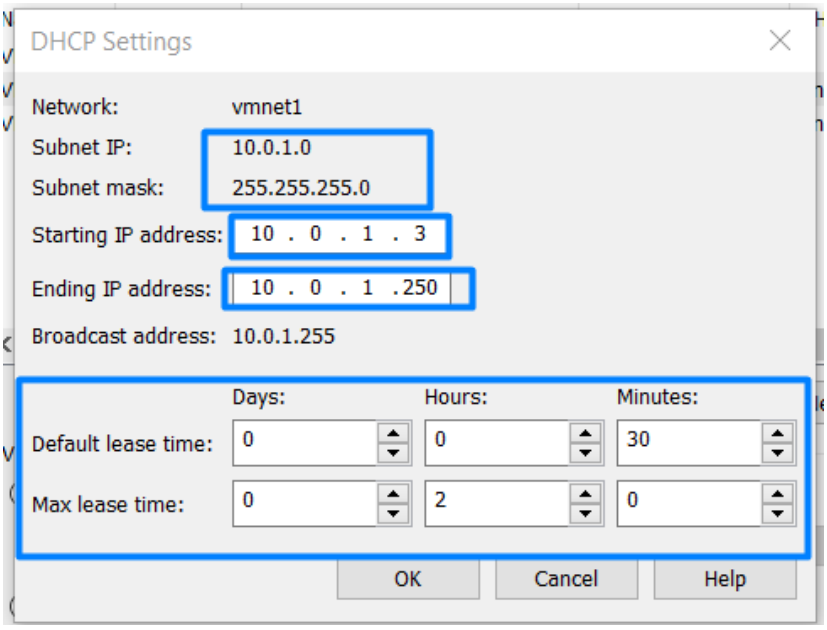
1.5. VMnet8 => NAT => DHCP Setting



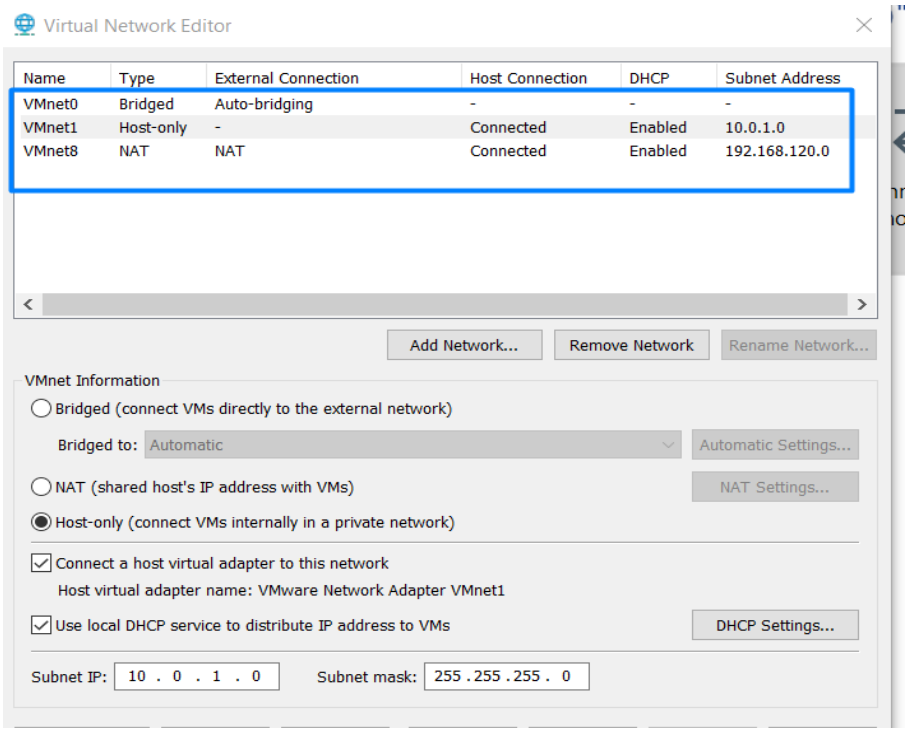
1.6. Vmnet1=>Host Only =>DHCP



1.7. VMnet8 => Host Only => DHCP Setting

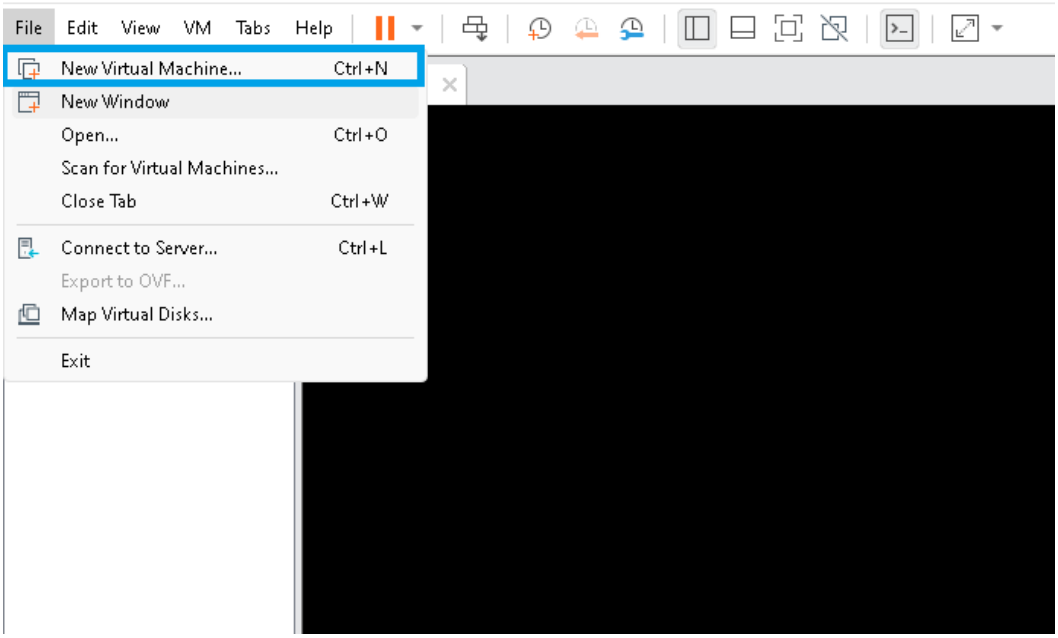


1.8. Finley the Configuration looks like, Virtual Network Editor IP

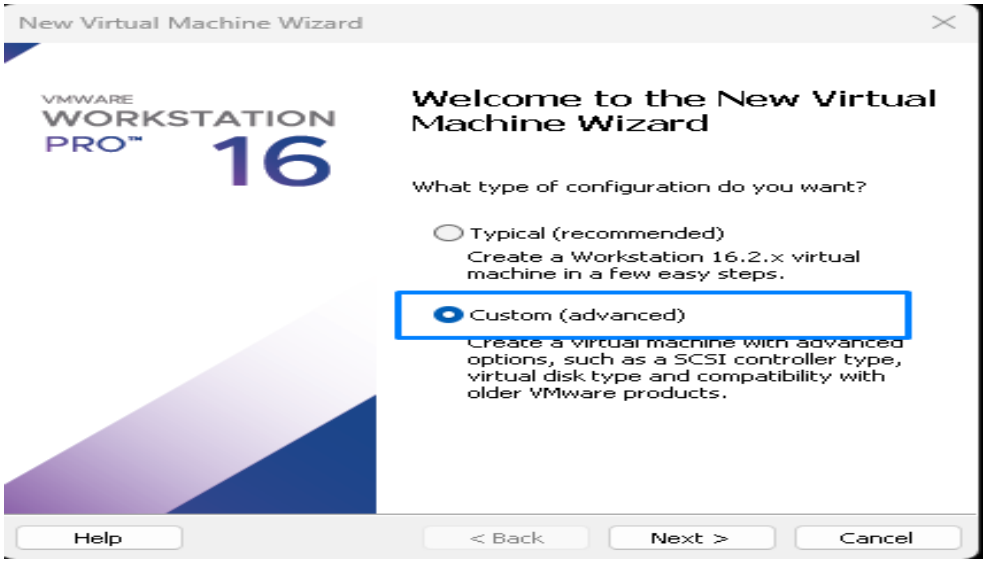


2. New VM Configuration for Openfiler

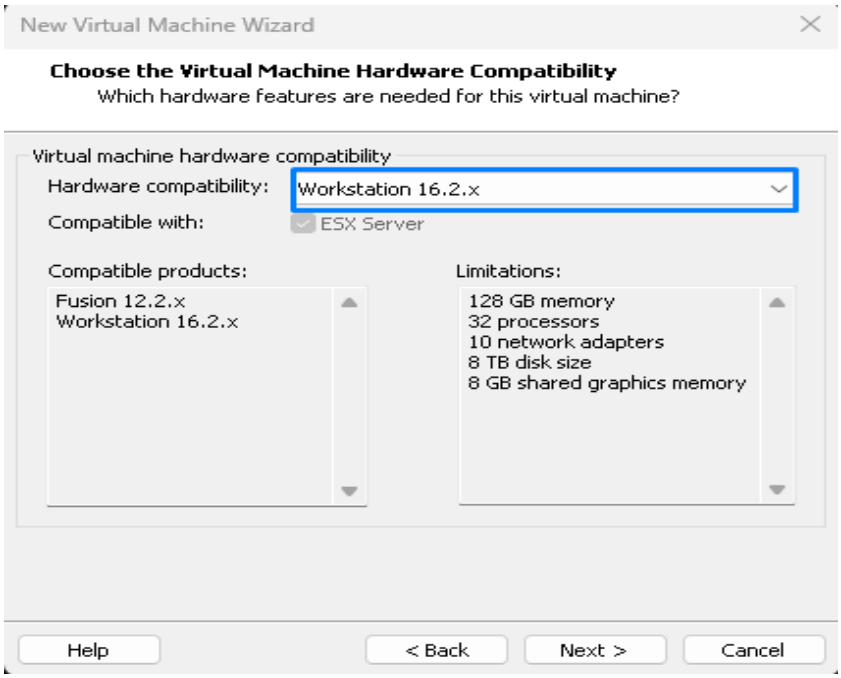
2.1. File => New Virtual Machine



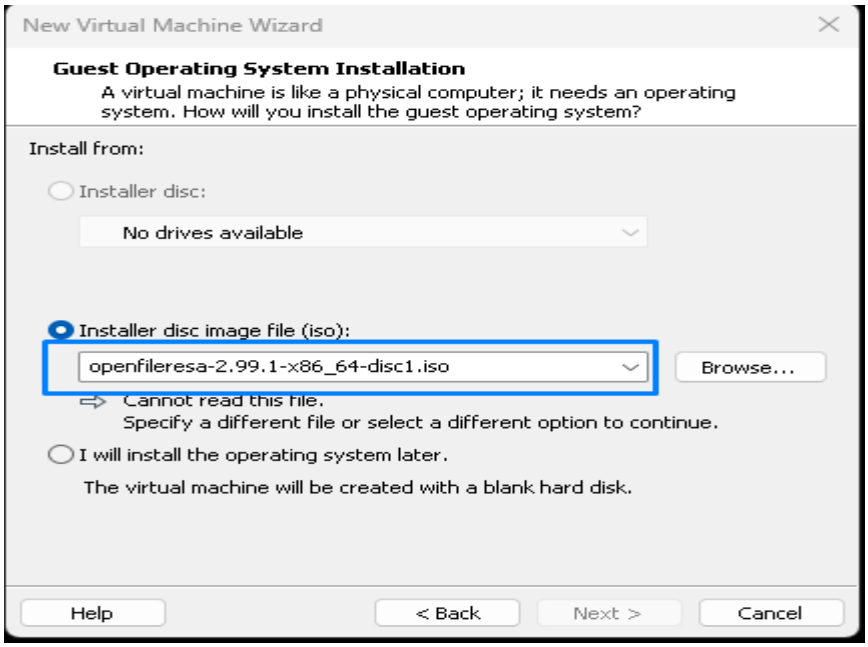
2.2. Choose Custom configuration.



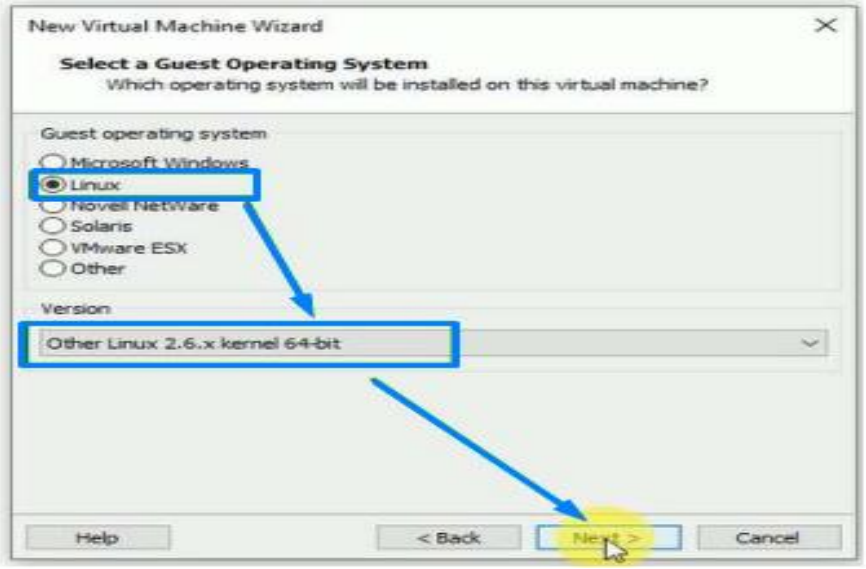
2.3. Choose default Hardware compatibility



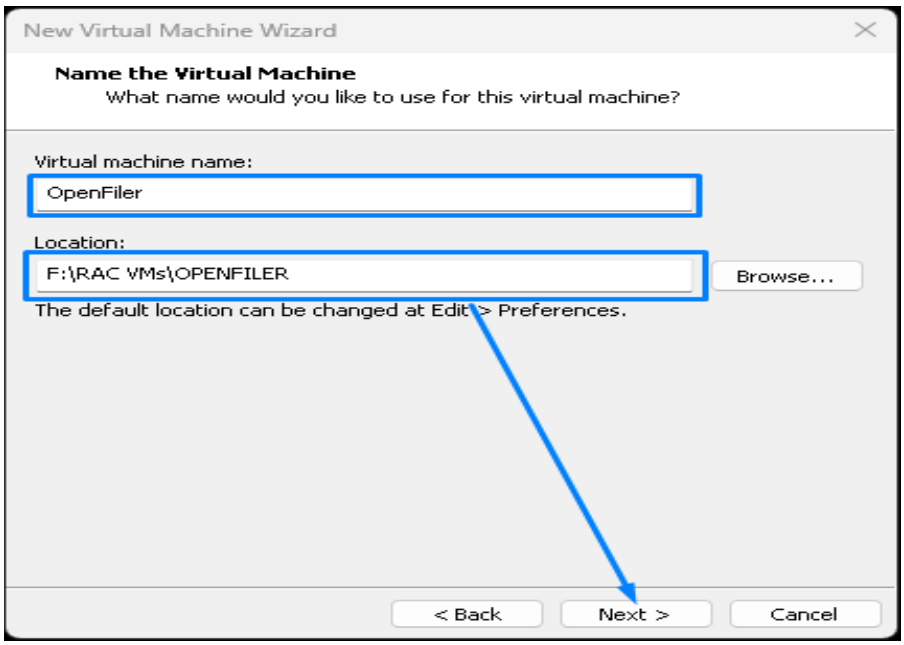
2.4. Choose Openfiler iso file (openfileresa-2.99.1-x86_64-disc1.iso) using Browse



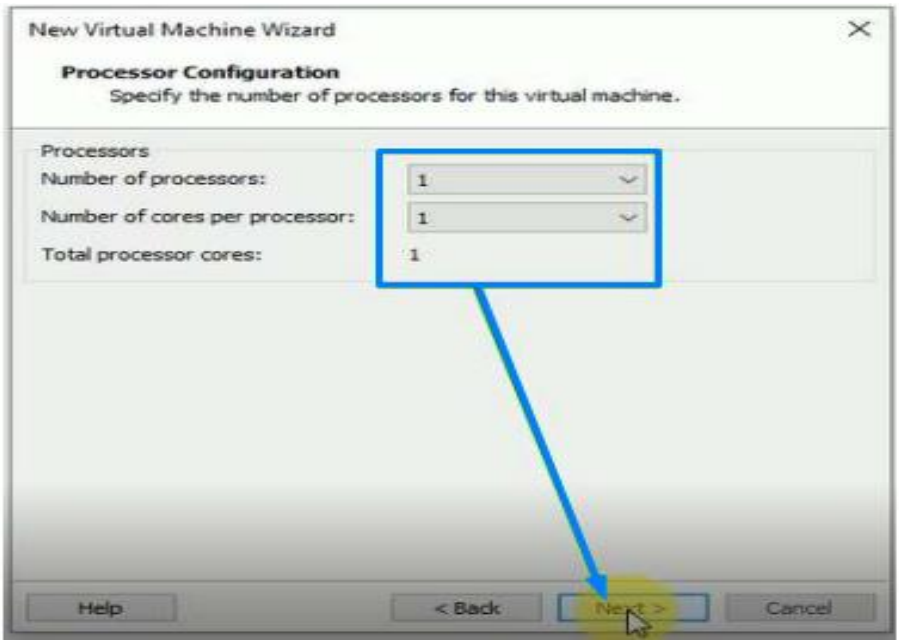
2.5. Choose OS and Version



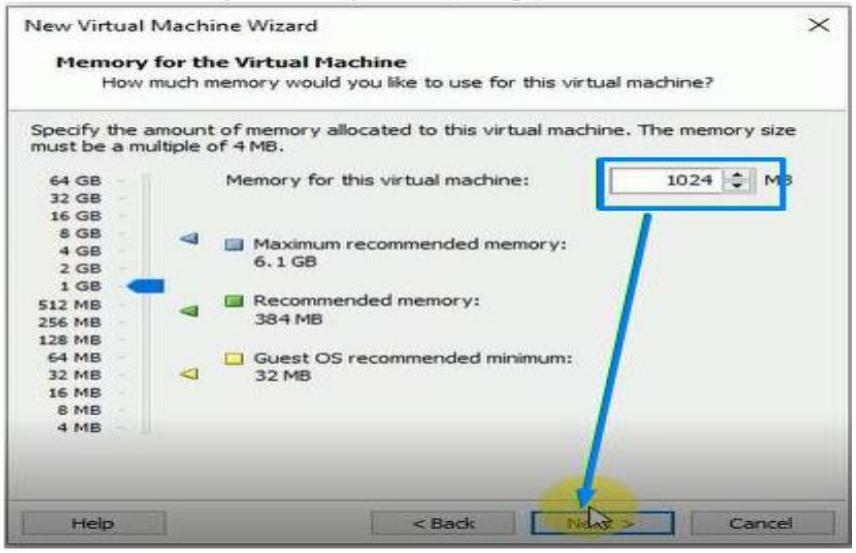
2.6. Provide VM Machine name and location where you want to store



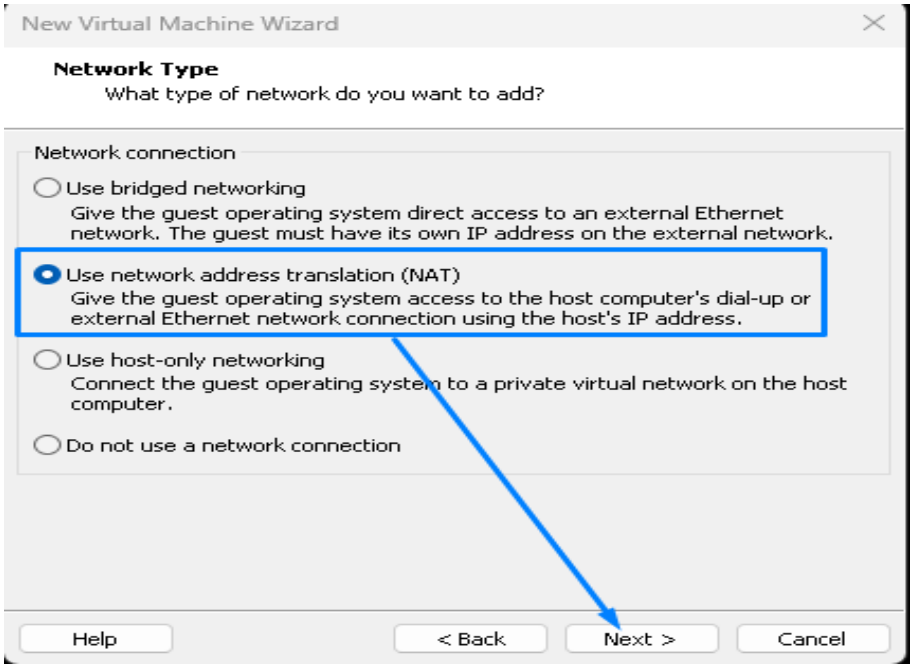
2.7. Select the processors and core as your machine



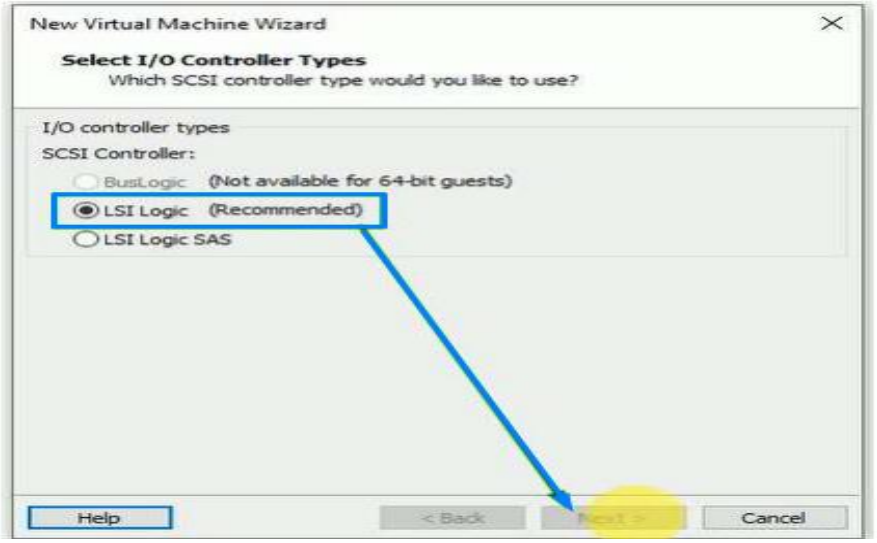
2.8. Put the memory 1GB for Openfiler (Storage)



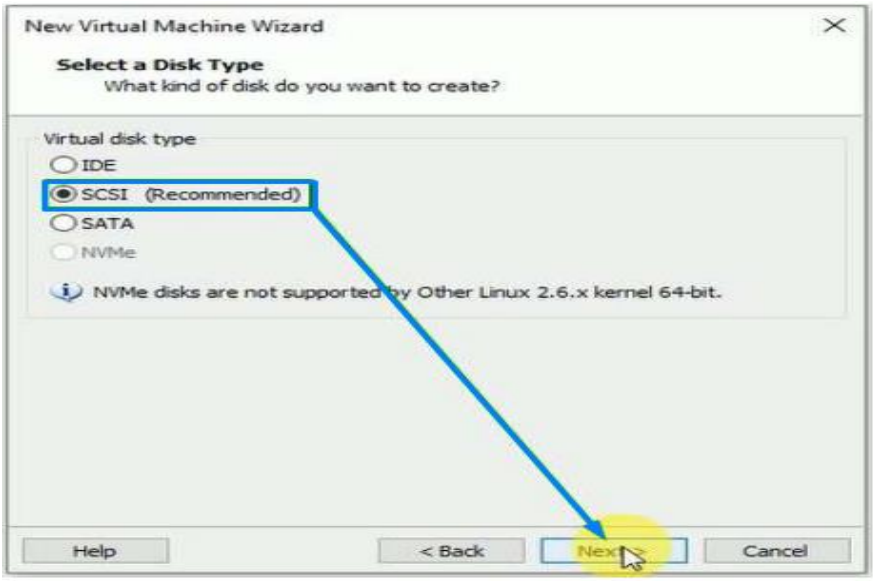
2.9. Choose NAT Network Connection



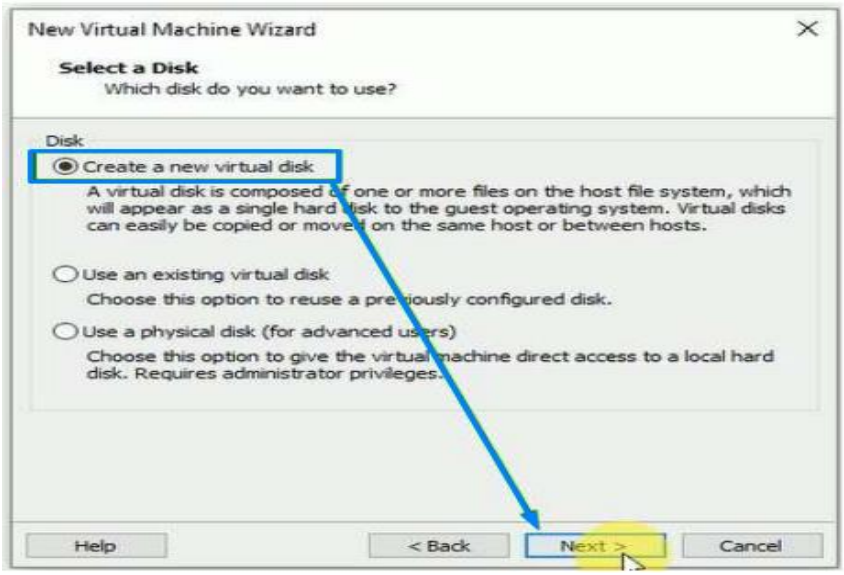
2.10. Select I/O Controller Type as LSI Logic



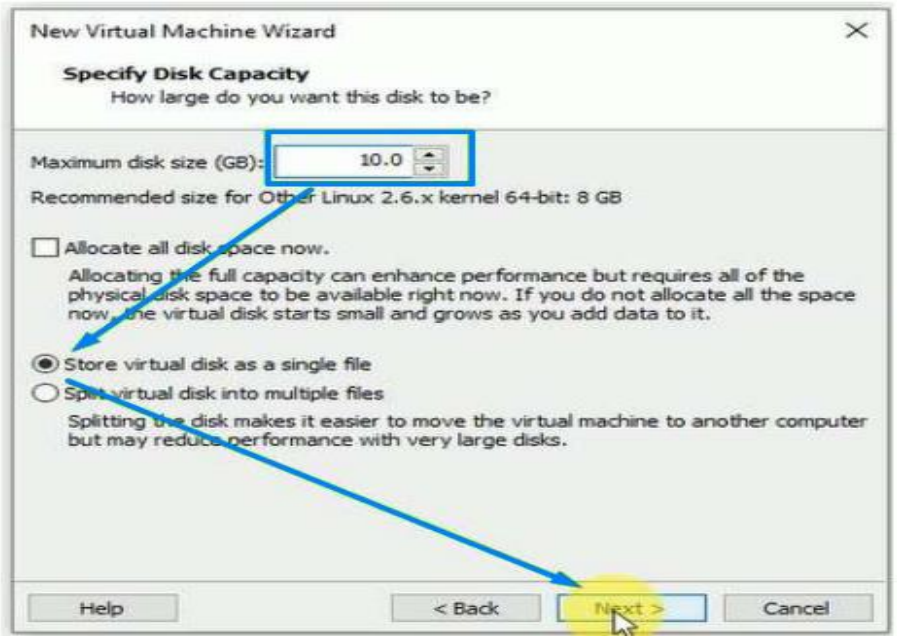
2.11. Select Disk Type as SCSI



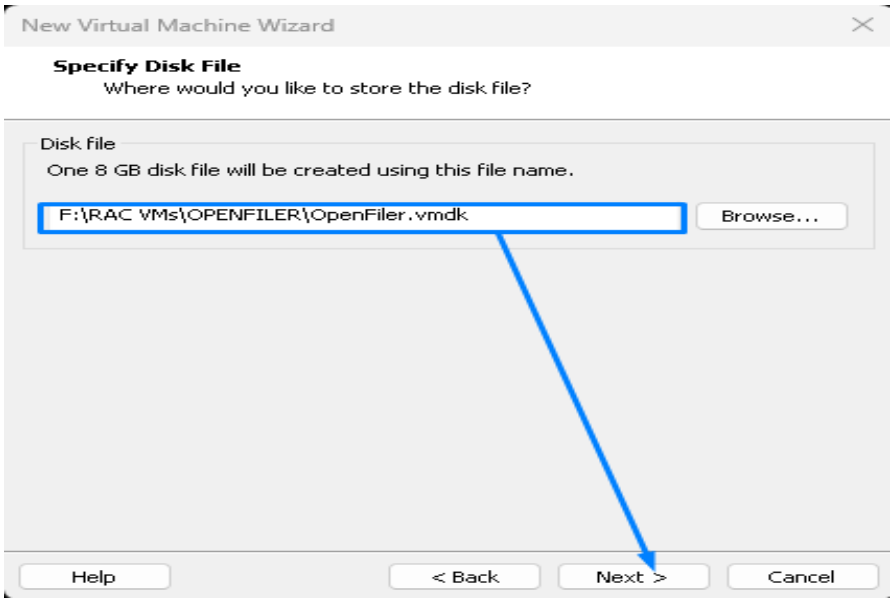
2.12. Create Disk to install Openfiler



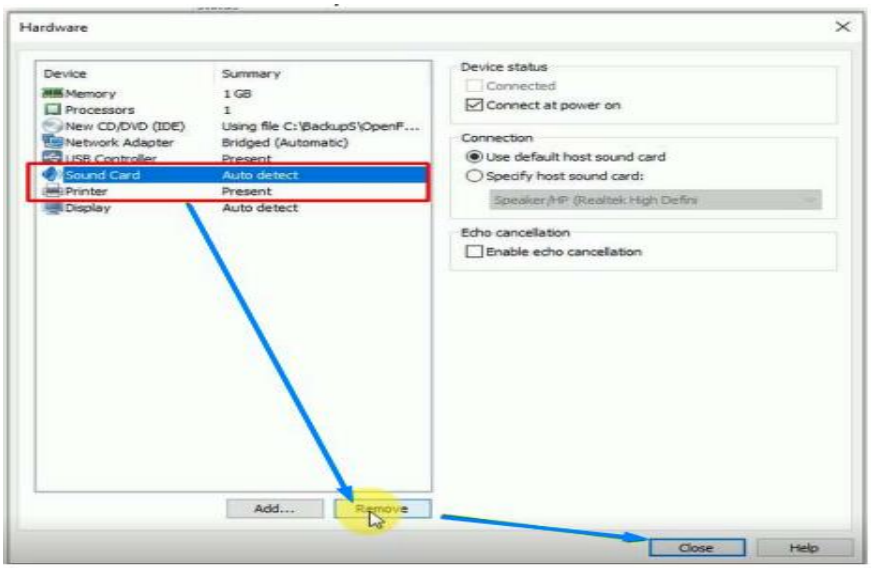
2.13. Put at list 10GB size to install Openfiler



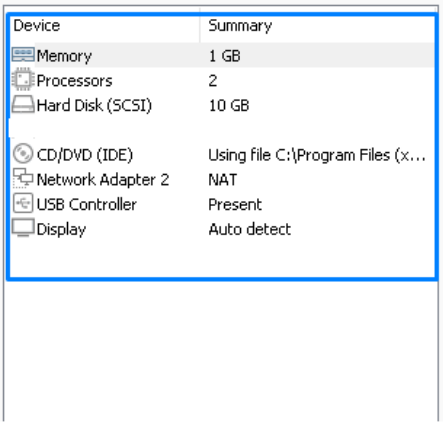
2.14. Provide location of Openfiler disk file



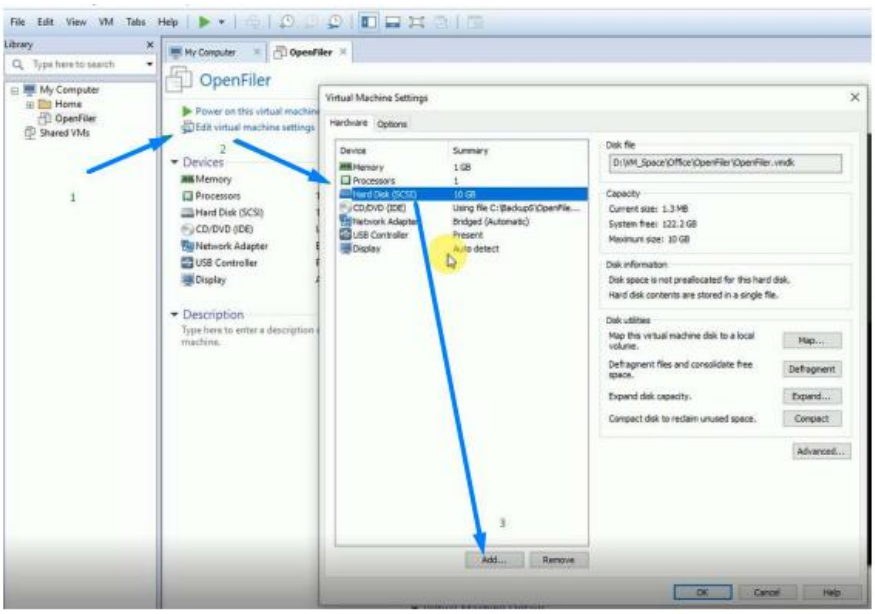
2.15. Remove the unnecessary drivers



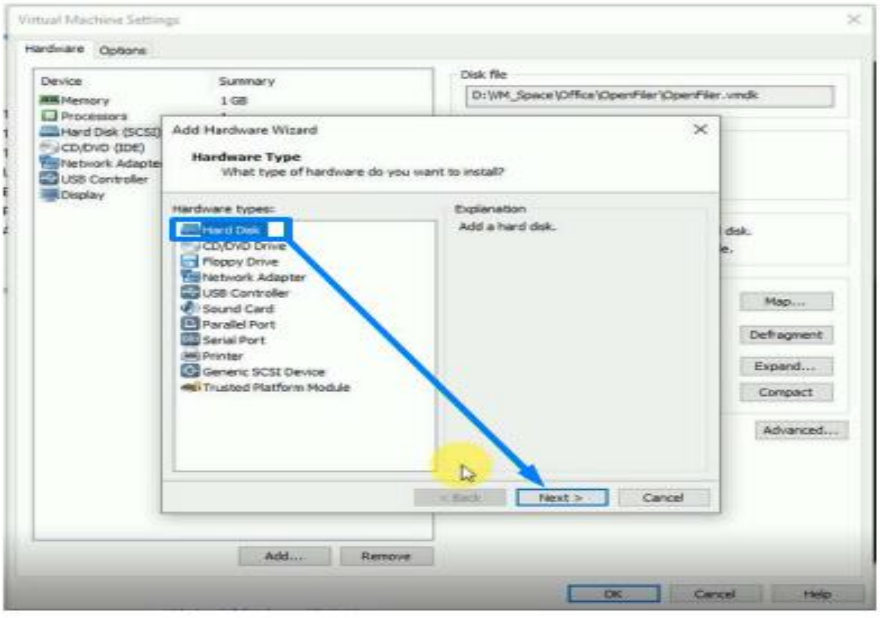
2.16. Verification of new VM machine



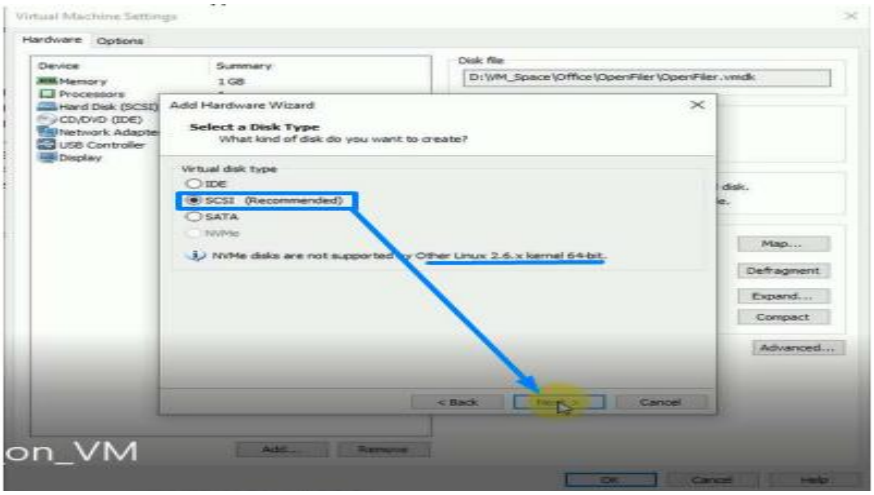
2.17. Adding Hard disk space to create OCR, DATA & FRA



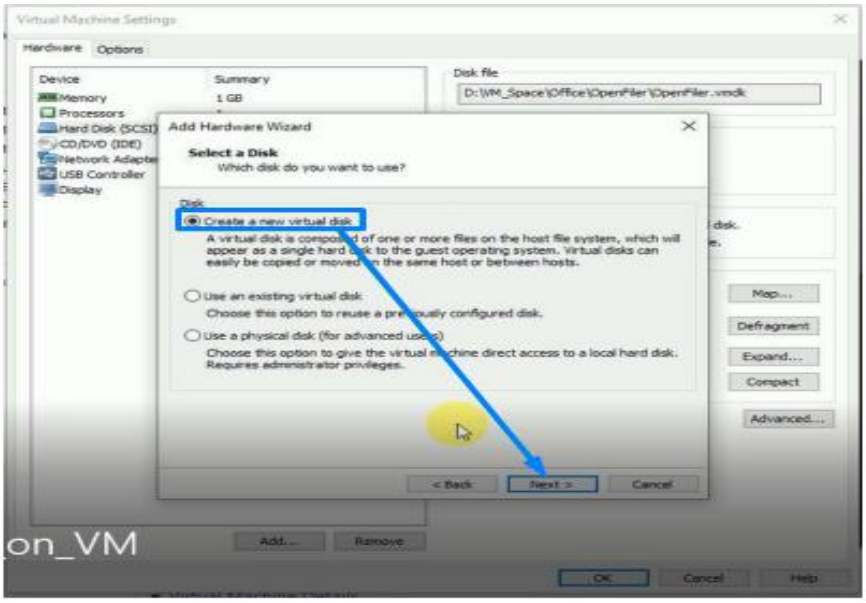
2.18. Run the VM Wizard to add hard disk



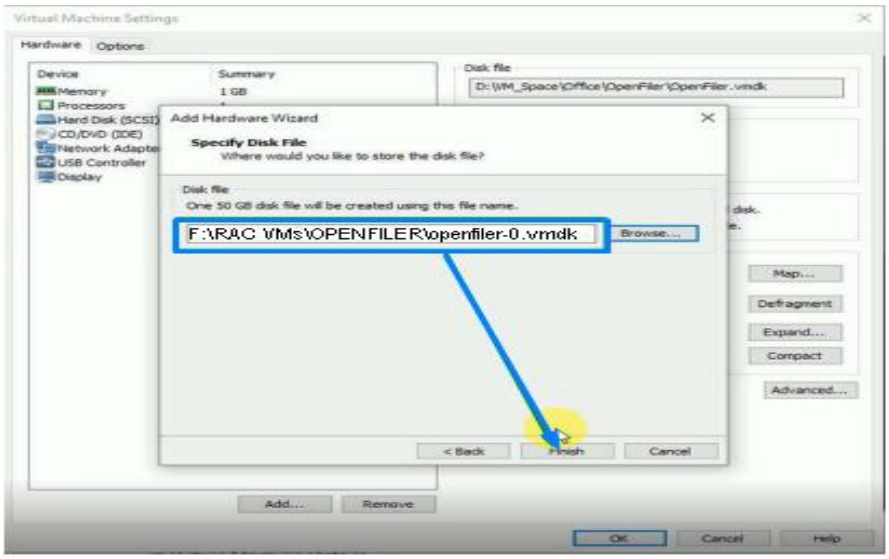
2.19. Select a disk type as SCSI



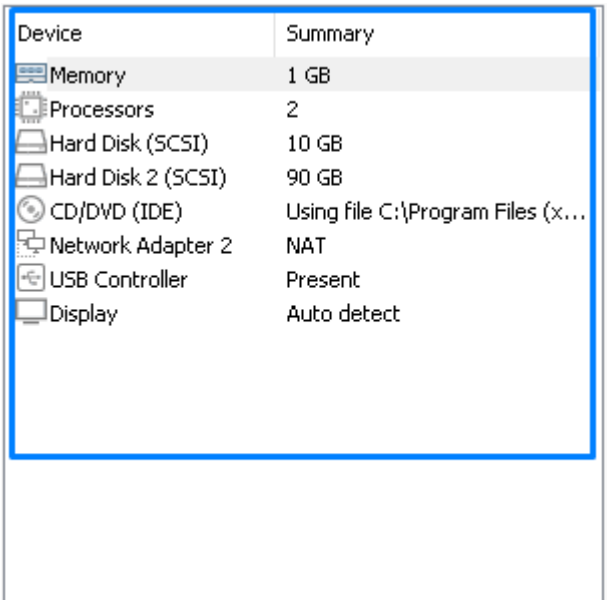
2.20. Select to Create a new virtual disk



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

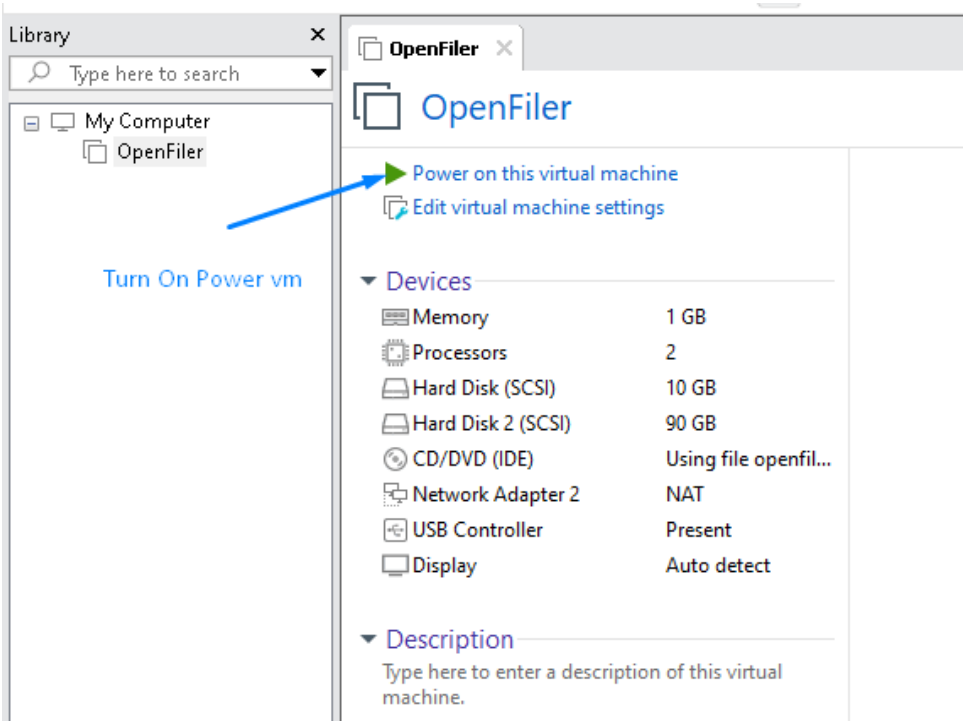


2.22. Verification of Openfiler Configuration

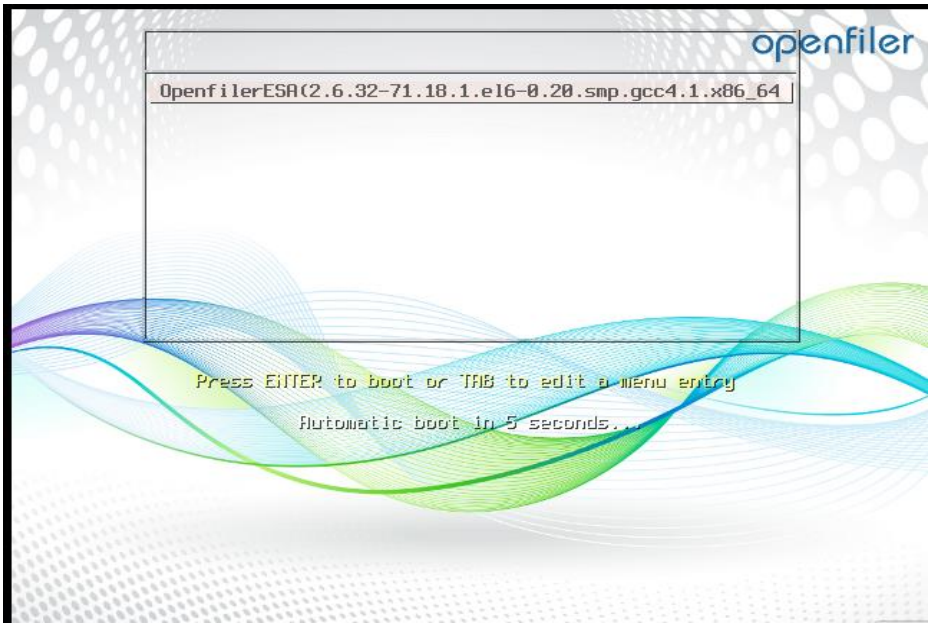


3. Installation of Openfiler over VM machine

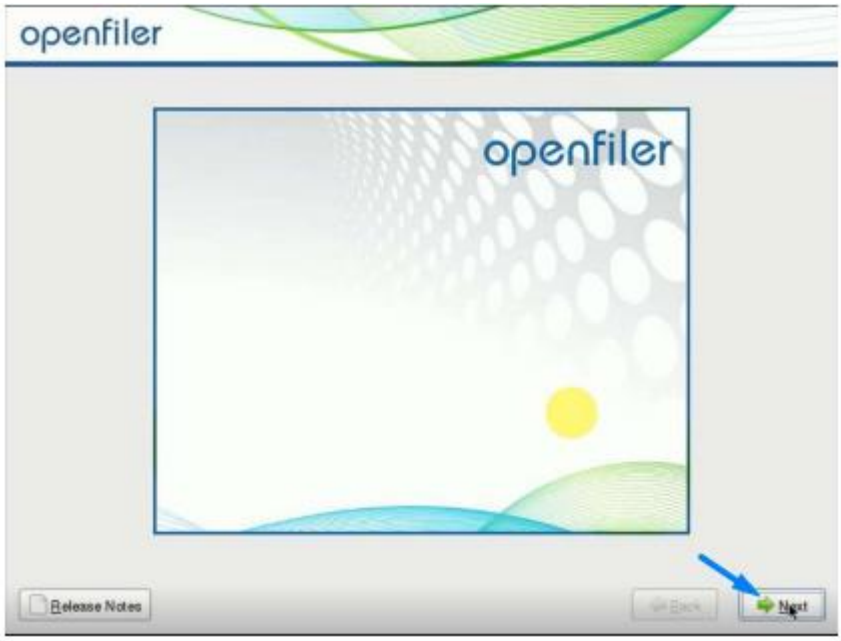
3.1. Power on the Openfiler VM machine to install



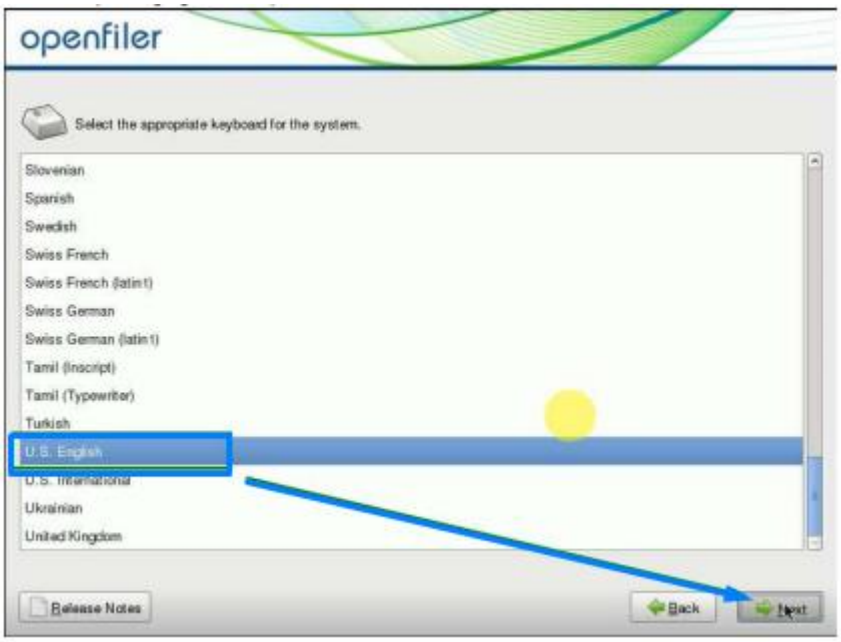
3.2. Proceed to install openfiler by hitting Enter Key



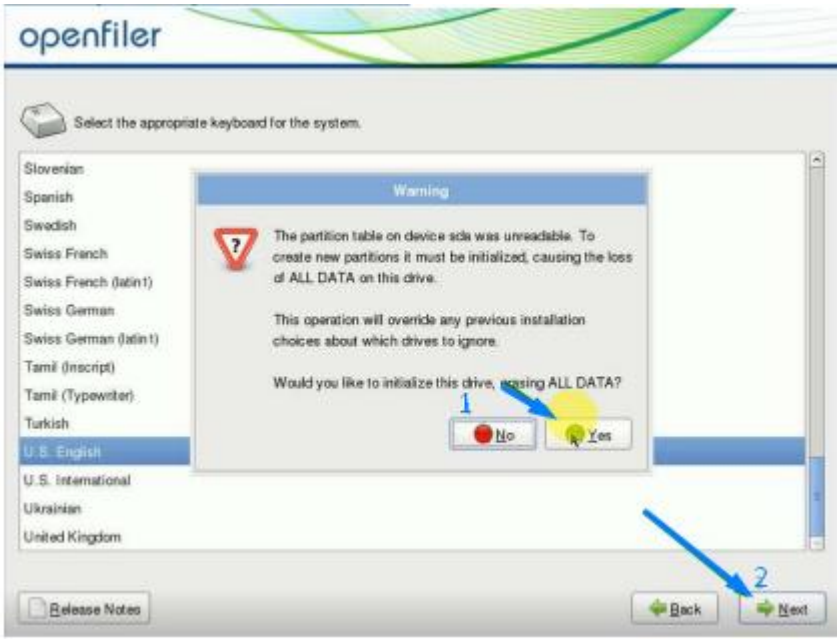
3.3. Proceed to Enter Next Button



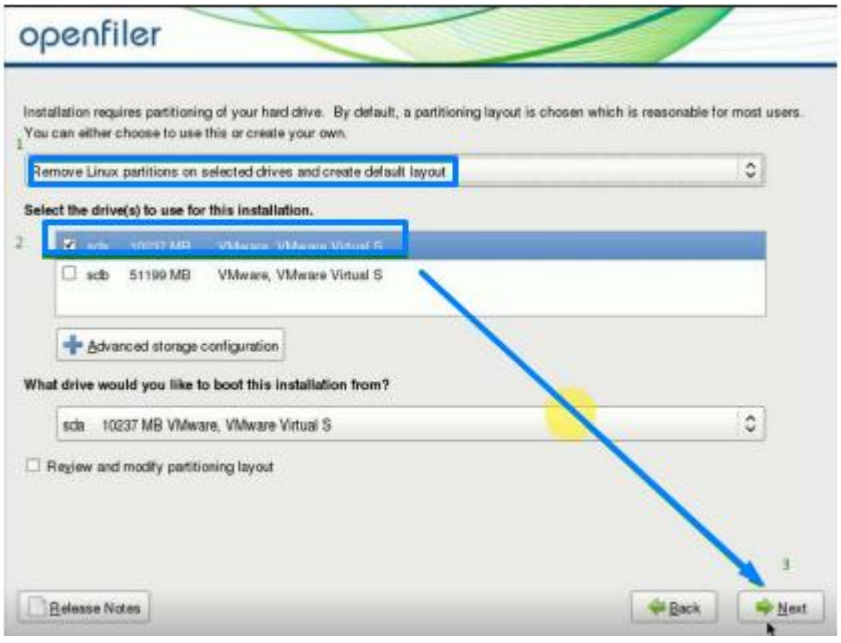
3.4. Choose your language and then proceed to Enter Next Button



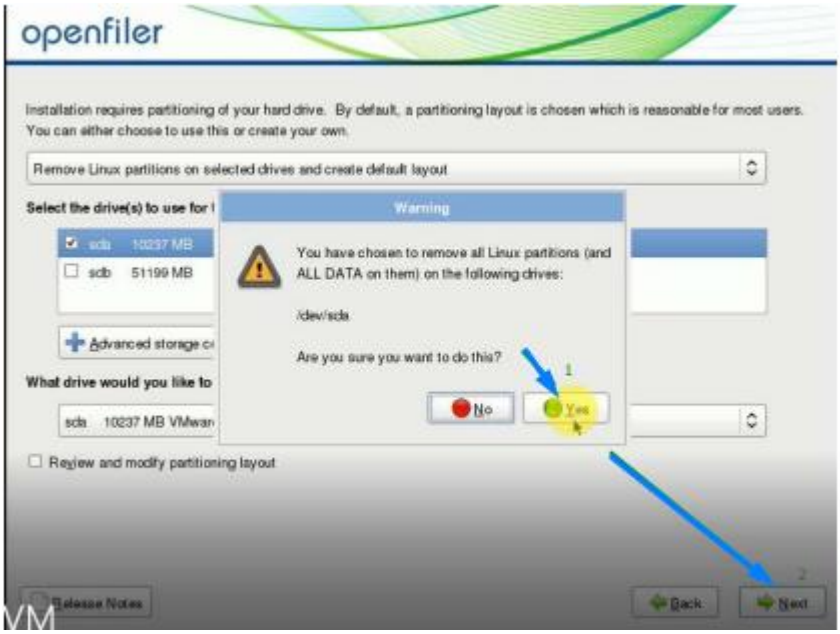
3.5. Click on yes and then proceed to Enter Next Button



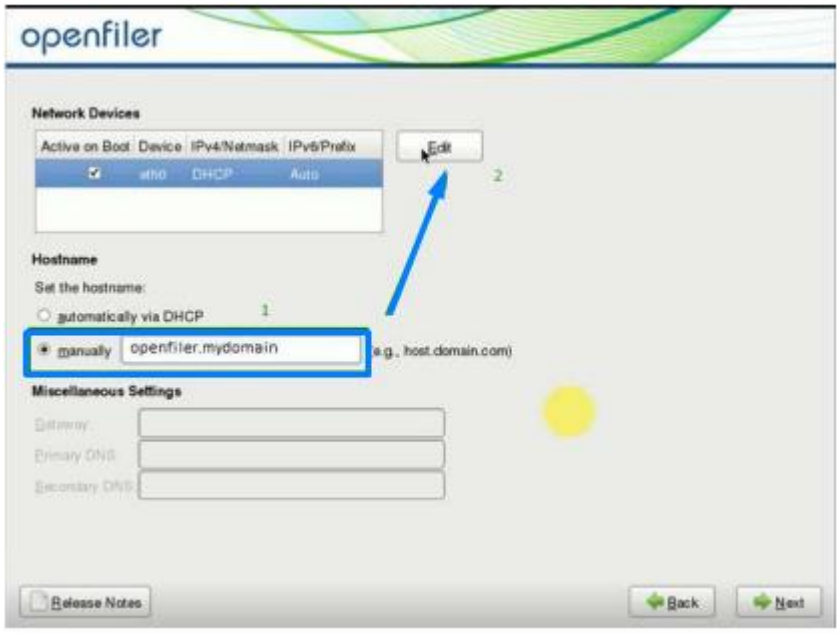
3.6. Choose storage, format option and then proceed to Enter Next Button



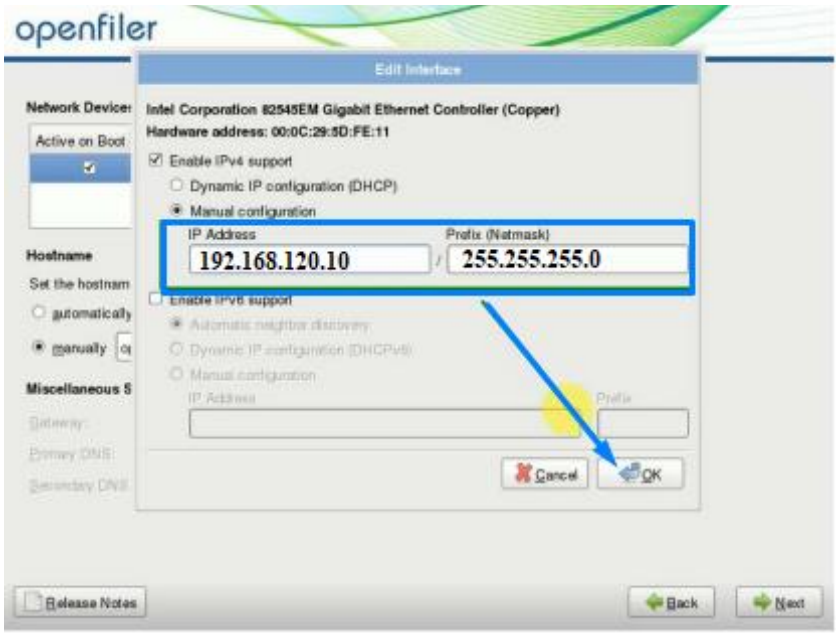
3.7. Click on yes button and then proceed to Enter Next Button



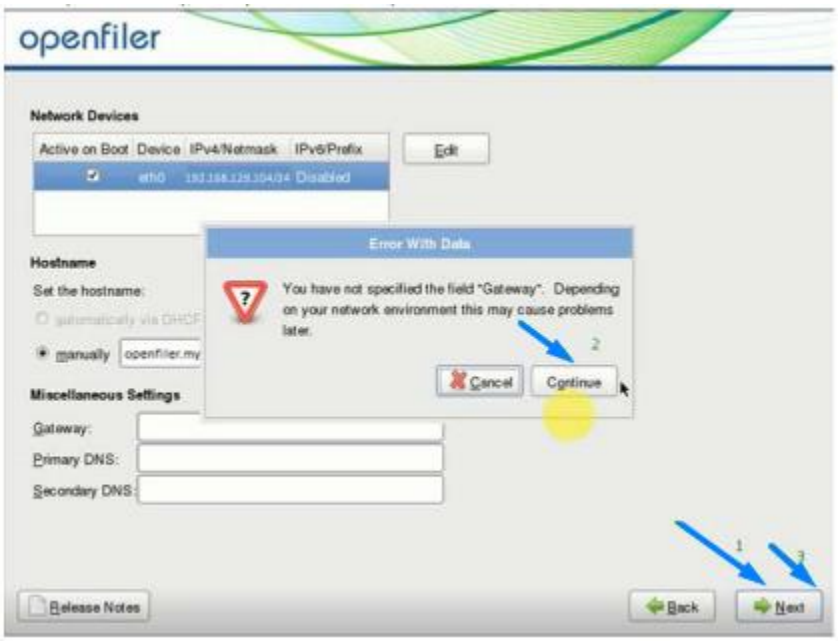
3.8. Enter your hostname and click on edit button to set your network



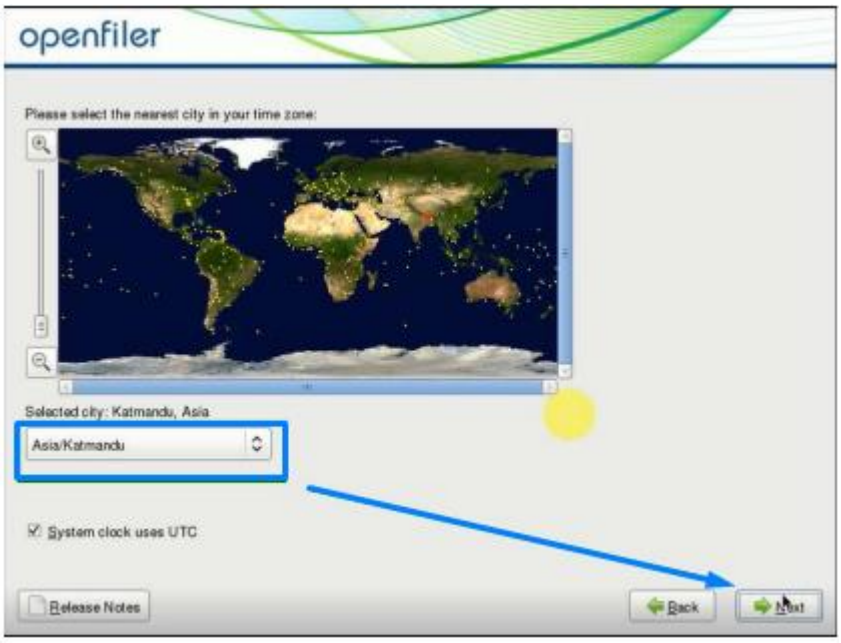
3.9. Set eth0 manual IP and then enter ok button



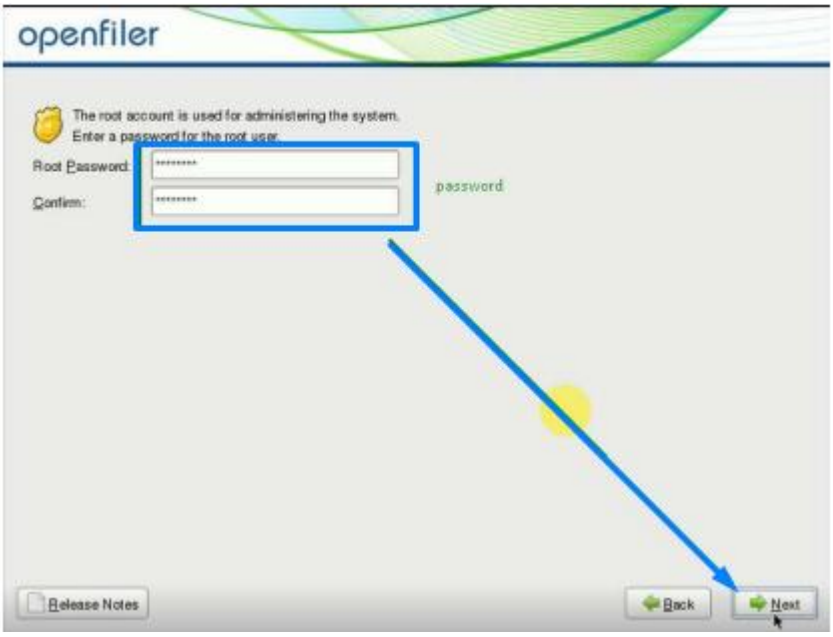
3.10. Skip when Gateway, Primary DNS and Secondary DNS IP asked and then enter ok button



3.11. Choose your city and then enter ok button

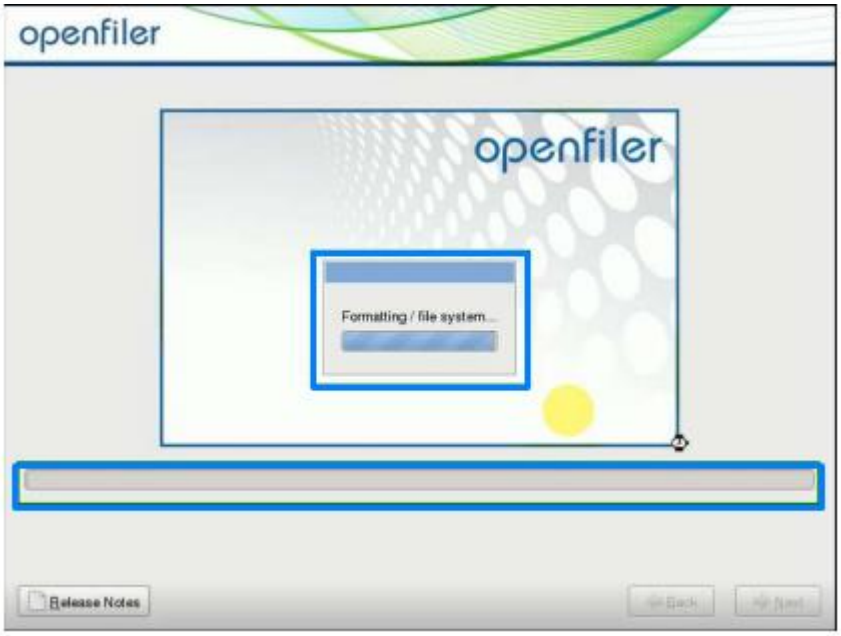


3.12. Set your root password for openfiler and then enter ok button

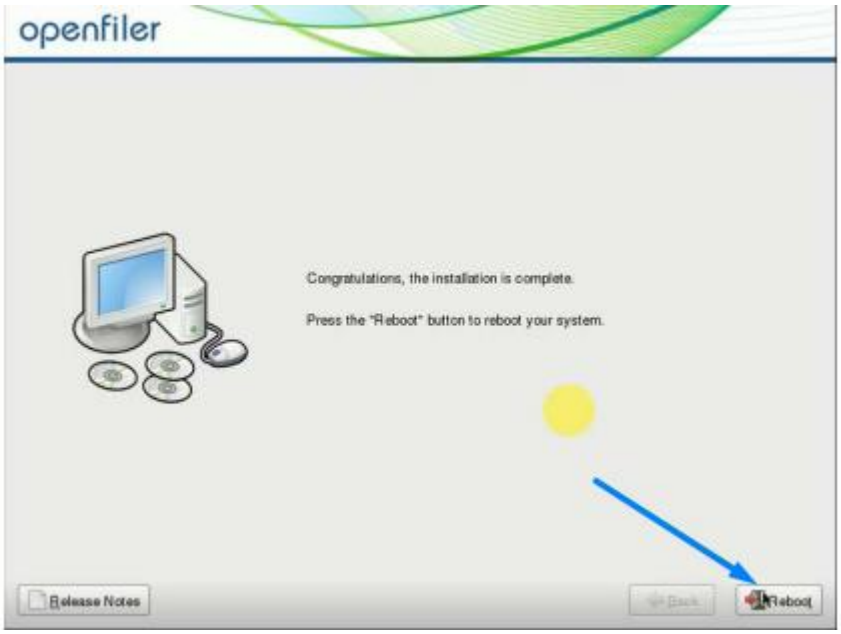


3.13. Proceed to enter ok button

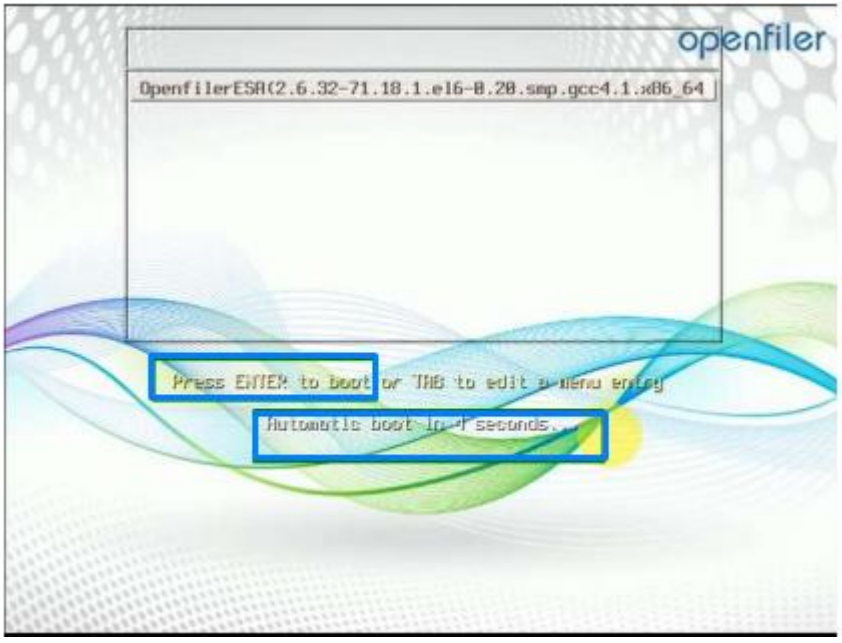
3.14. Wait for progress status of openfiler



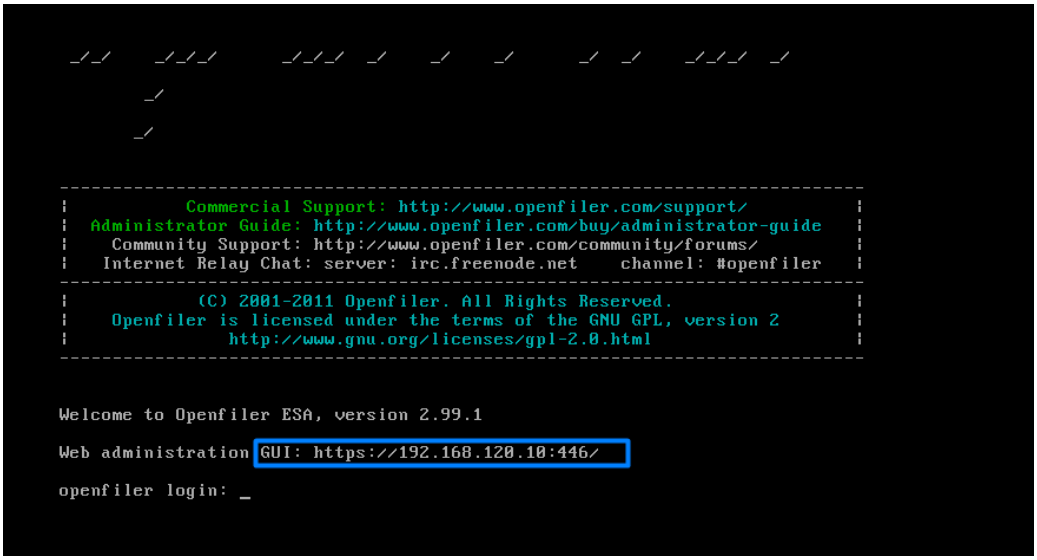
3.15. Proceed to enter Reboot button



3.16. Proceed to enter from Key board

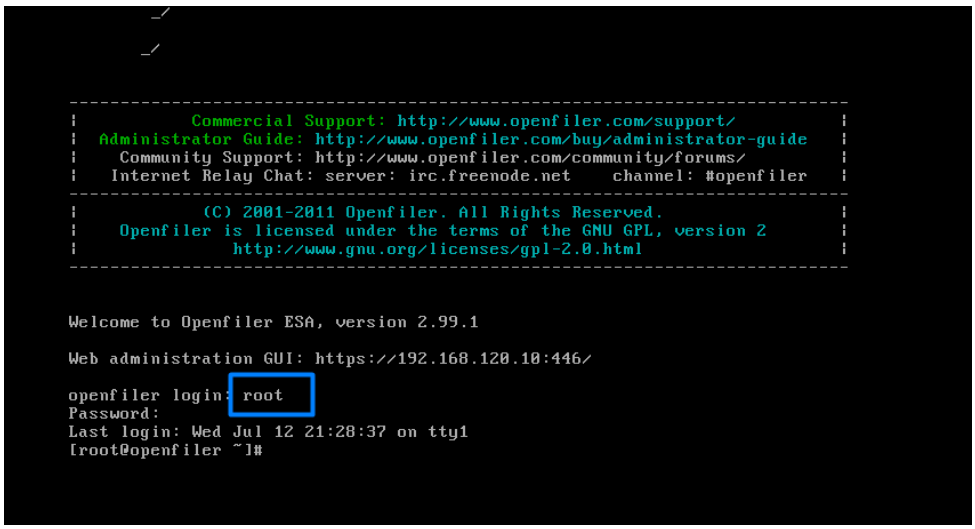


3.17. Openfiler provide us url as https://192.168.120.10:446/



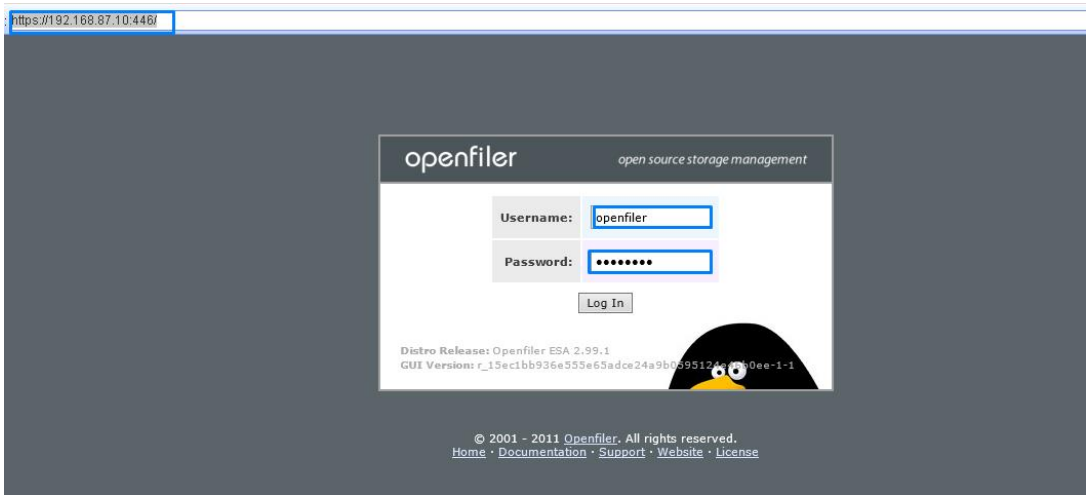
4. Change the parameter files of Openfiler using root user

4.1. Login as root use

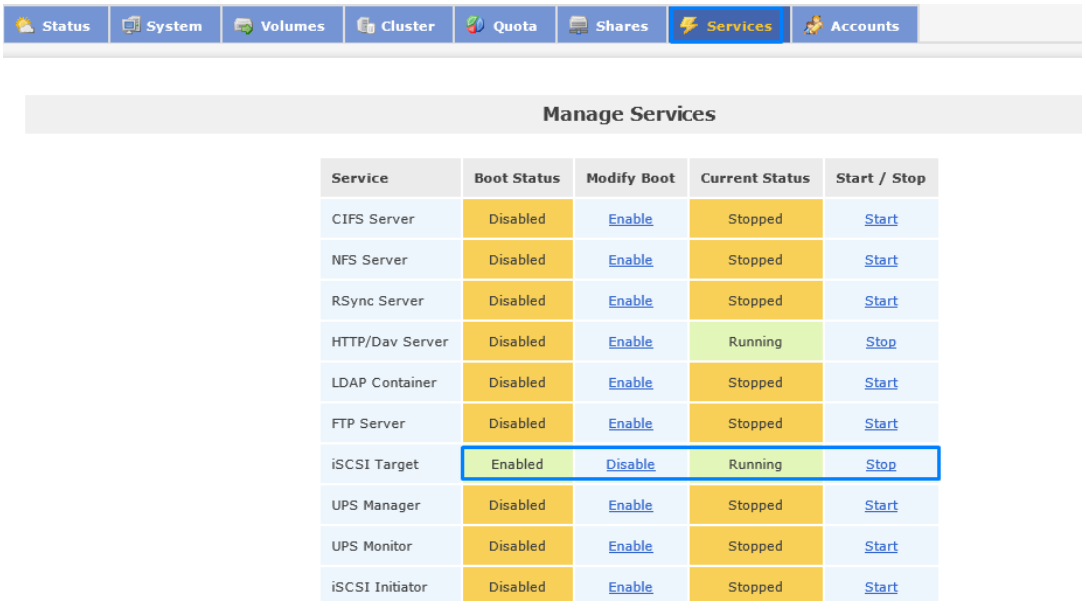


5. Configure Openfiler using URL https:/192.168.120.10:446/

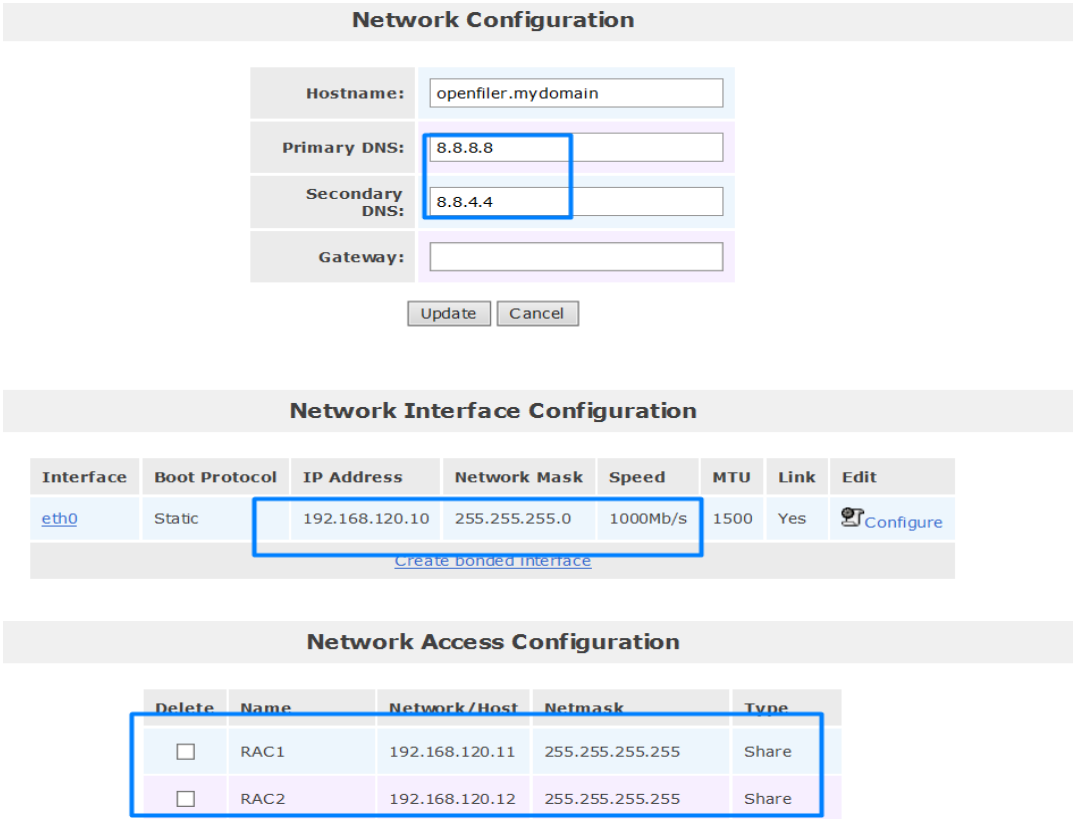
5.1. Login as user openfiler with password is password.



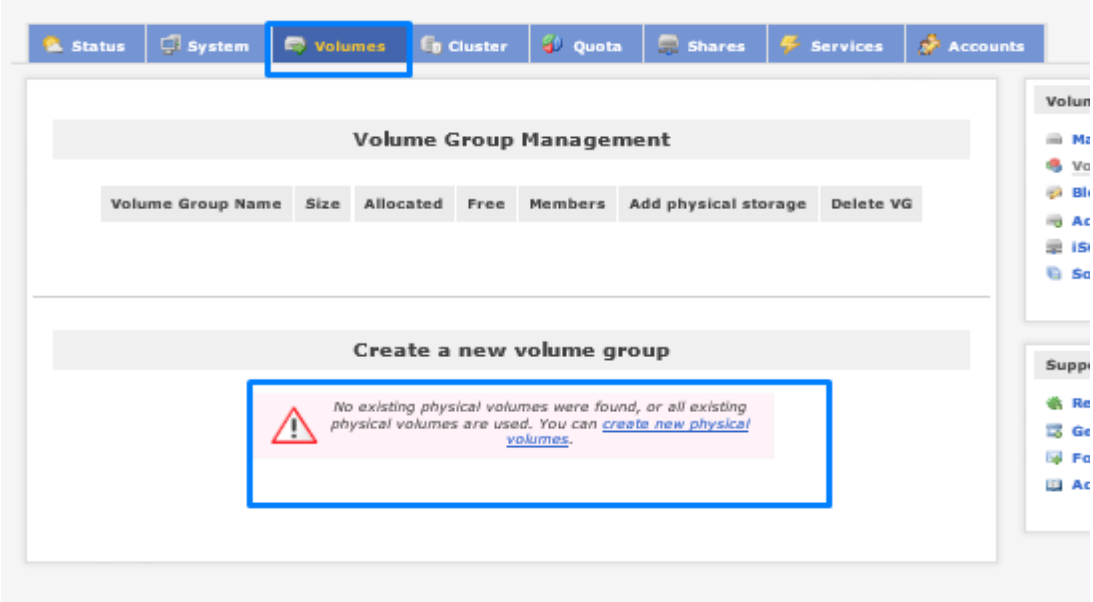
5.2. First click on Services tab then Enable and Start the iSCSI Target services



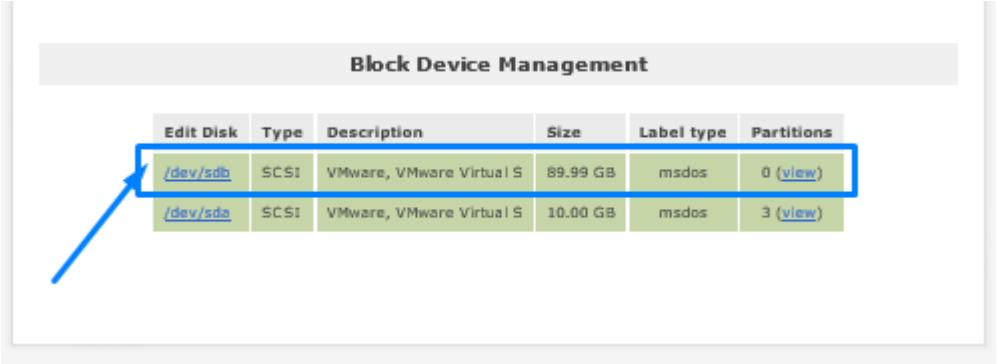
5.3. First click on System tab then go to Network Interface Configuration section then add rac1 and rac2 name and IP details, meanwhile click on update button.



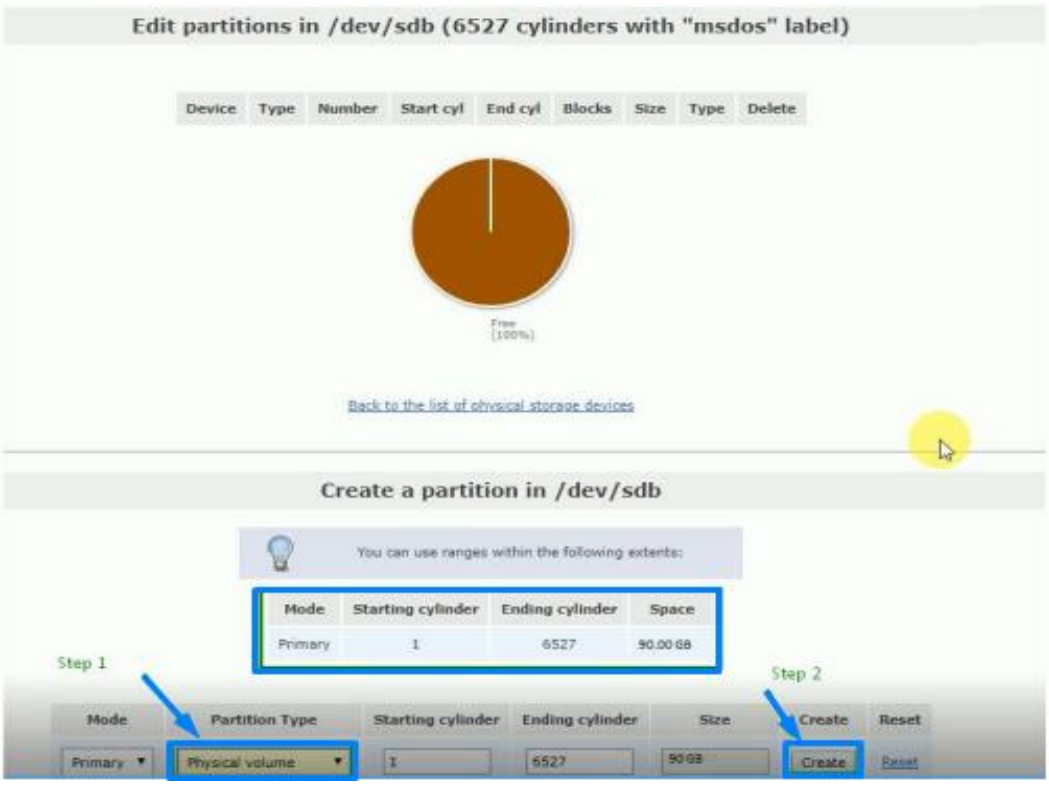
5.4. First click on Volumes tab then go to Create a new volume group section then click on create new physical volumes link.



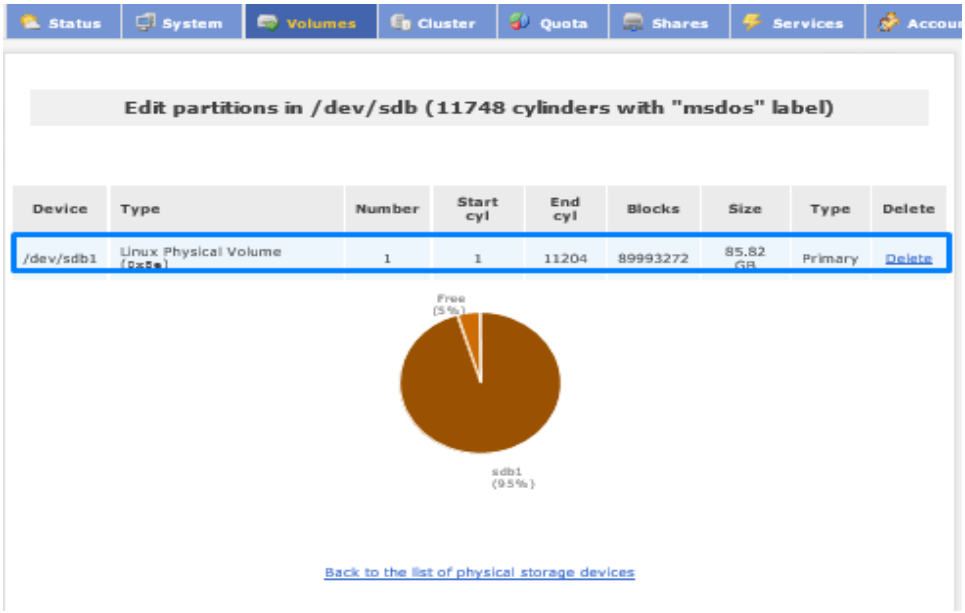
5.5. You have chosen the proper partition to create OCR, DATA and FRA disks and click over link (/dev/sdb).



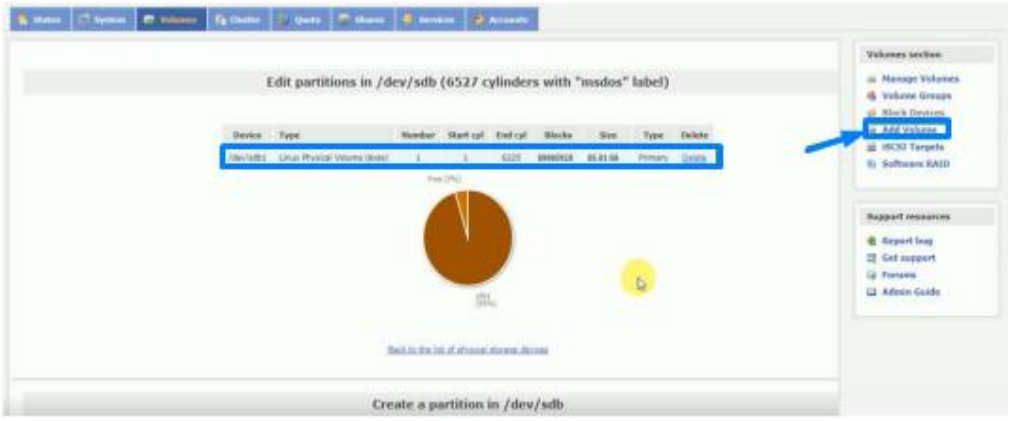
5.6. Go to create a partition in /dev/sdb section and select partition type as Physical volume then click on create button.



5.7. Now your Physical volume looks like.

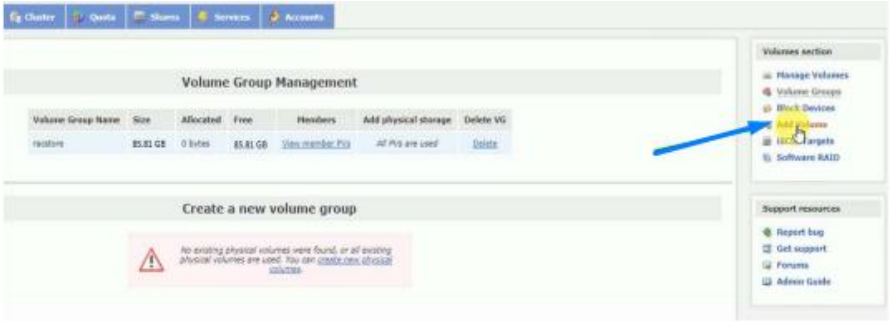


5.8. Now you have to click over Add Volume link.

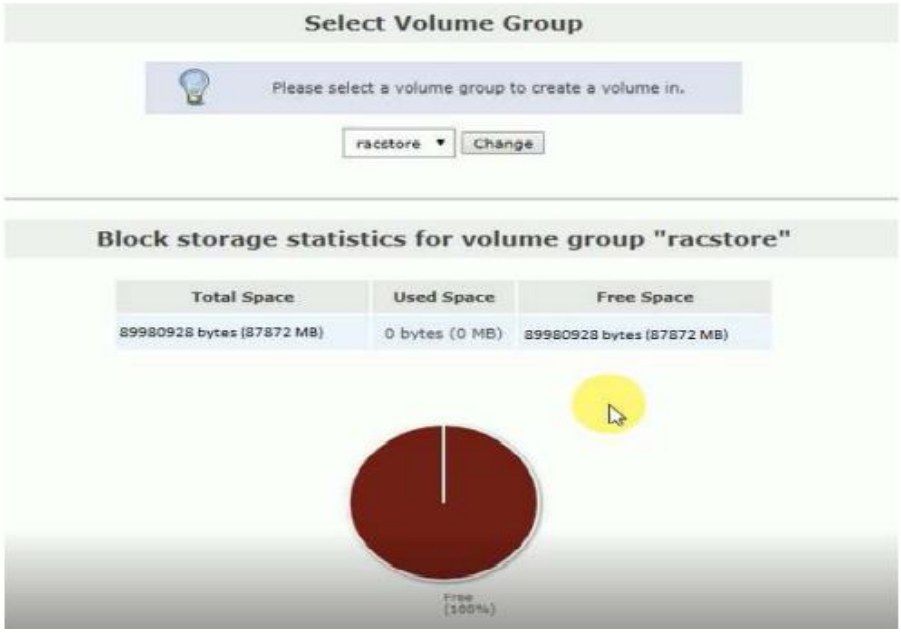


5.9. Go to Create a new volume group section and provide group name select the partition name and then click on Add volume group button.

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



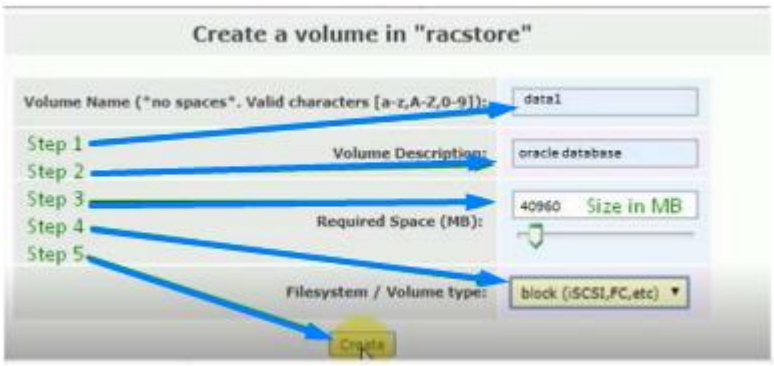
5.11. Then it looks like.



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

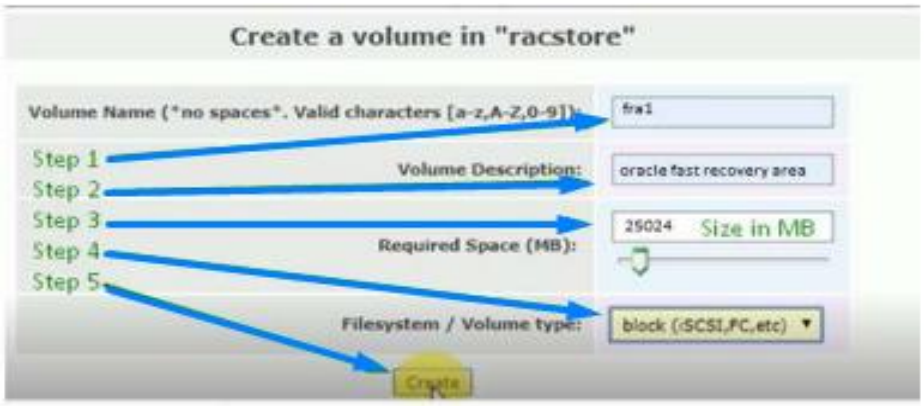
5.13. Now OCR/Voting disk look like and proceed to create storage for DATA Disks click on Add Volume.

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

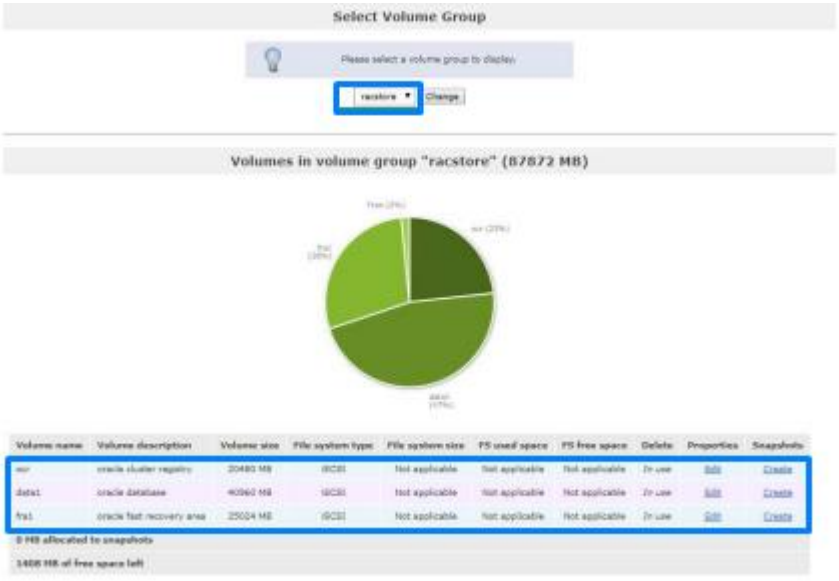


5.15. Now DATA disk look like and proceed to create storage for FRA Disks click on Add Volume.

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

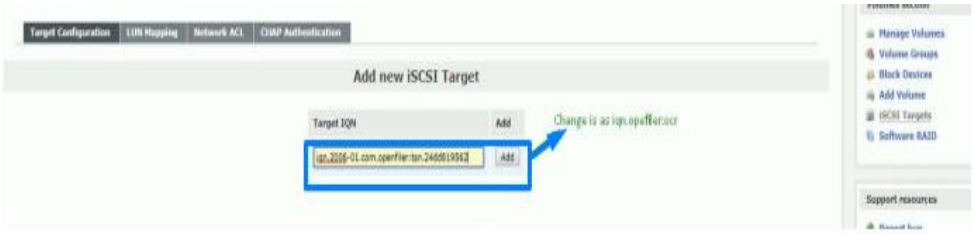


5.17. Finally, “racstore” looks like.

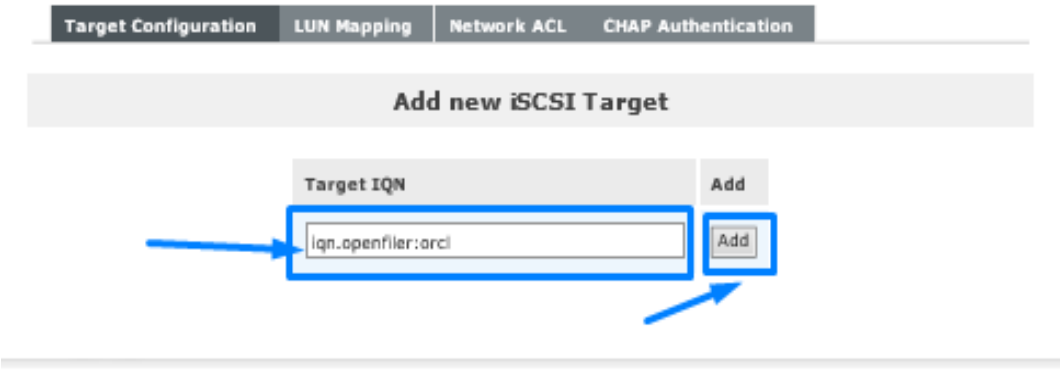


5.18. Configure iSCSI Targets

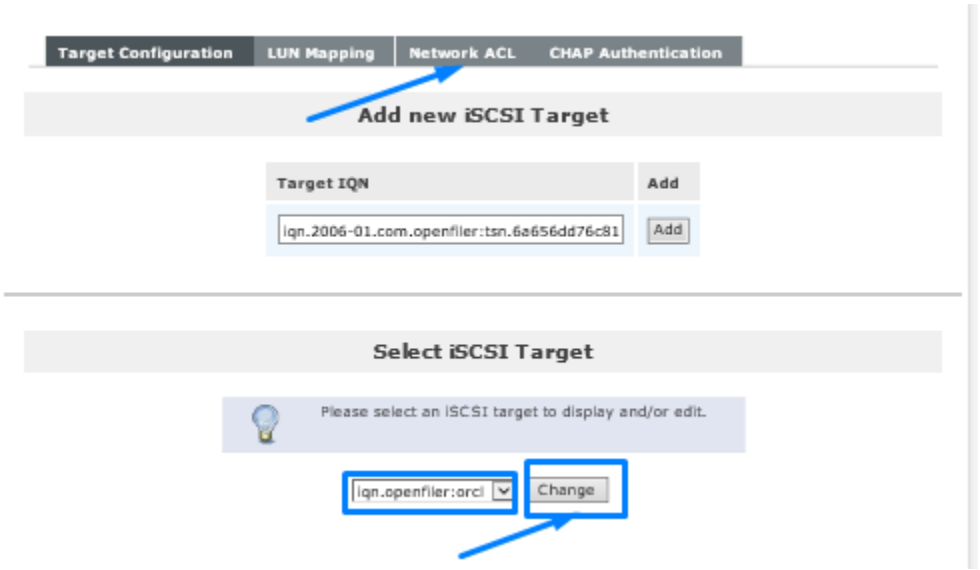
5.19. Configure iSCSI Target IQN



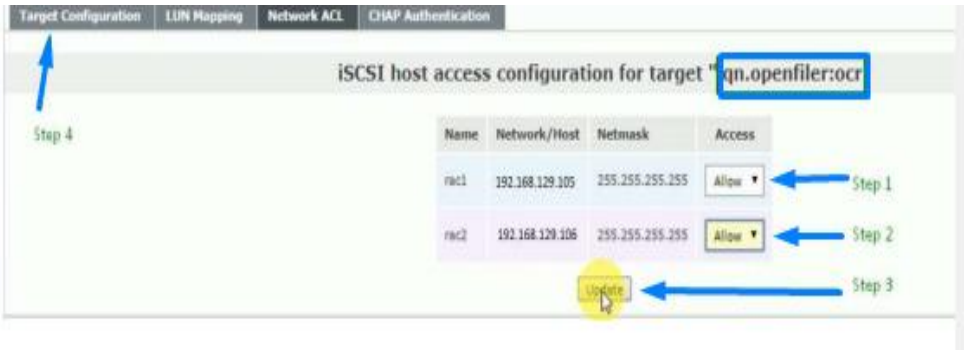
5.20. Configure iSCSI Target IQN for OCR



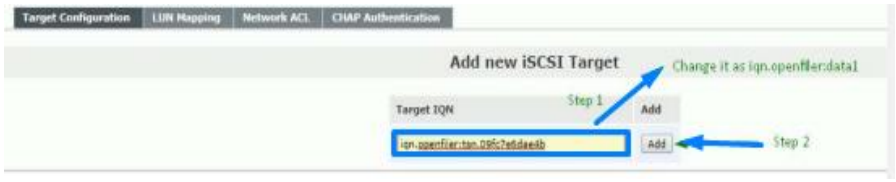
5.21. Go to Select iSCSI Target section choose IQN for OCR and click on Change button and then click on Network ACL tab.



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.



5.23. Configure iSCSI Target IQN for DATA



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

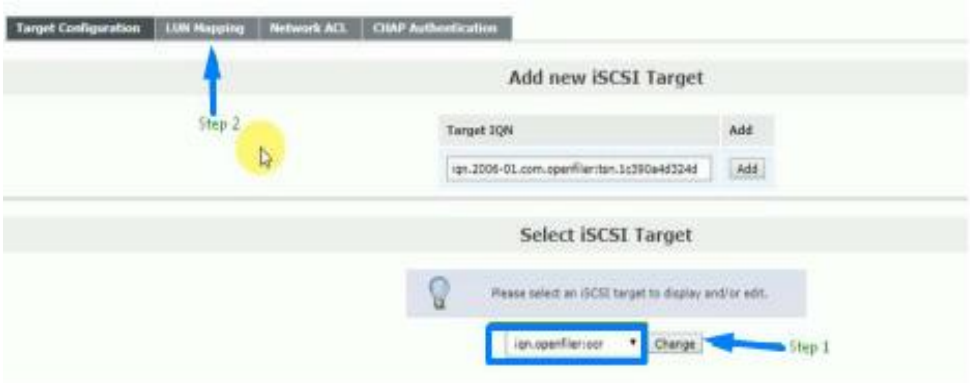
5.25. Configure Network ACL configuration (Change Access columns status, Deny to Allow) for DATA and click on Update button then click on Target Configuration tab.

5.26. Configure iSCSI Target IQN for FRA.

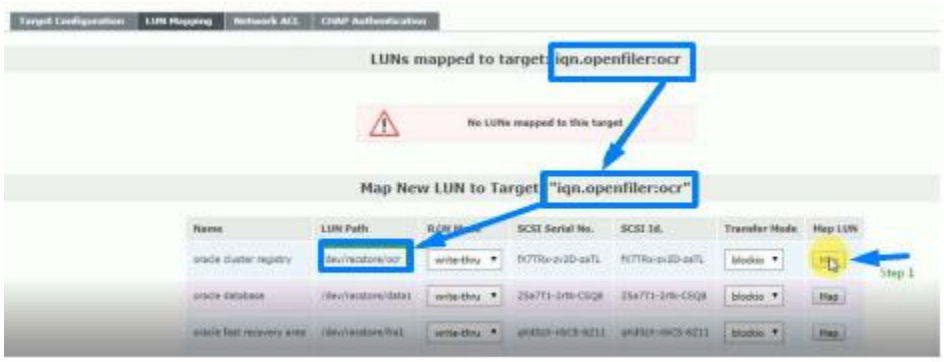
5.27. Go to Select iSCSI Target section choose IQN for FRA and click on Change button and then click on Network ACL tab.

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.

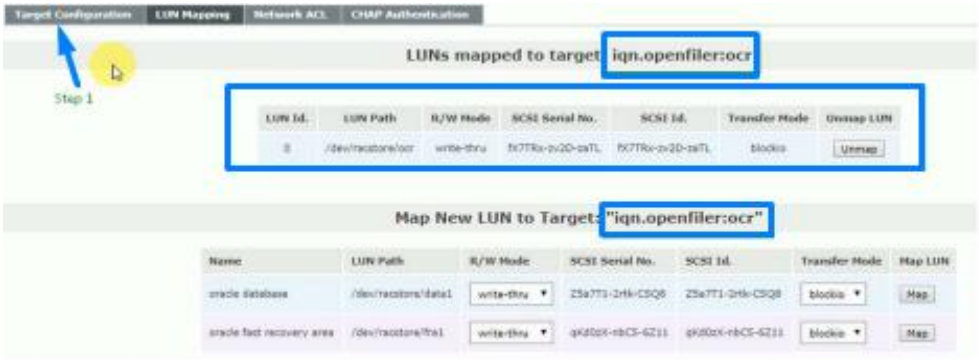
5.29. Go to Select iSCSI Target section choose OCR and click on Change button then click on LUN Mapping tab.



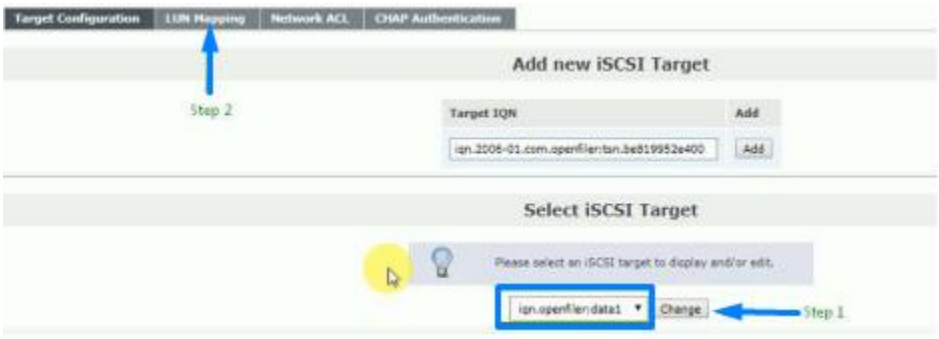
5.30. Verify the iqn for OCR and click on Map button.



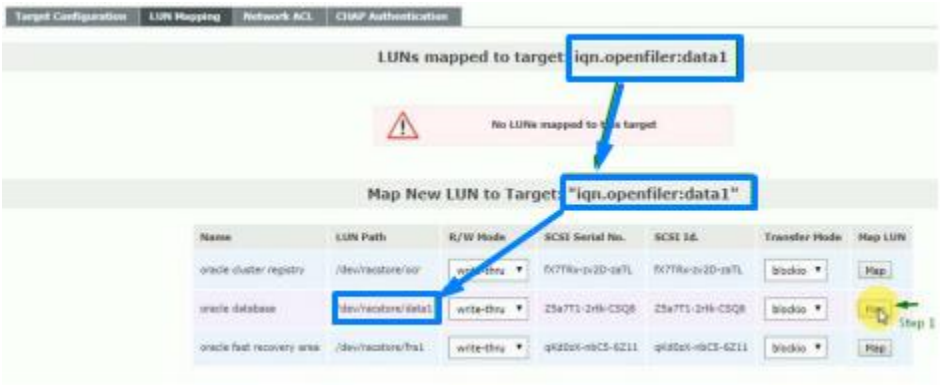
5.31. Verify the iqn for OCR and click on Target Configuration tab.



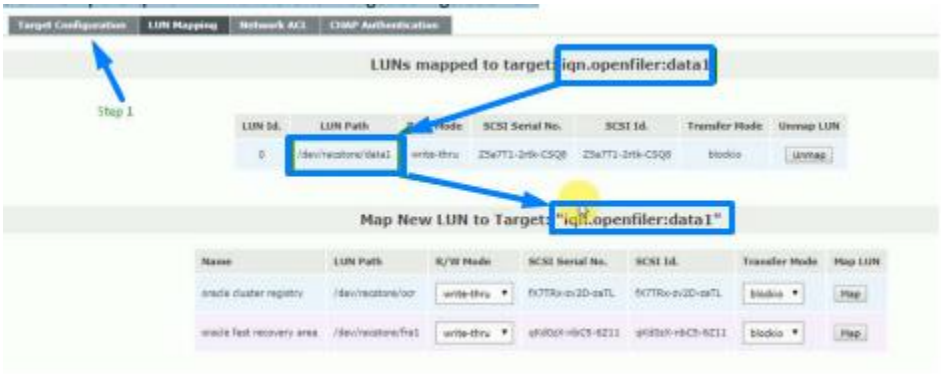
5.32. Go to Select iSCSI Target section choose DATA and click on Change button then click on LUN Mapping tab.



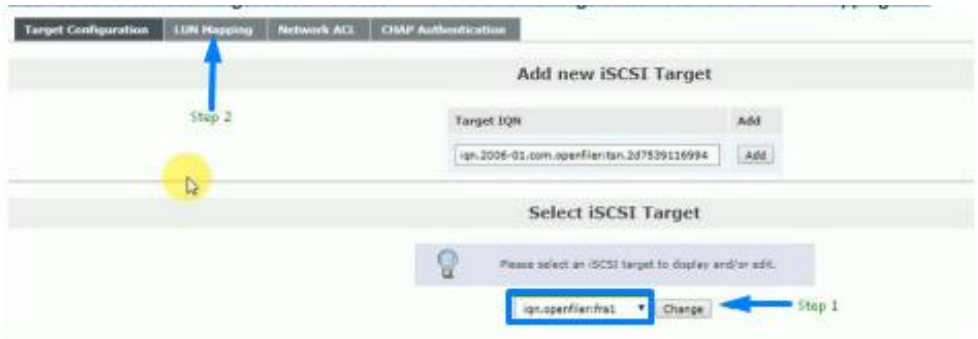
5.33. Verify the iqn for DATA and click on Map button.



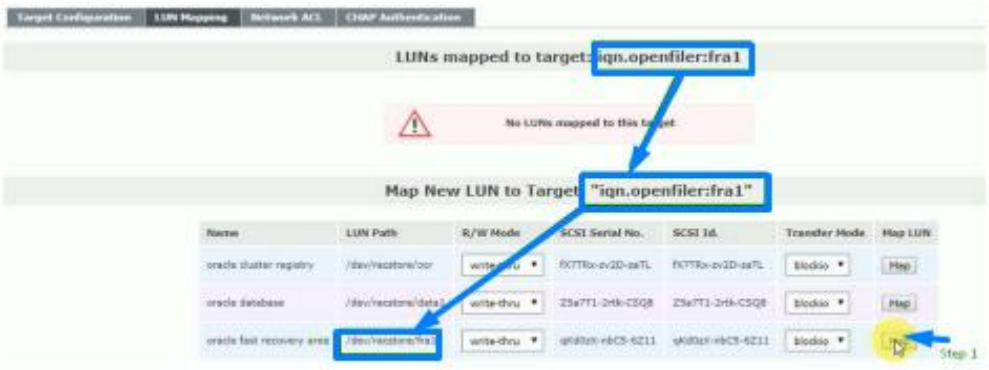
5.34. Verify the iqn for DATA and click on Target Configuration tab.



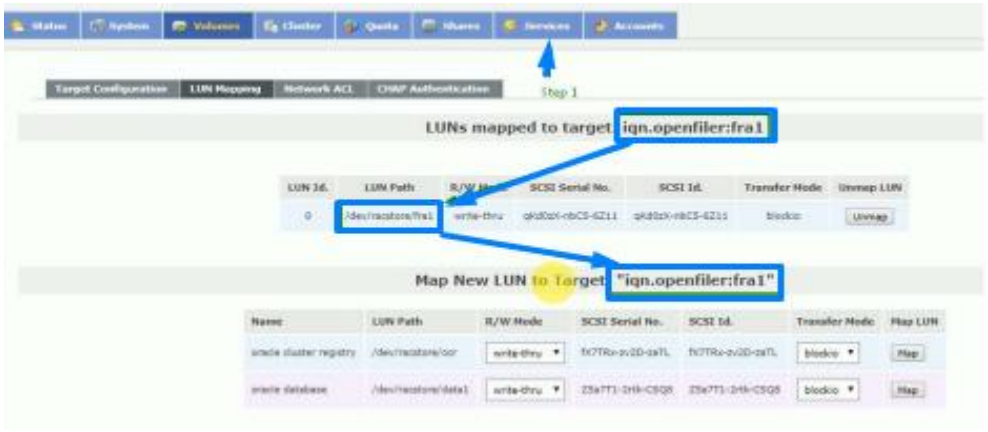
5.35. Go to Select iSCSI Target section choose FRA and click on Change button then click on LUN Mapping tab.



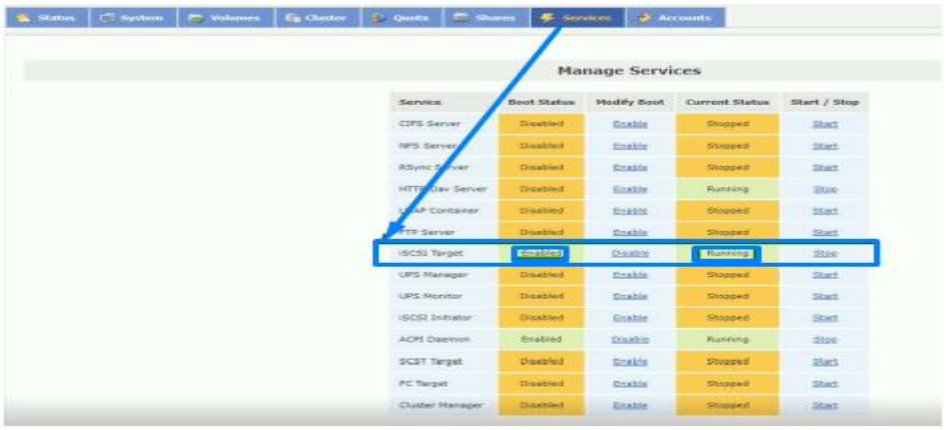
5.36. Verify the iqn for FRA and click on Map button.



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



5.38. Verify the iSCSI service.



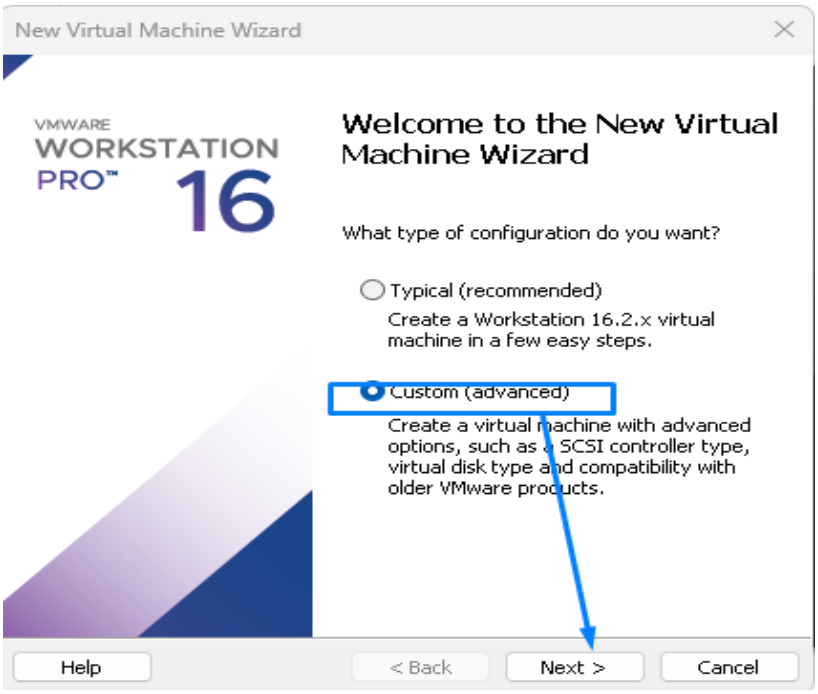
Installation Steps of Oracle Linux Server 6.10:

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.

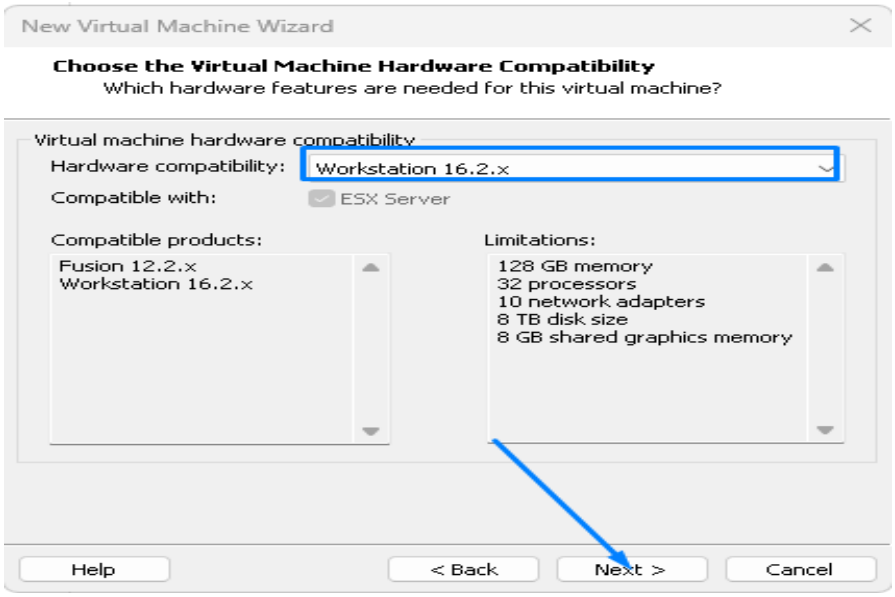
6. OS Installation for RAC1 (VM 2)

6.1. New Virtual machine setup

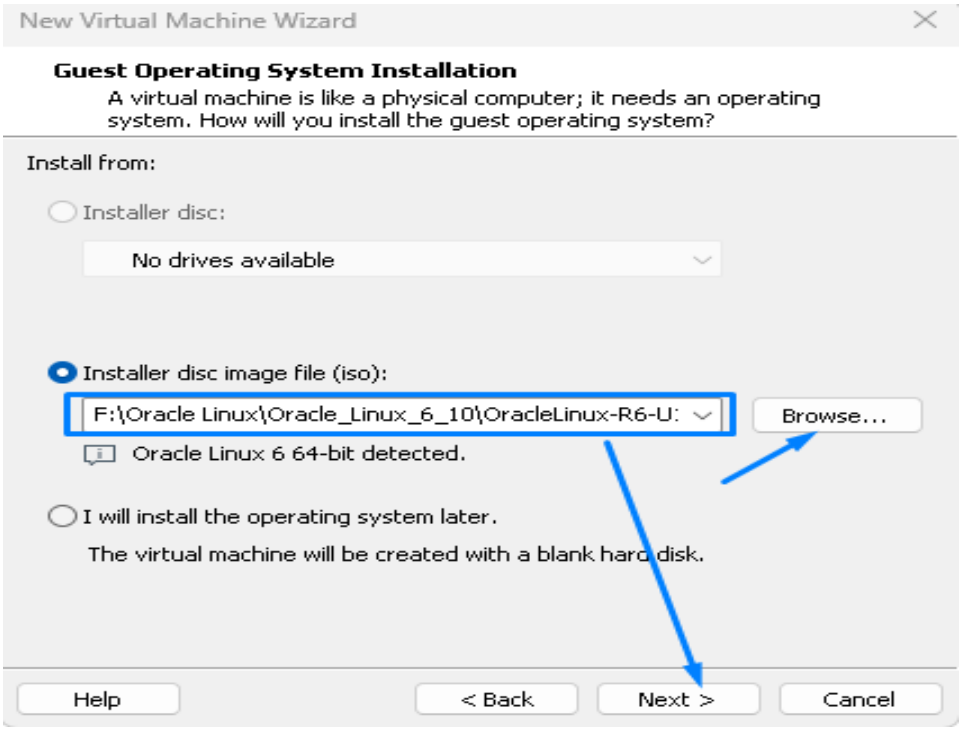
6.2. Choose Custom setting then click on Next button



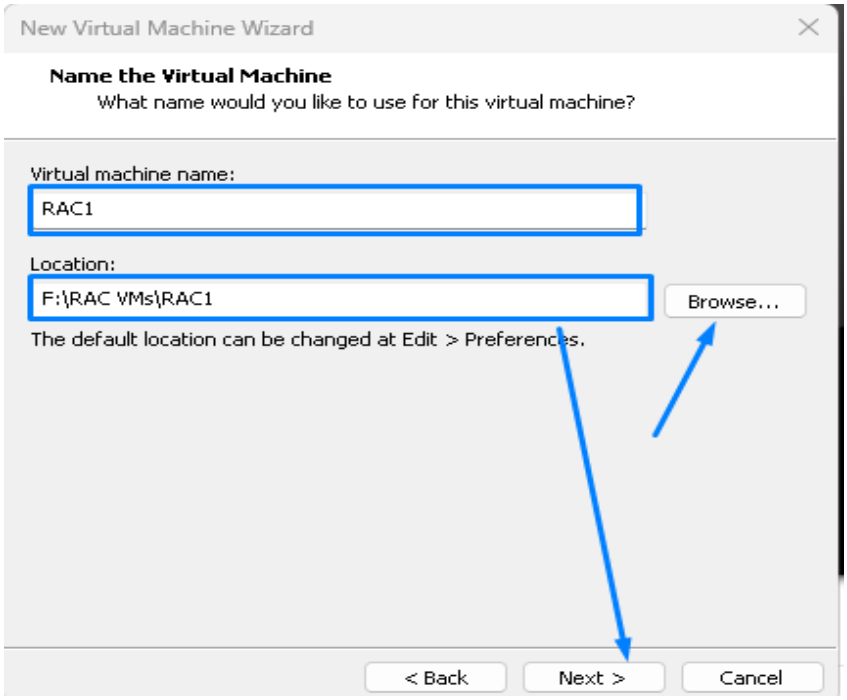
6.3. Choose Hardware default compatibility then click on Next button



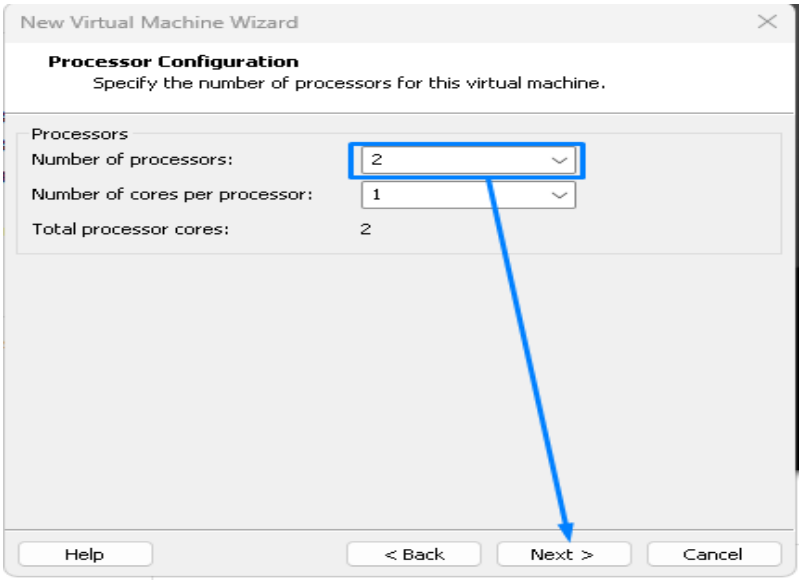
6.4. Choose Oracle Linux Server 6.10 iso file (V37084-01.iso) then click on Next button



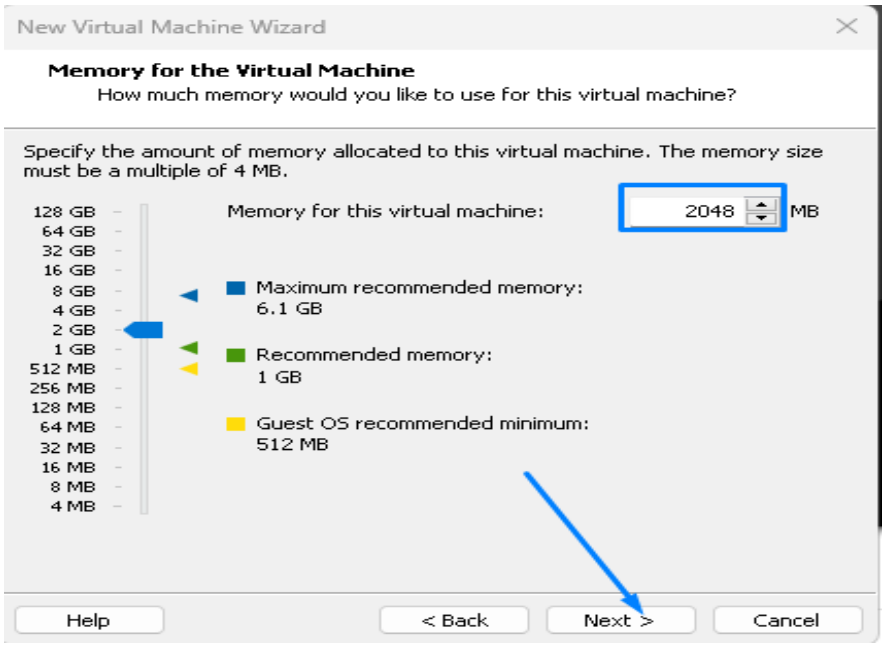
6.5. Put your machine named as RAC1 and provide a location where you want to store/create VM space then click on Next button



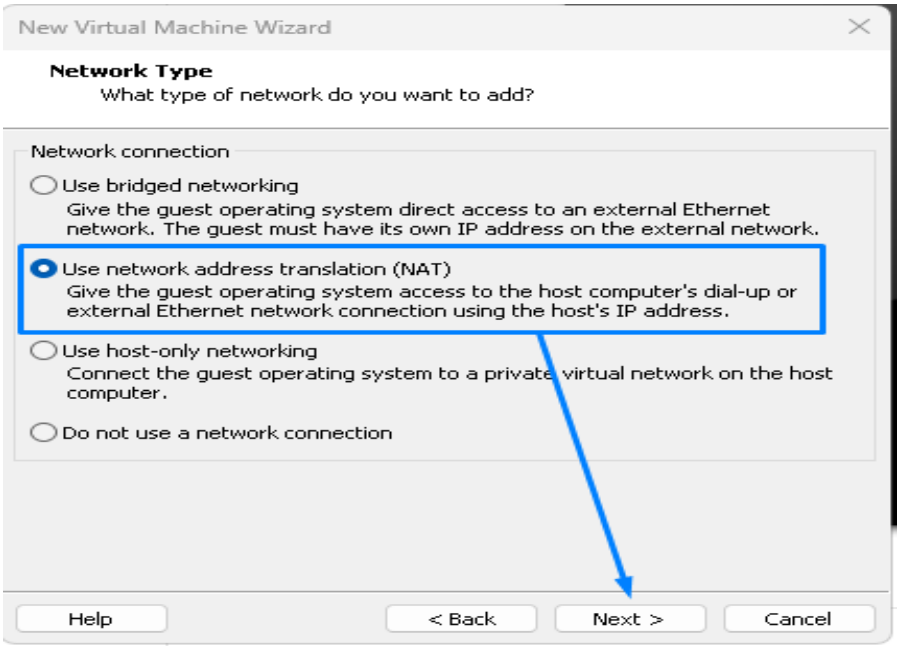
6.6. Select Number of processors then click on Next button



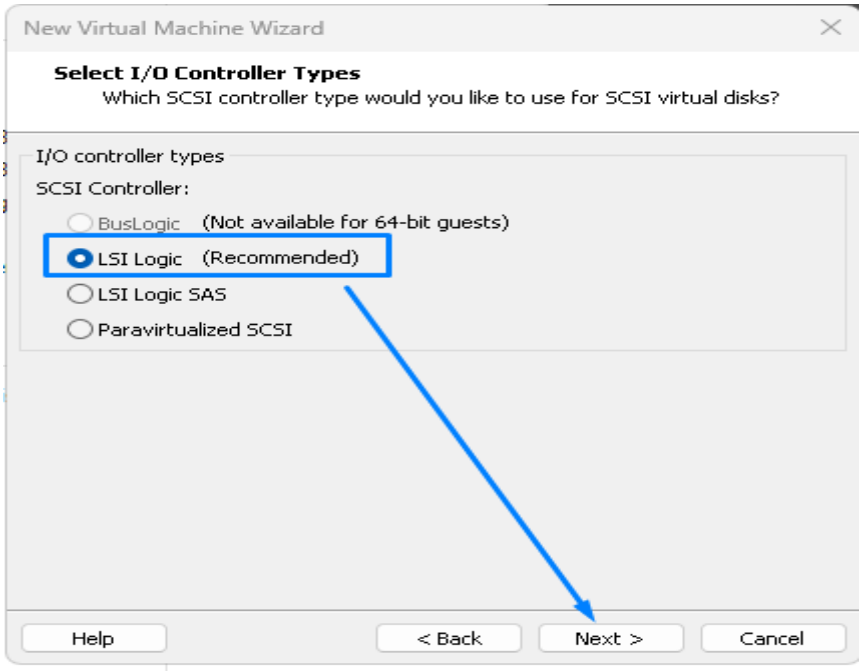
6.7. Put Memory as RAM 2GB then click on Next button.



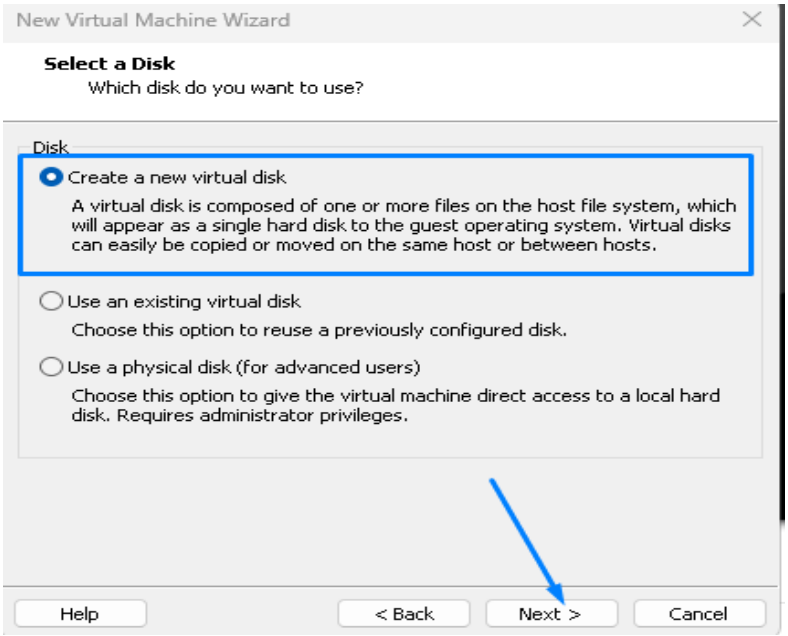
6.8. Select Network connection as bridge then click on Next button.



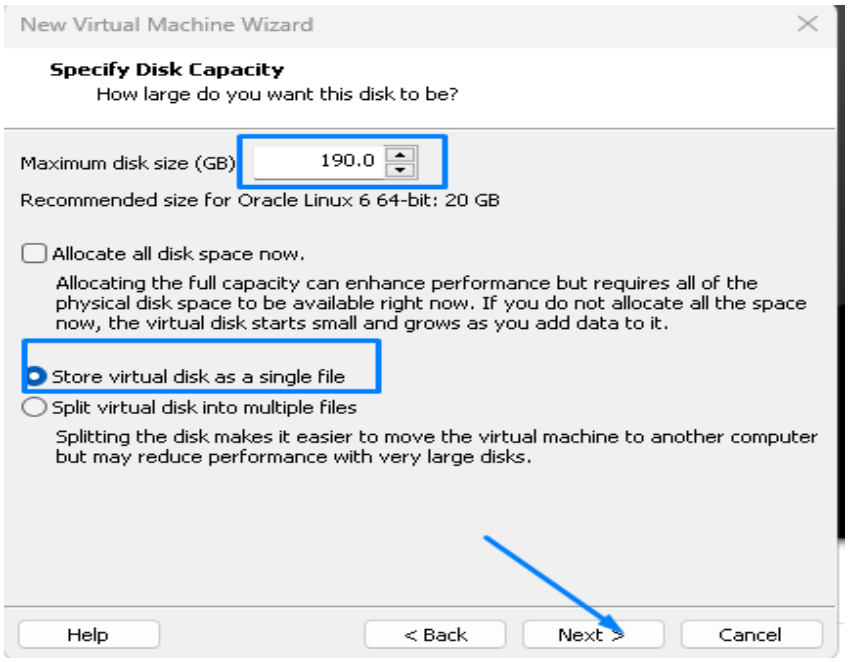
6.9. Select LSI Logic then click on Next button. 1.10. Select SCSI then click on Next button.



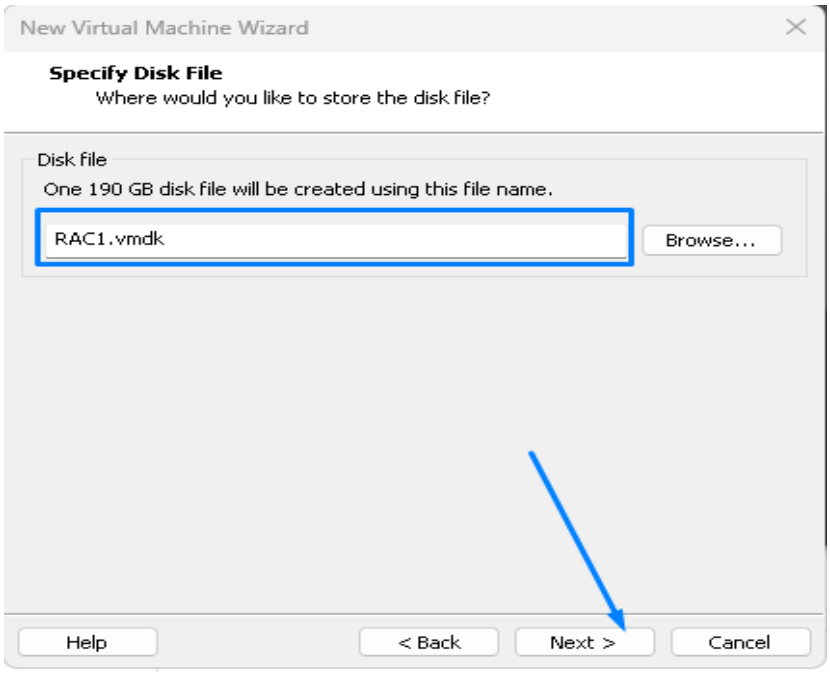
6.10. Select create a new virtual disk then click on Next button



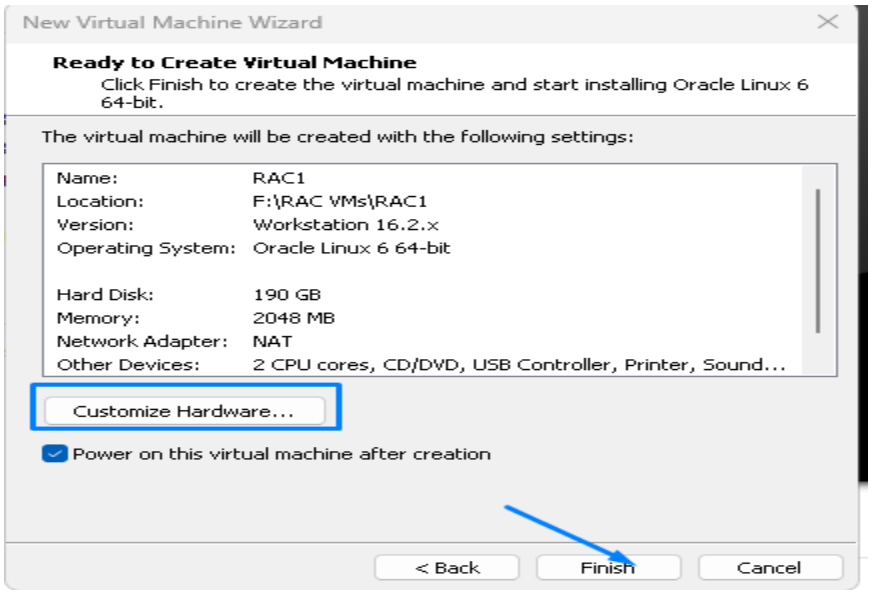
6.11. Put storage as Hard Disk 190GB and select Store virtual disk as a single file then click on Next button.



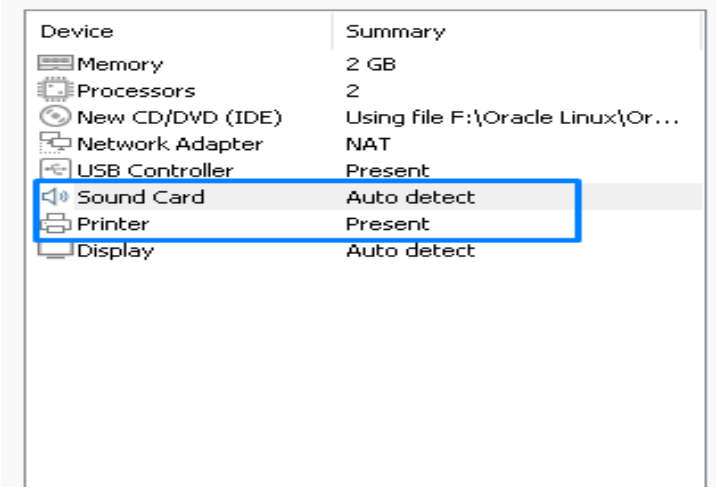
6.12. Select location to Store virtual disk as a single file then click on Next button



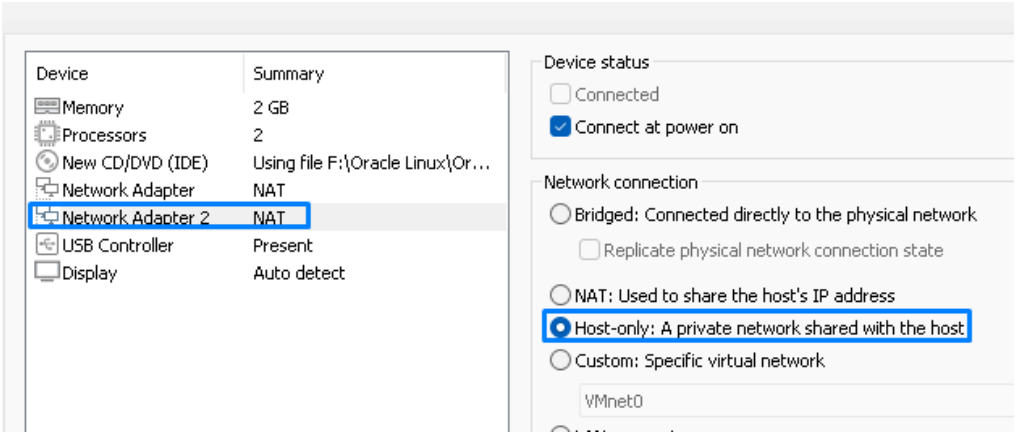
6.13.Click on Customize hardware.



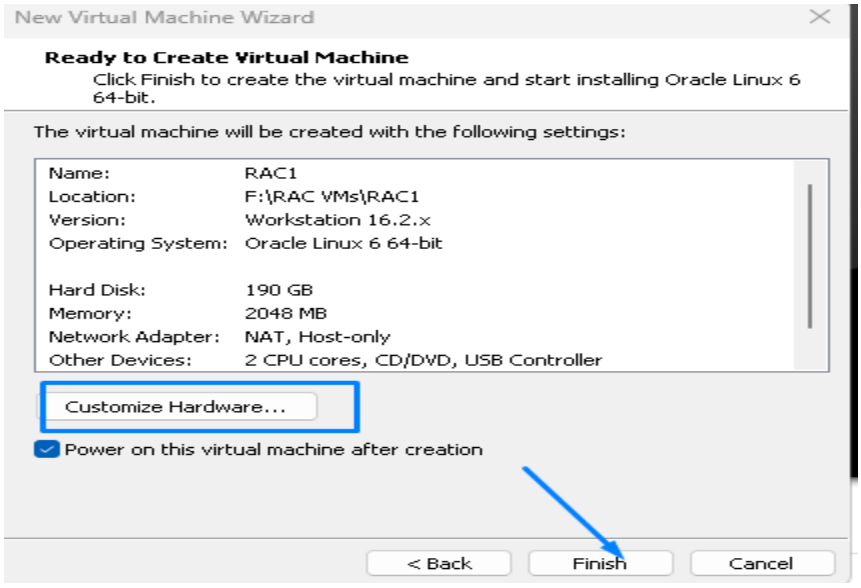
6.14. Remove the unnecessary hardware's.



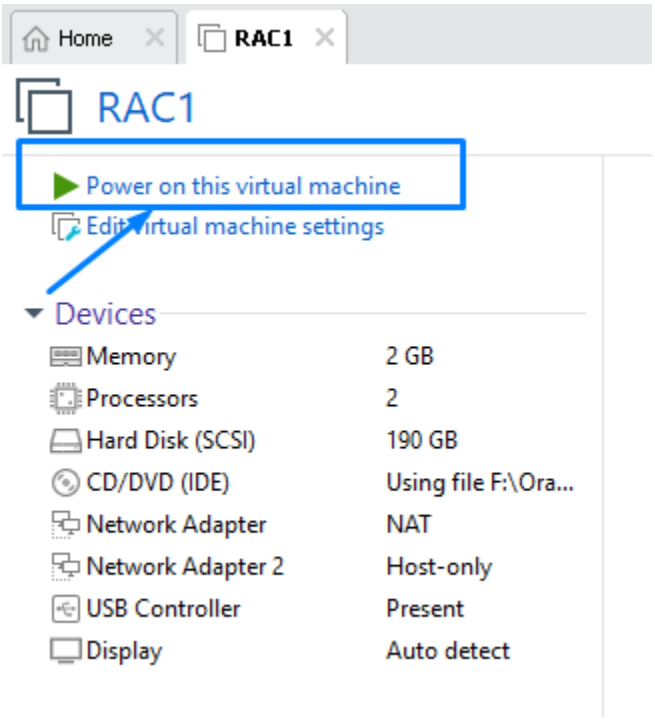
6.15. Add Network Adapter and Select network Adaptor then change the Network connection as Bridge then click on Close button..



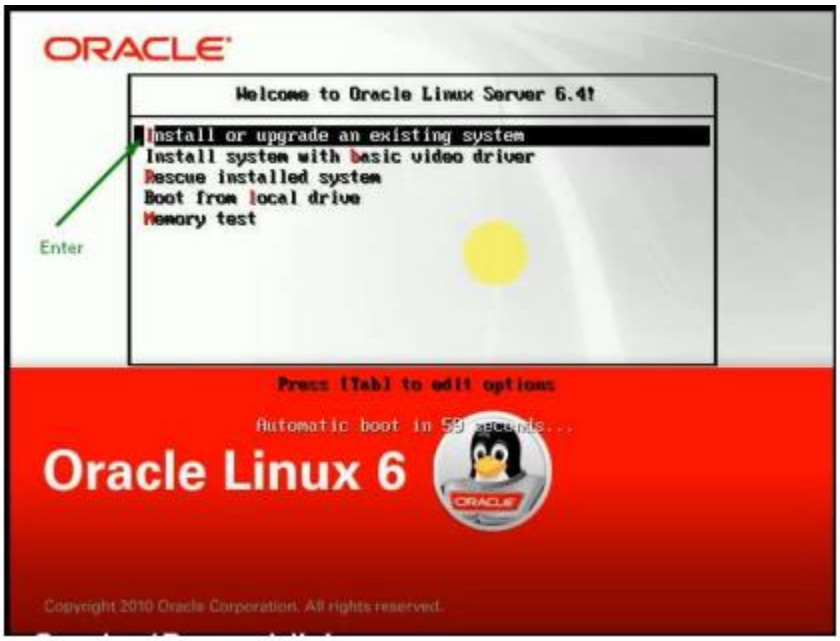
6.16. Click on Finish button



6.17. Click on the Power on button.



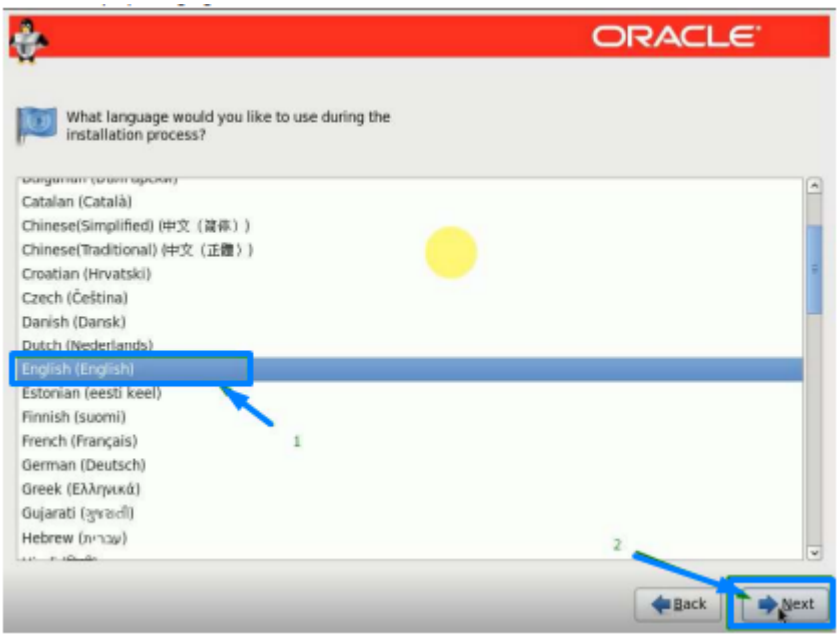
6.18. Install Oracle Linux Server.



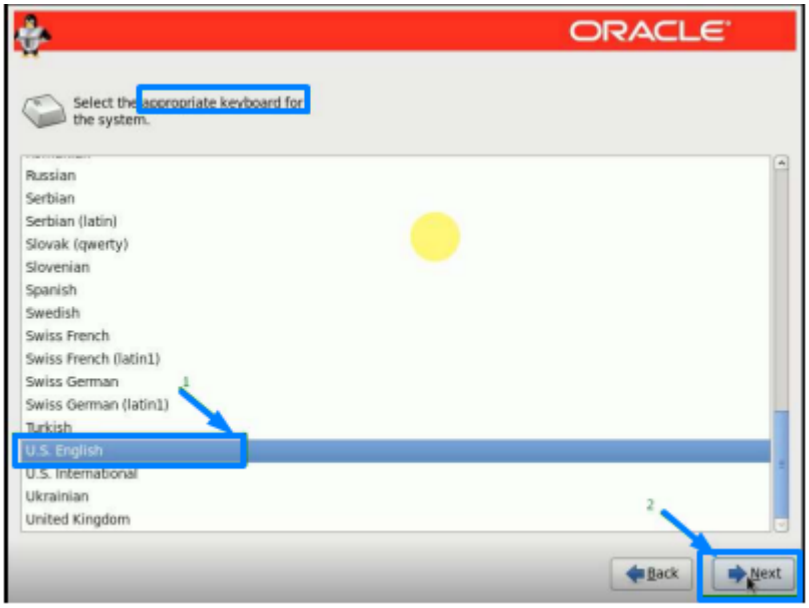
6.19. Click on Skip tab using Keyboard.

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.

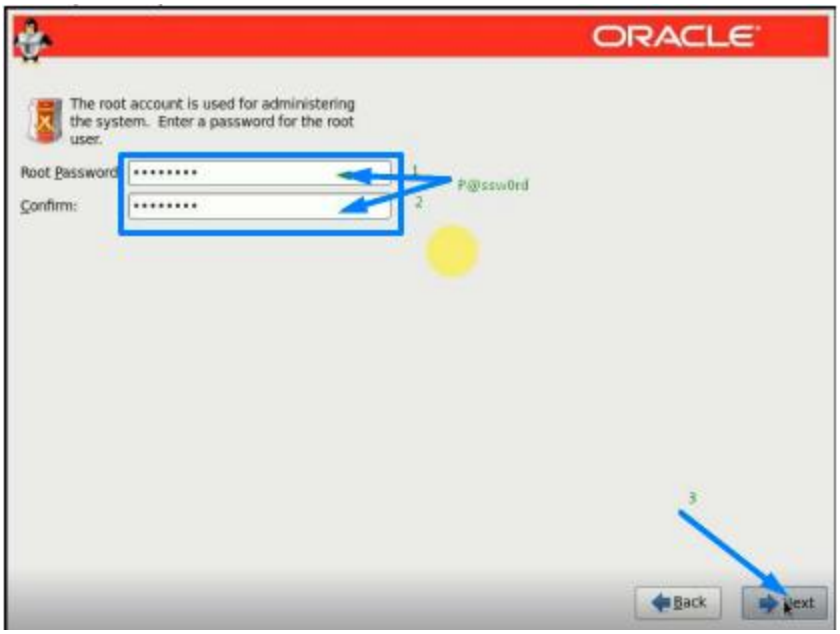


6.23 Select the proper Storage Device Warning Then Click on Next button.

6.24 Click on the Next button.

6.25 Select proper city then Click on Next button.

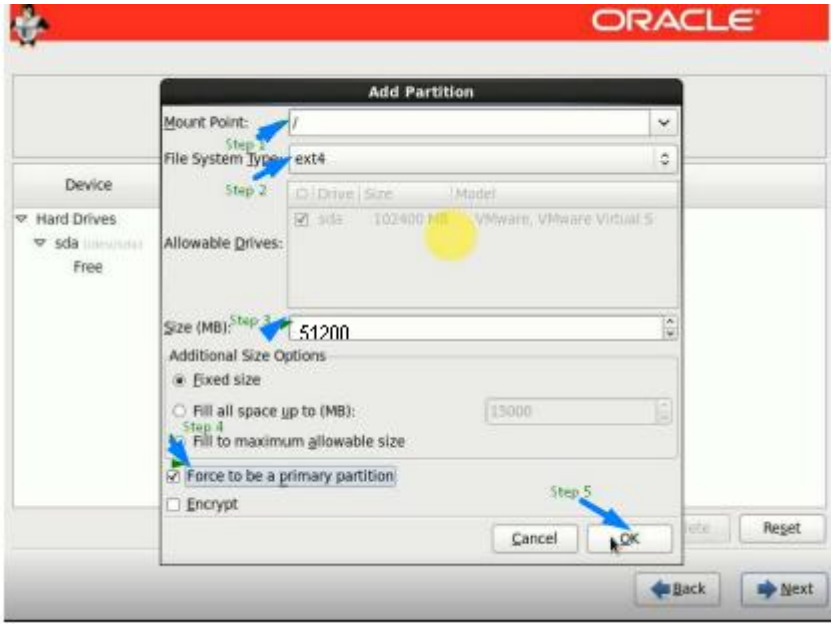
6.26 Put your “root” password the Click on Next button.



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

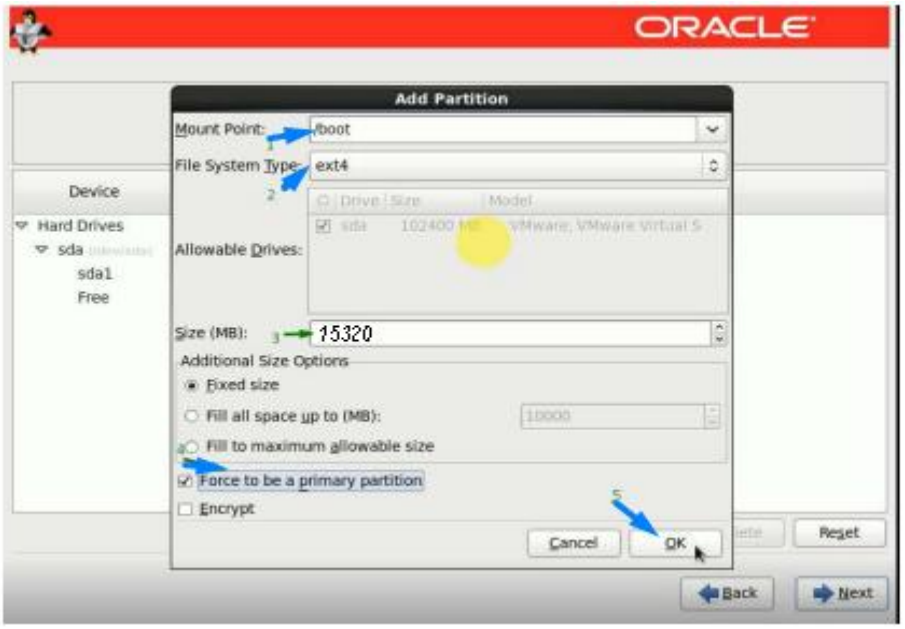
6.28 Proceed to create partition of OS Drive

6.29 Create “/” root partition as Force to be a primary partition



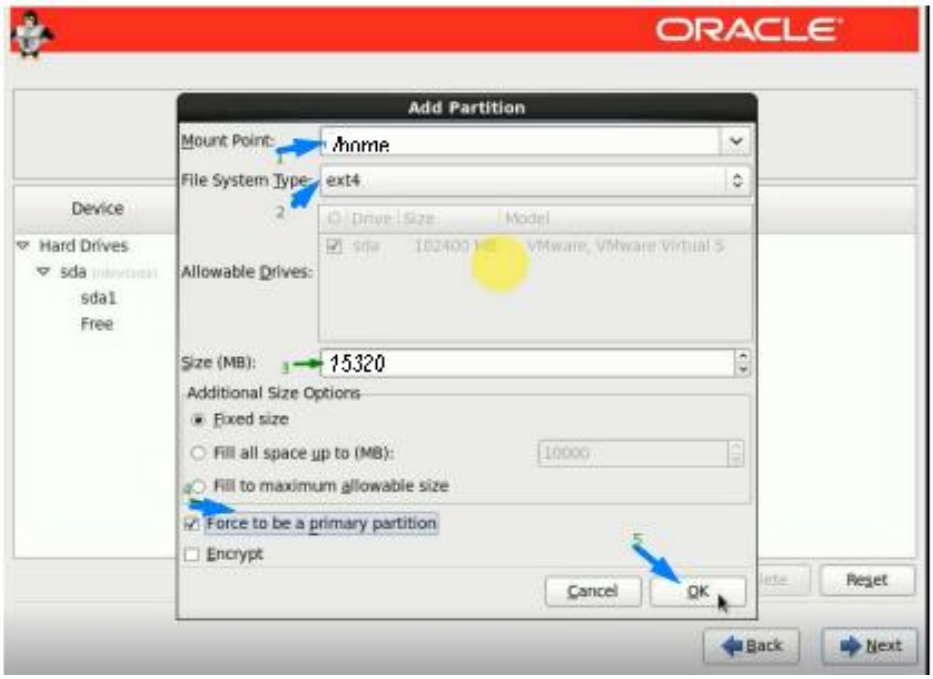
6.30 Proceed to create a new partition.

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



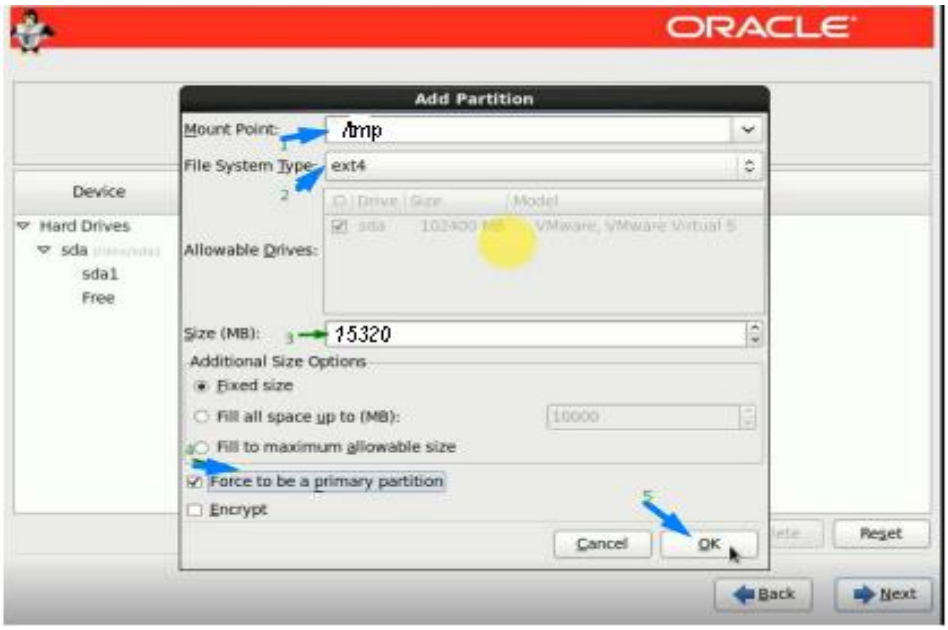
6.32 Proceed to create a new partition.

6.33 Create “/home” partition.



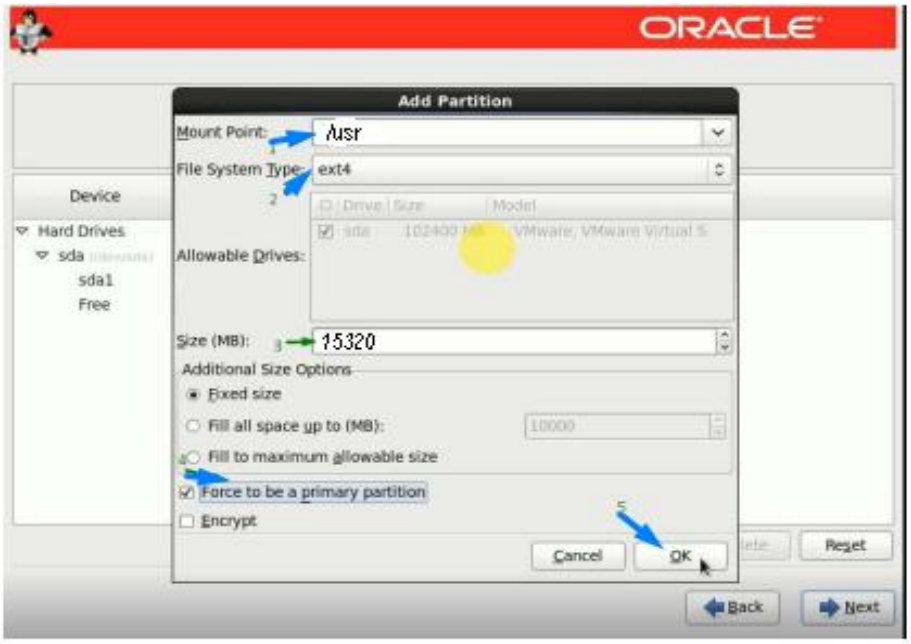
Proceed to create a new partition.

6.34 Create “/tmp” partition



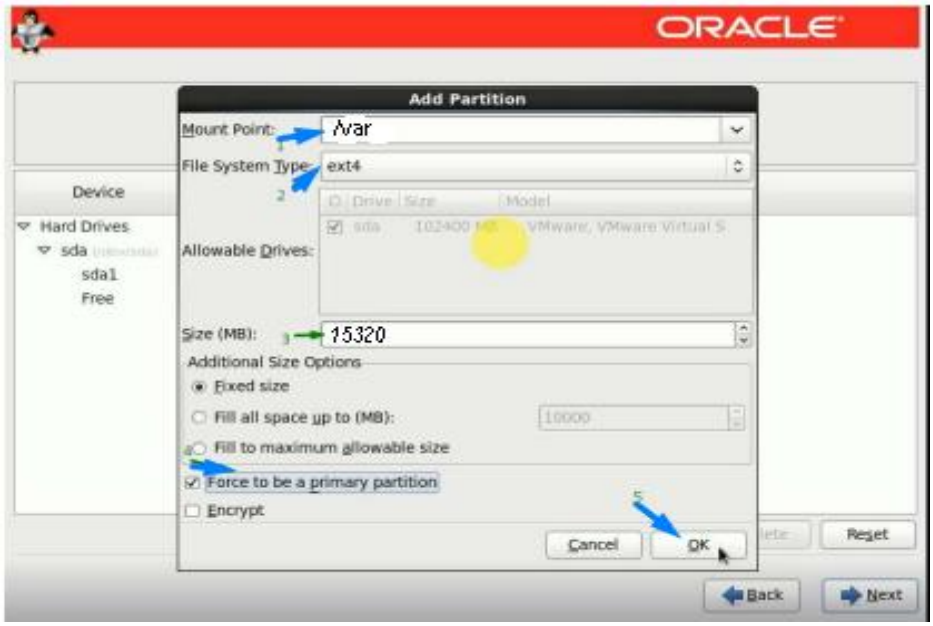
6.35 Proceed to create a new partition.

6.36 Create “/usr” partition



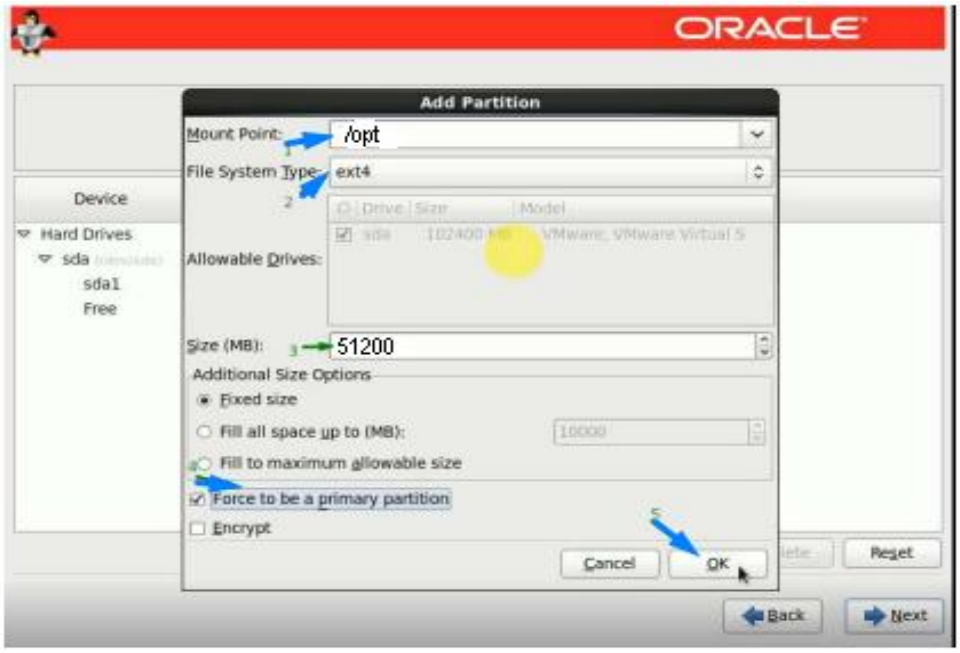
6.37 Proceed to create a new partition.

6.38 Create “/var” partition



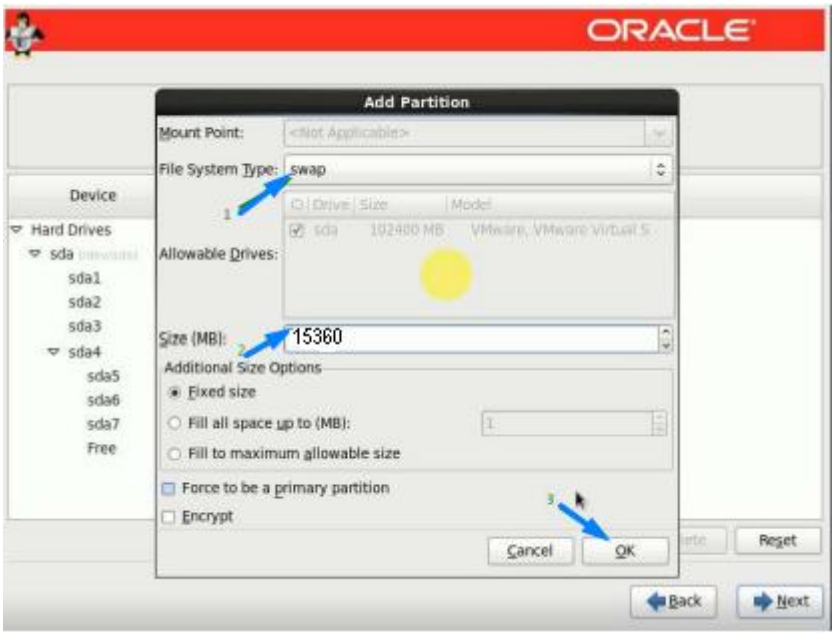
6.39 Proceed to create a new partition

6.40 Create “/opt” a partition.

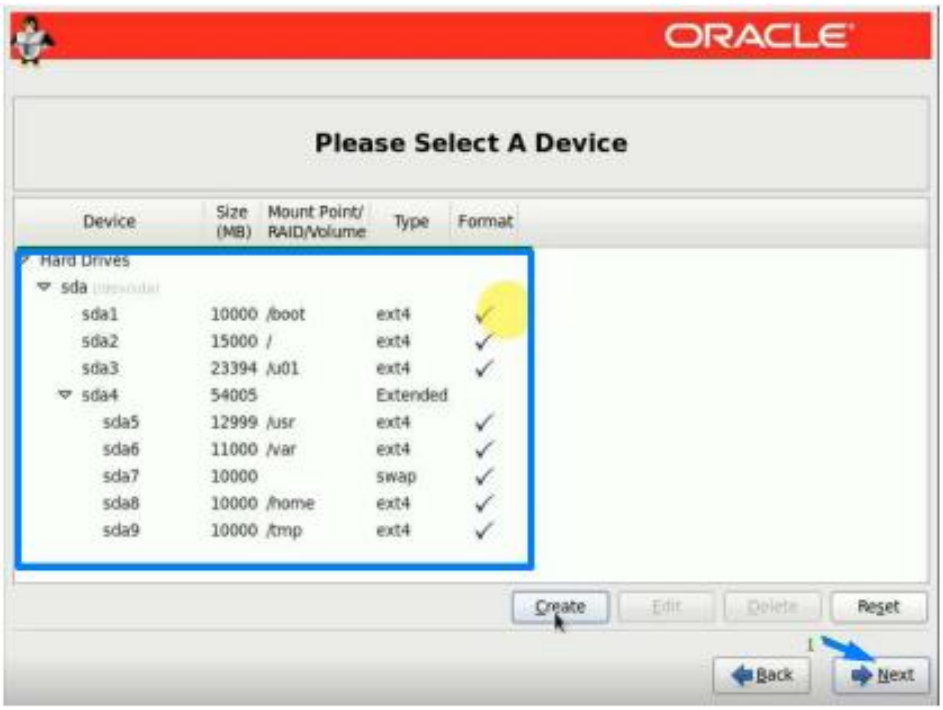


6.41 Proceed to create new partition

6.42 Create “swap” partition



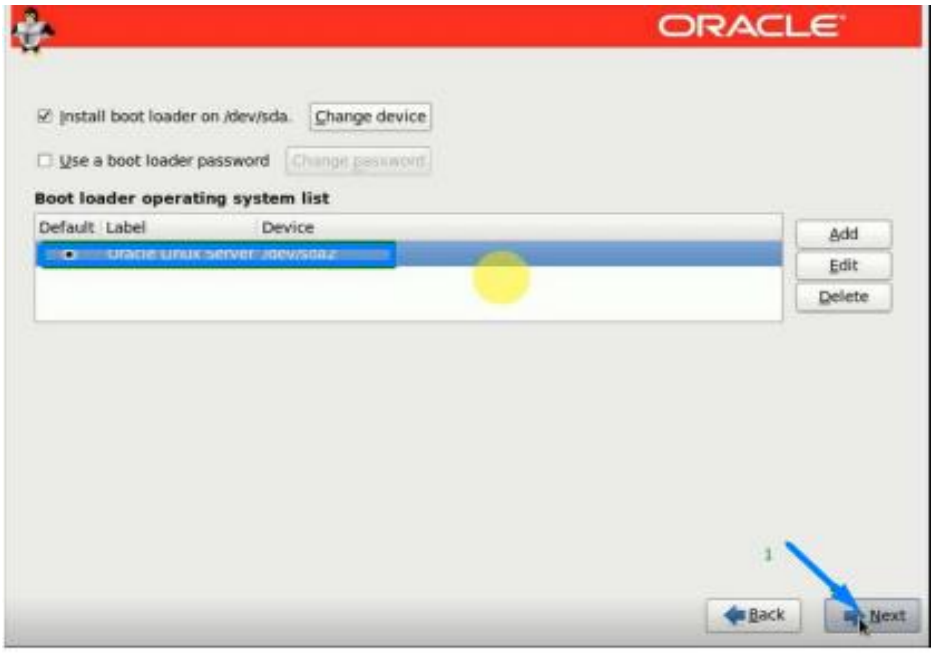
6.43 Finally, our partition looks like and then click on Next button.



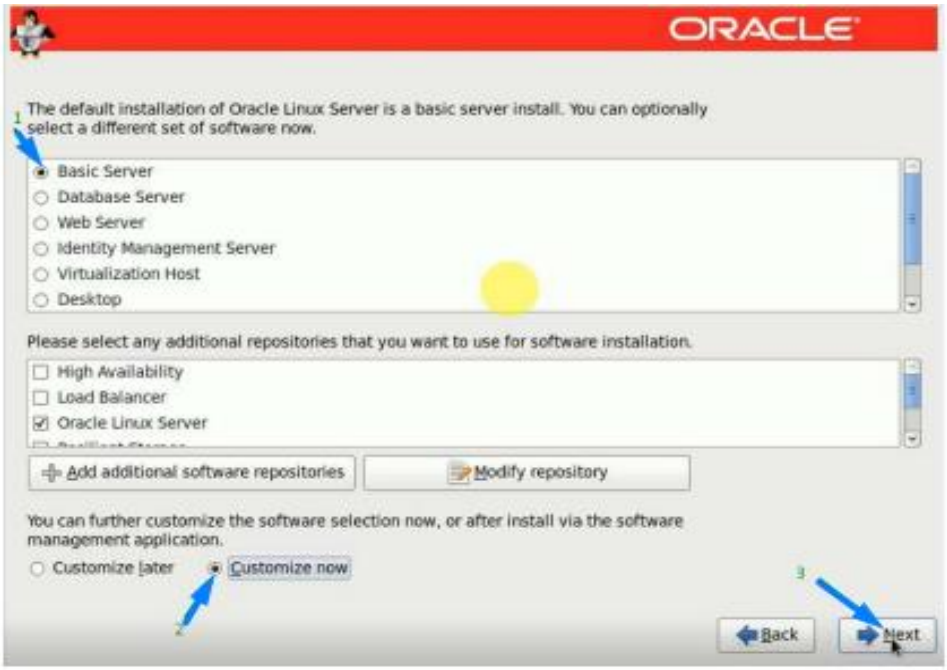
6.44 Proceed to erase our partitions, click on Format button.

6.44. Click on Write changes to disk button

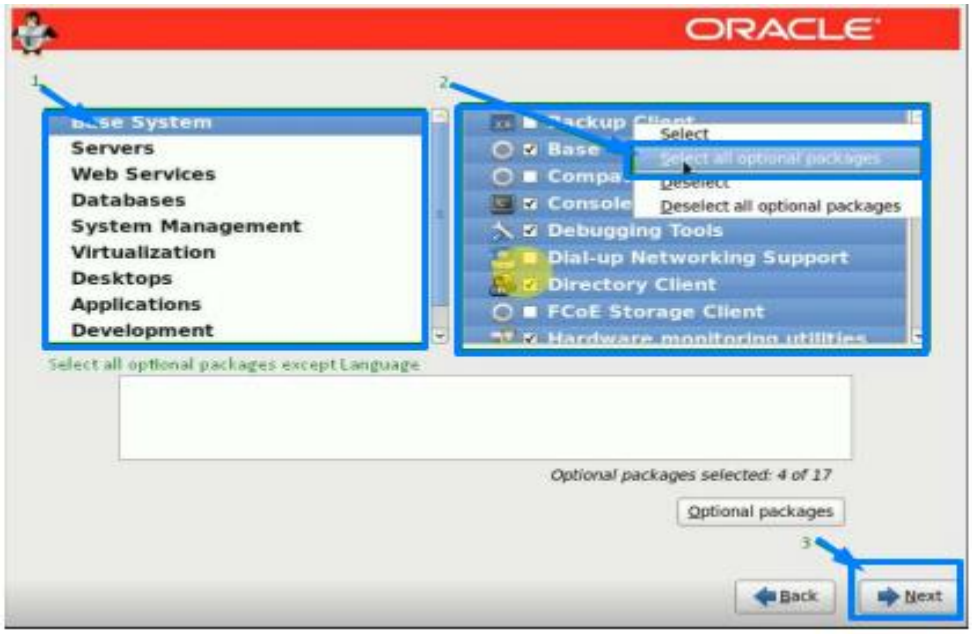
6.45 Select Boot loader operating system then Click on Next button.

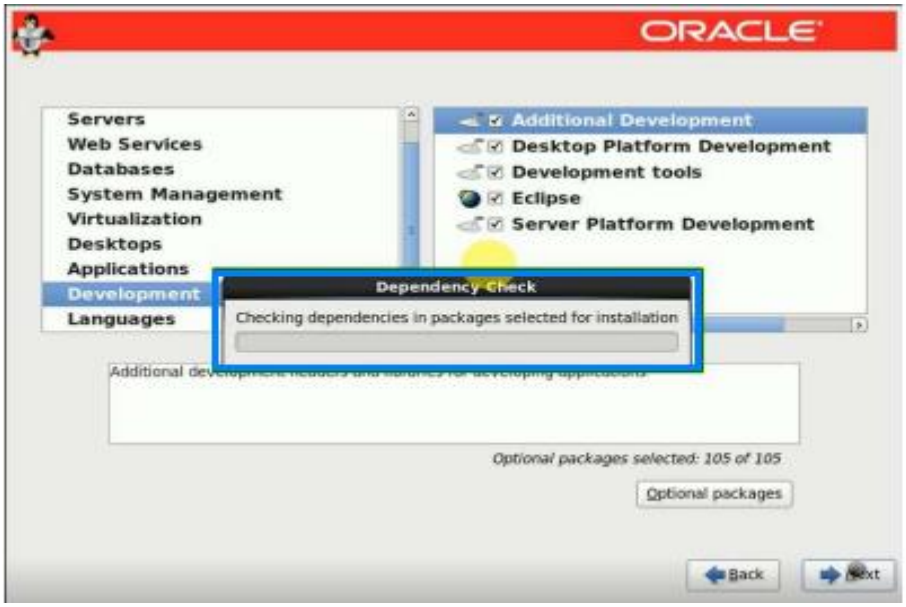


6.46 Choose Customize now option then Click on Next button.



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



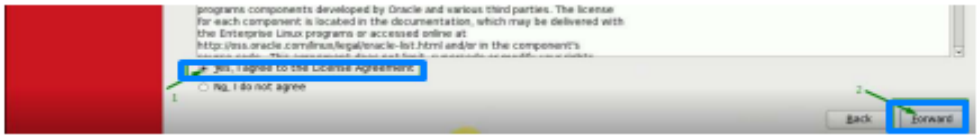


.

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 as 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.

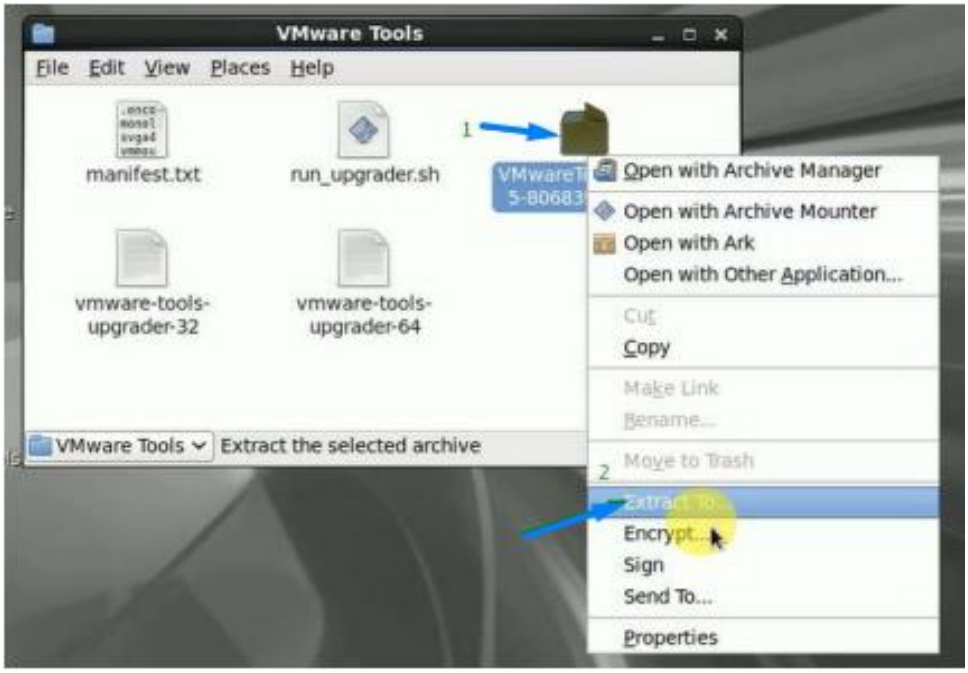
6.52. Click on the Forward button.

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

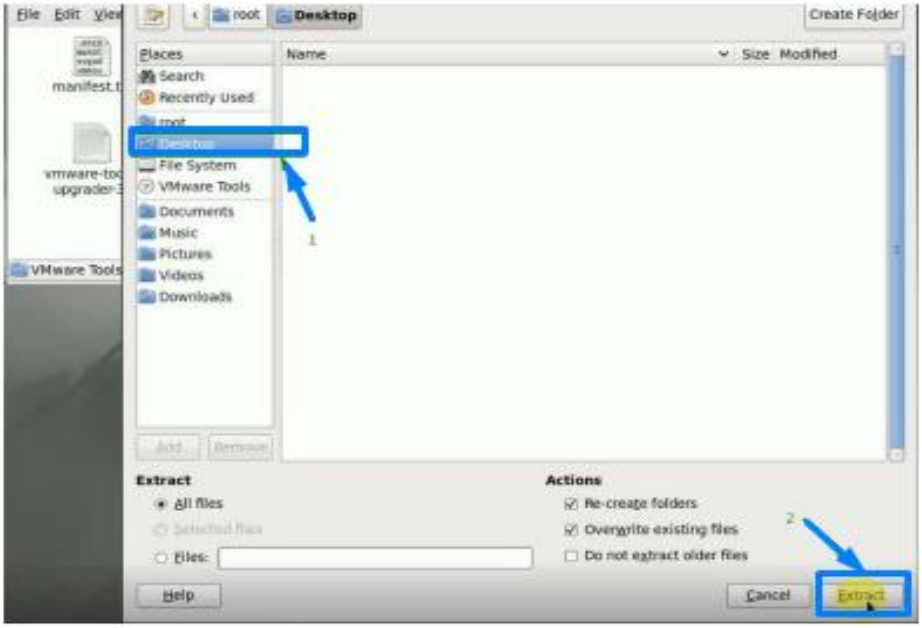
6.53. Login as “root” user with previously password then click on Log In button.

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

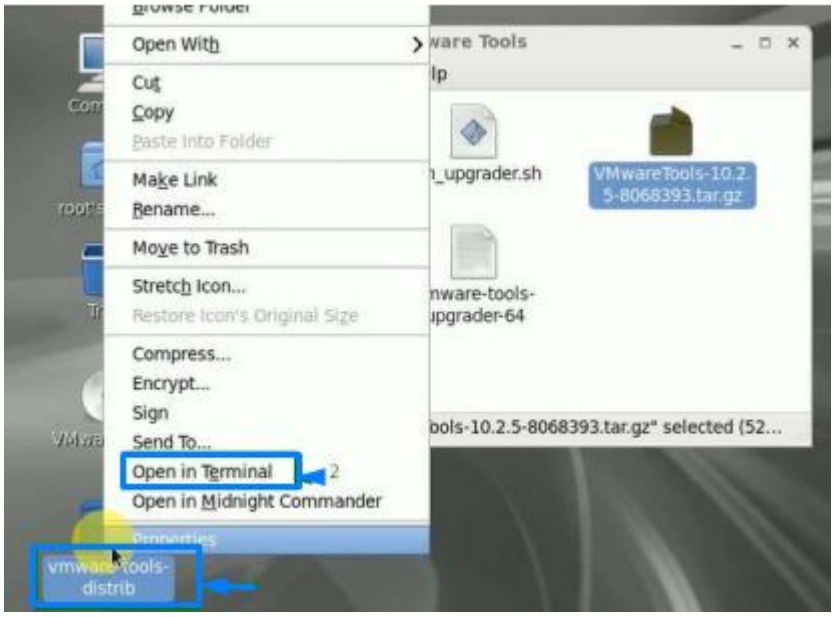
6.55. After step “1.64” there is a terminal with “VMwareTools-10.2.5-8068393.tar.gz” directory appeared then right click on directory and click on “Extract To”



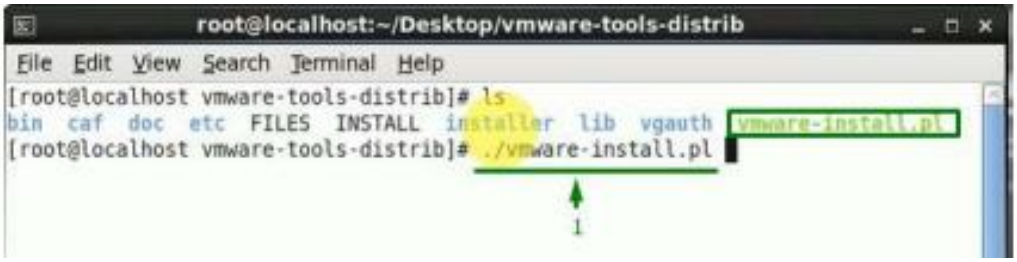
6.56. Choose the proper location where you want to extract.



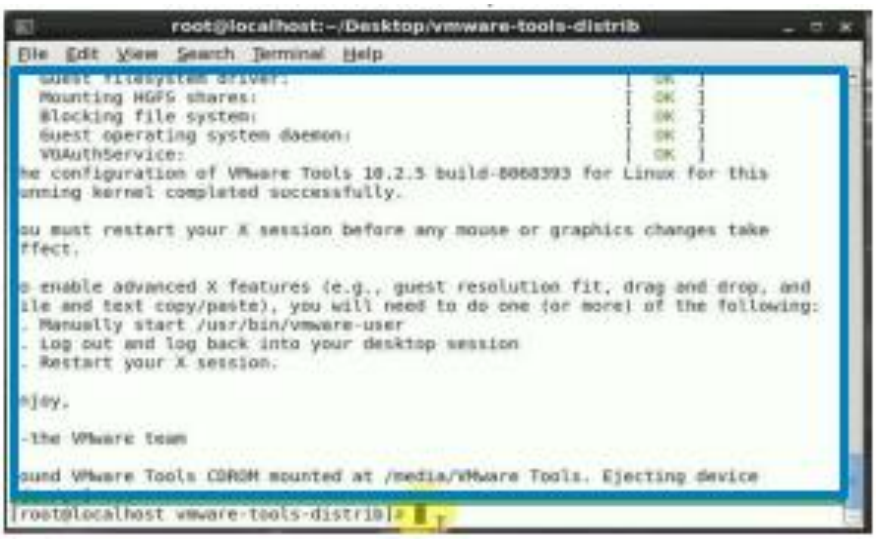
6.57. Right Click on extracted folder named as “vmwaretools-distrib” then click on “Open in Terminal”.



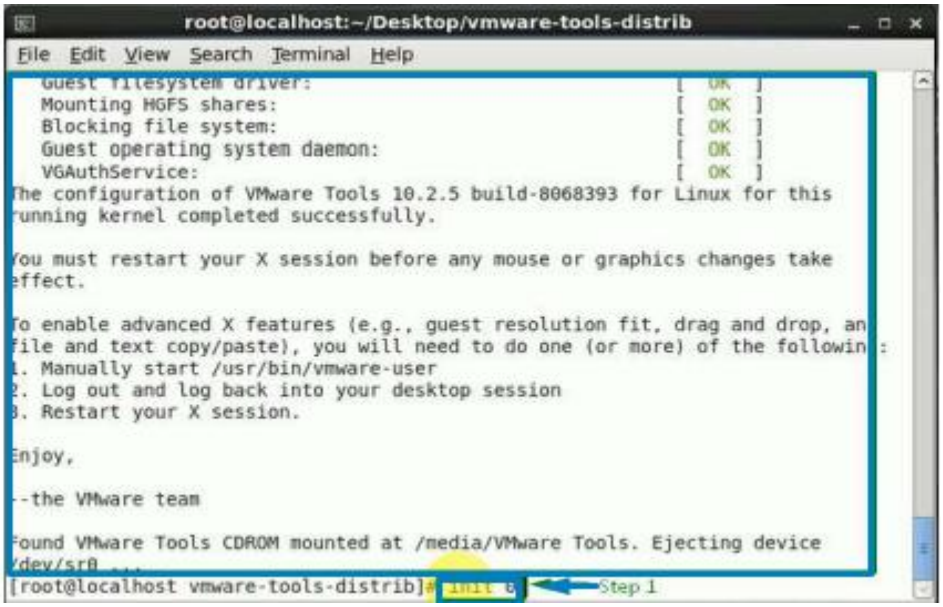
6.57. Run Pearl file (vmware-install.pl) to install VM tools in your OS with every asked option proceed to Enter form keypad to set default option.



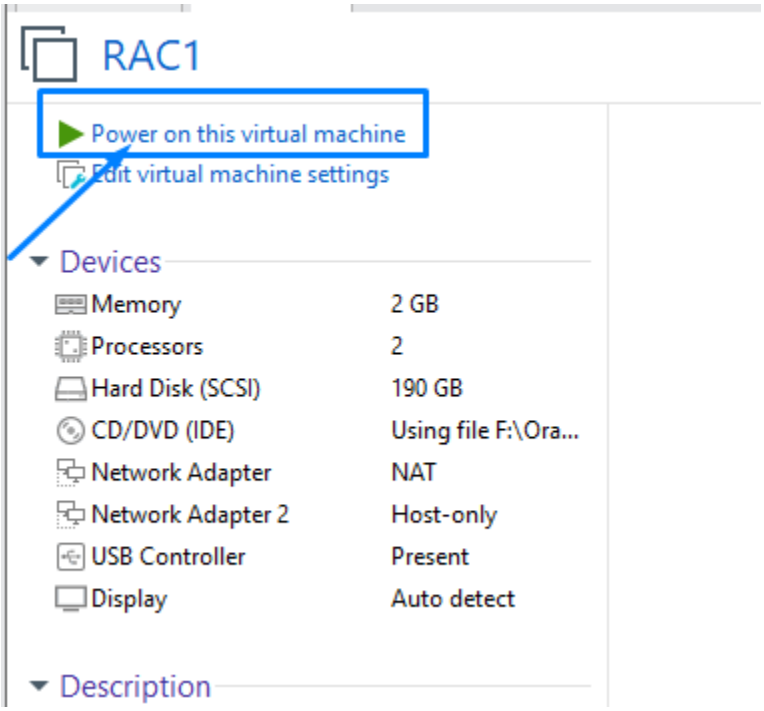
6.58. After successful installation of vm tools your terminal looks like



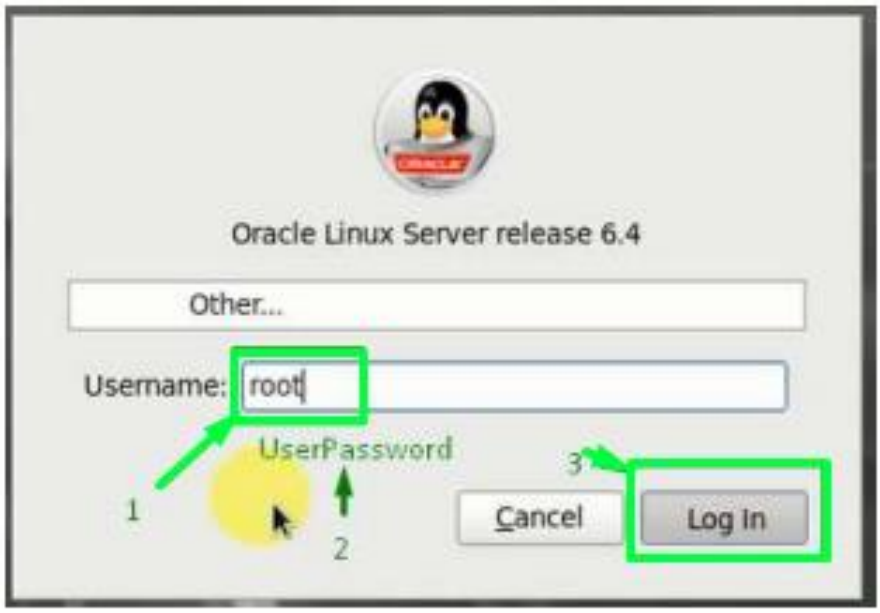
6.59.Type “init 0” to shut down your VM machine.



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