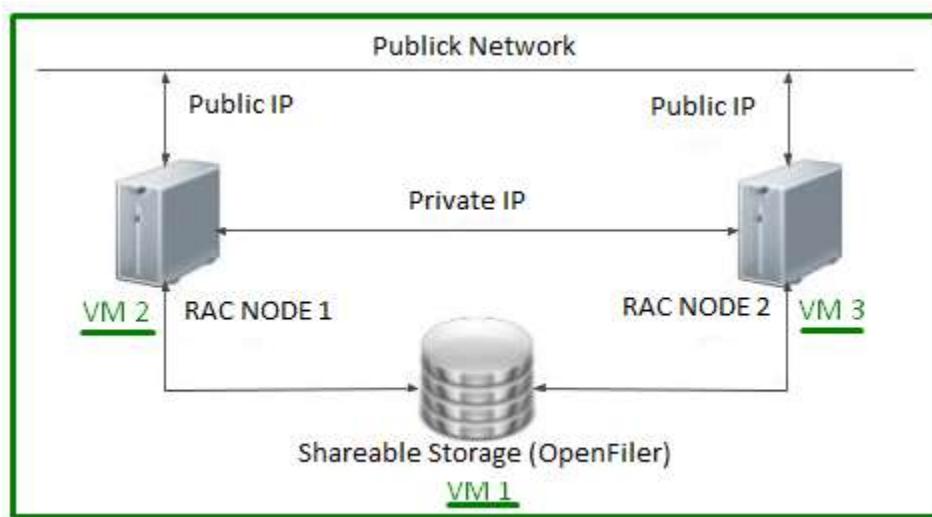


Oracle Database 11g Release 2 (11.2.0.3.0) 2-Node RAC on Oracle Linux 6.10
(Using OPENFILER and VMware Work Station Pro)

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 of these 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 work station 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 having processor: core i7, Memory: 8GB and SSD 248 GB.



We needs 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)
Host Name	rac1.mydomain	rac2.mydomain	openfiler.mydomain
Instance Name	racdb1	racdb2	
Database Name	racdb	racdb	
Operating System	OEL 6.10 - (x86_64)	OEL 6.10 - (x86_64)	Openfiler- 2.99.1 -(x86_64)
Public IP	IPADDR=192.168.129.105 NETMASK=255.255.255.0 GATEWAY=192.168.129.6 DNS1=192.168.129.16 DNS2=192.168.129.2	IPADDR=192.168.129.106 NETMASK=255.255.255.0 GATEWAY=192.168.129.6 DNS1=192.168.129.16 DNS2=192.168.129.2	IPADDR=192.168.129.104 NETMASK=255.255.255.0 GATEWAY=192.168.129.6 DNS1=192.168.129.16 DNS2=192.168.129.2
Private IP	IPADDR=192.168.1.101 NETMASK=255.255.255.0 GATEWAY=192.168.129.6 DNS1=192.168.129.16 DNS2=192.168.129.2	IPADDR=192.168.1.102 NETMASK=255.255.255.0 GATEWAY=192.168.129.6 DNS1=192.168.129.16 DNS2=192.168.129.2	
Virtual IP	192.168.129.107	192.168.129.108	
SCAN IP	192.168.129.109 192.168.129.110	192.168.129.109 192.168.129.110	

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 Components

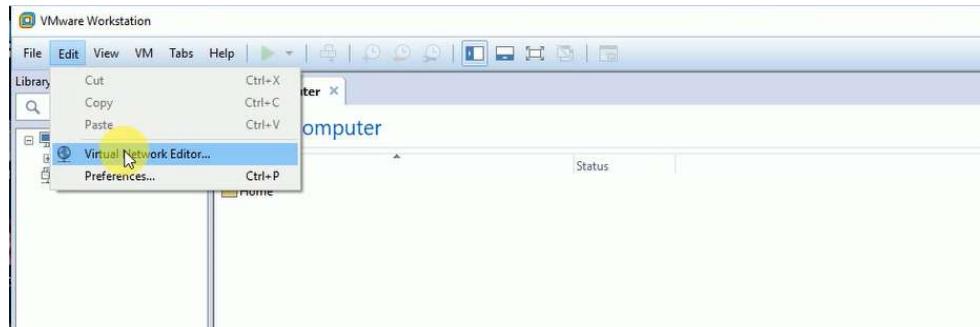
Storage Component	File System	Volume Size	ASM Volume Group Name	Openfiler Volume Name
OCR/Voting Disk	ASM	20GB	+CRS	crs
Database Files	ASM	40GB	+DATA	data1
Fast Recovery Area	ASM	25GB	+FRA	fra1

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

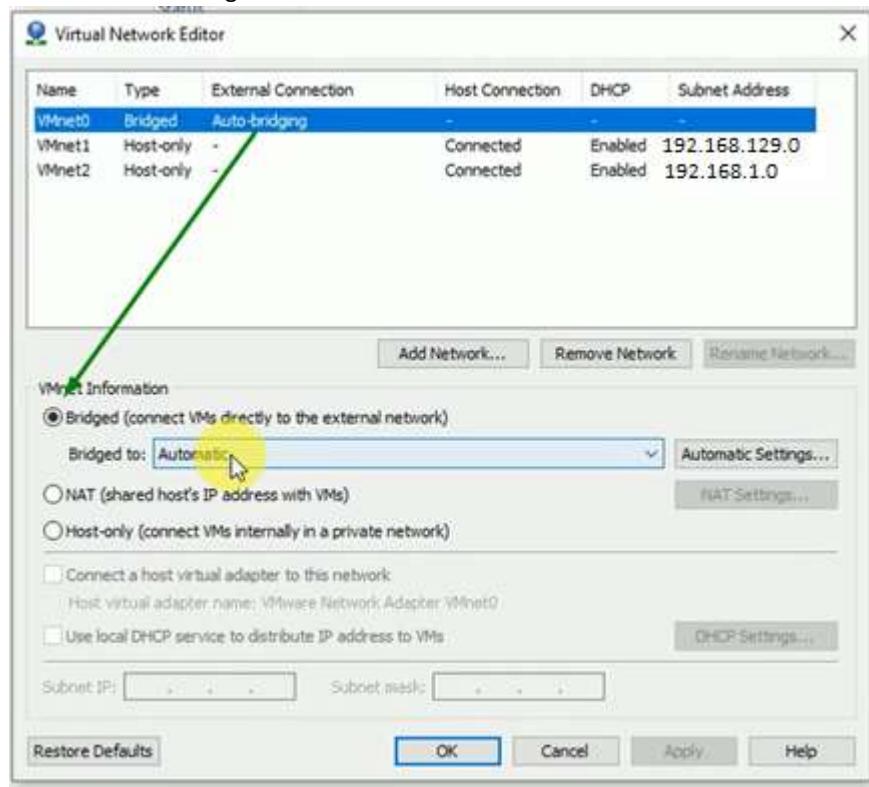


1.2. Initializing virtual networks

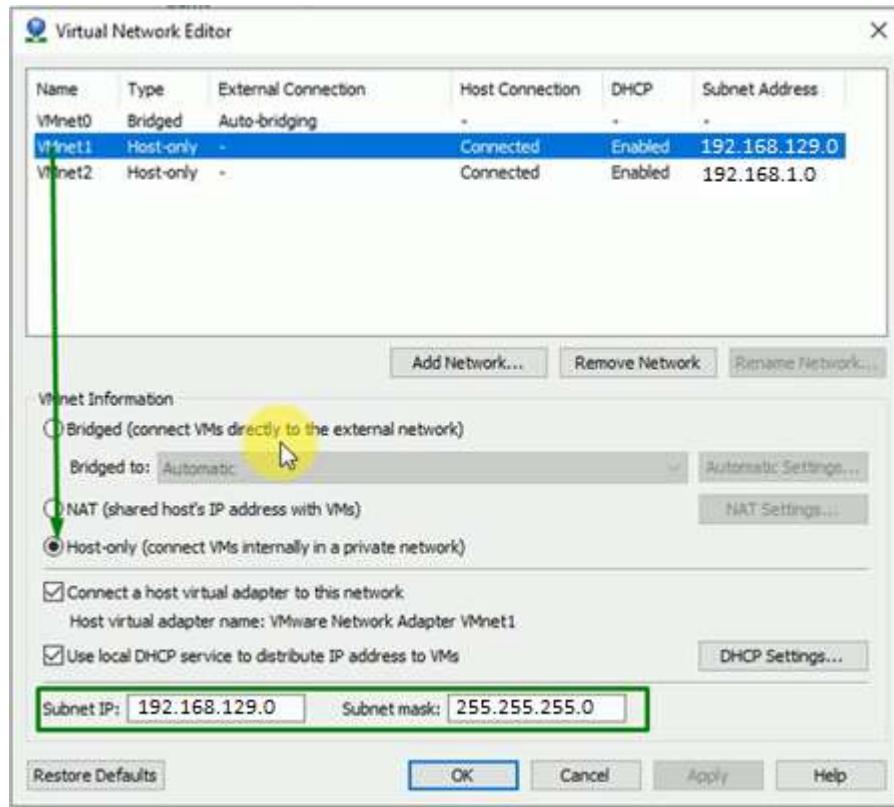
Initializing virtual networks

>Loading network configuration...

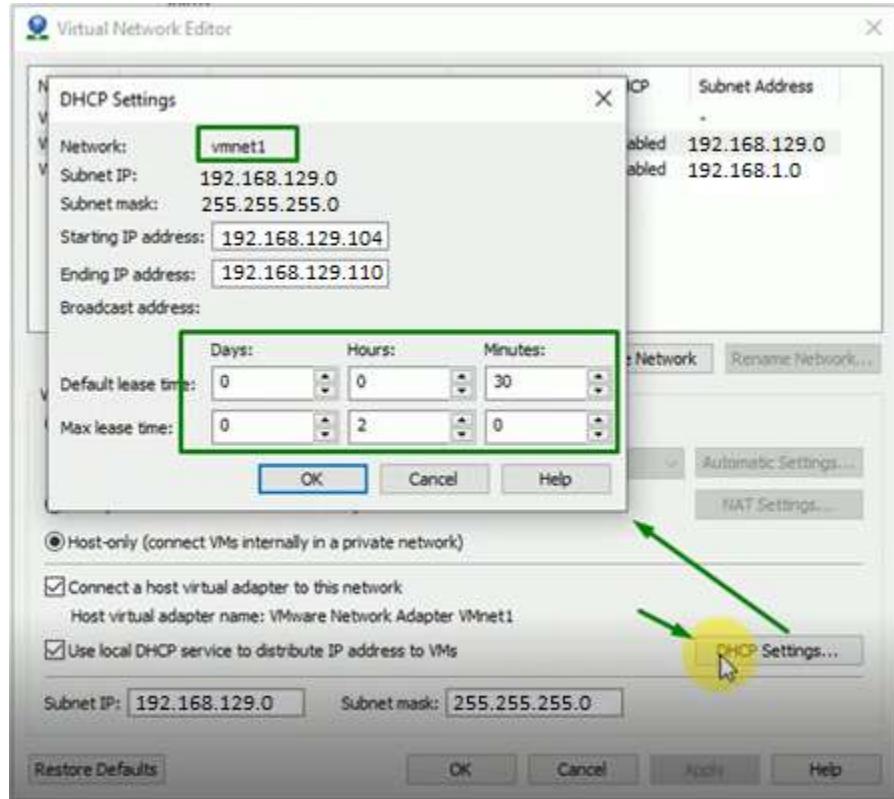
1.3. VMnet0 => Bridged => Automatic



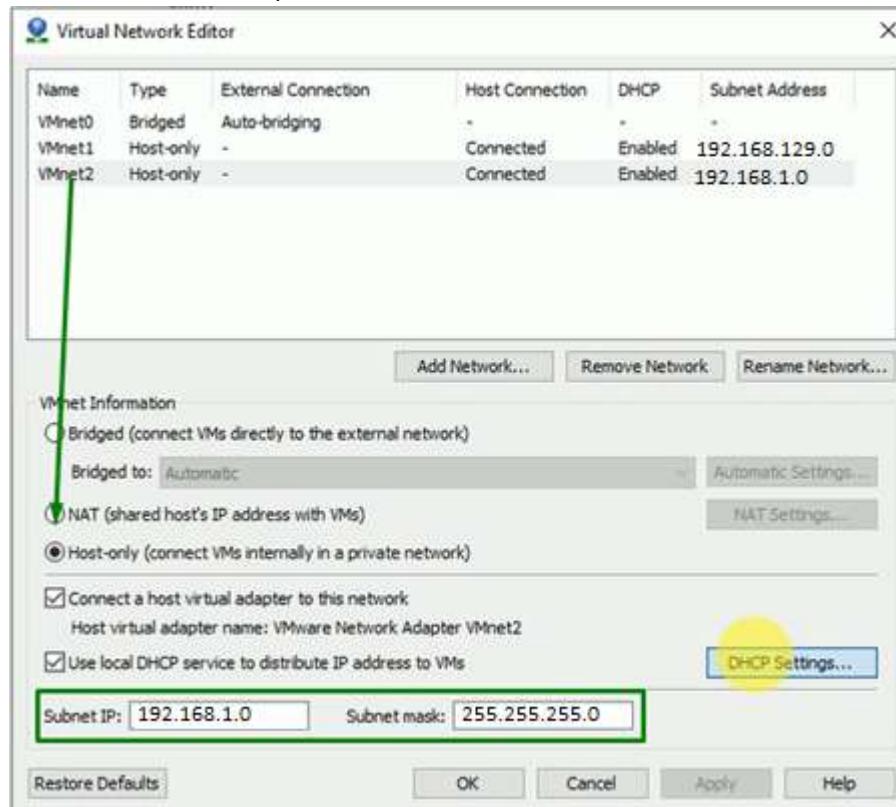
1.4. VMnet1 => Host-only => DHCP



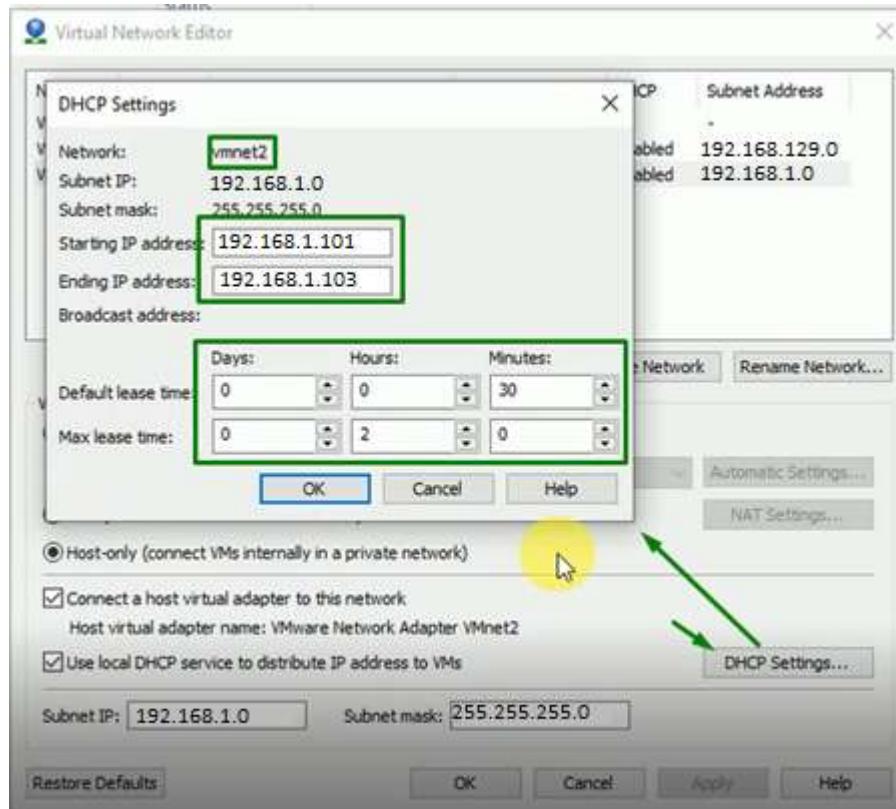
1.5. VMnet1 => Host-only => DHCP Setting



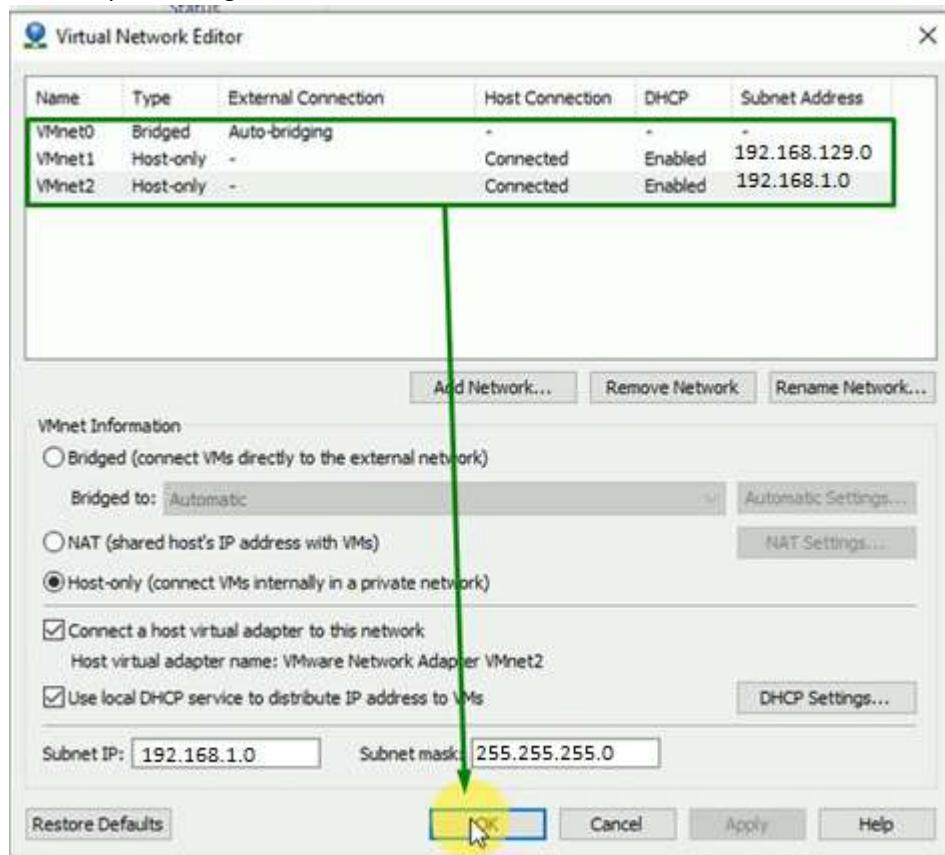
1.6. VMnet2 => Host-only => DHCP



1.7. VMnet2 => Host-only => DHCP Setting

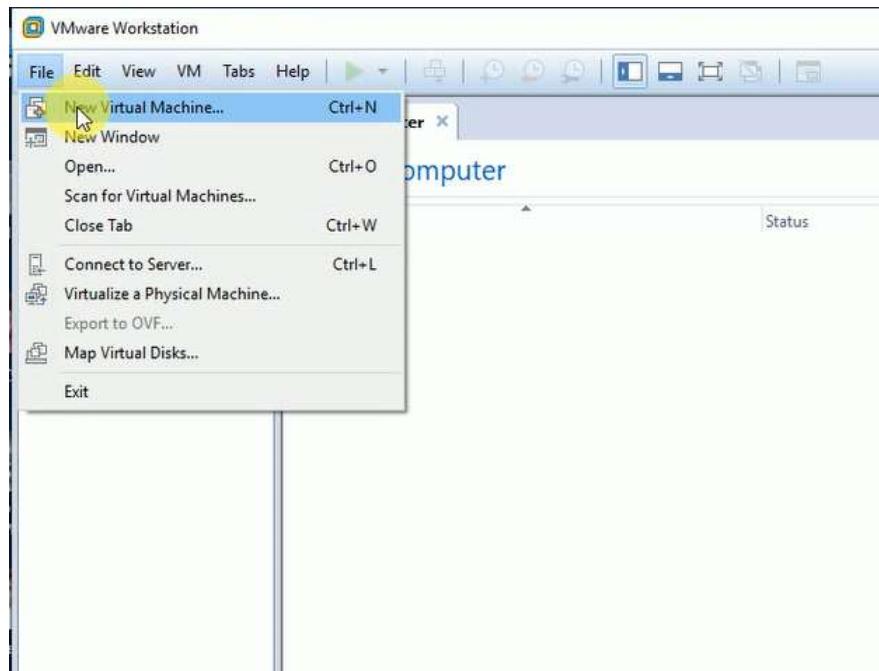


1.8. Finley the Configuration look like, Virtual Network Editor IP



2. New VM Configuration for Openfiler

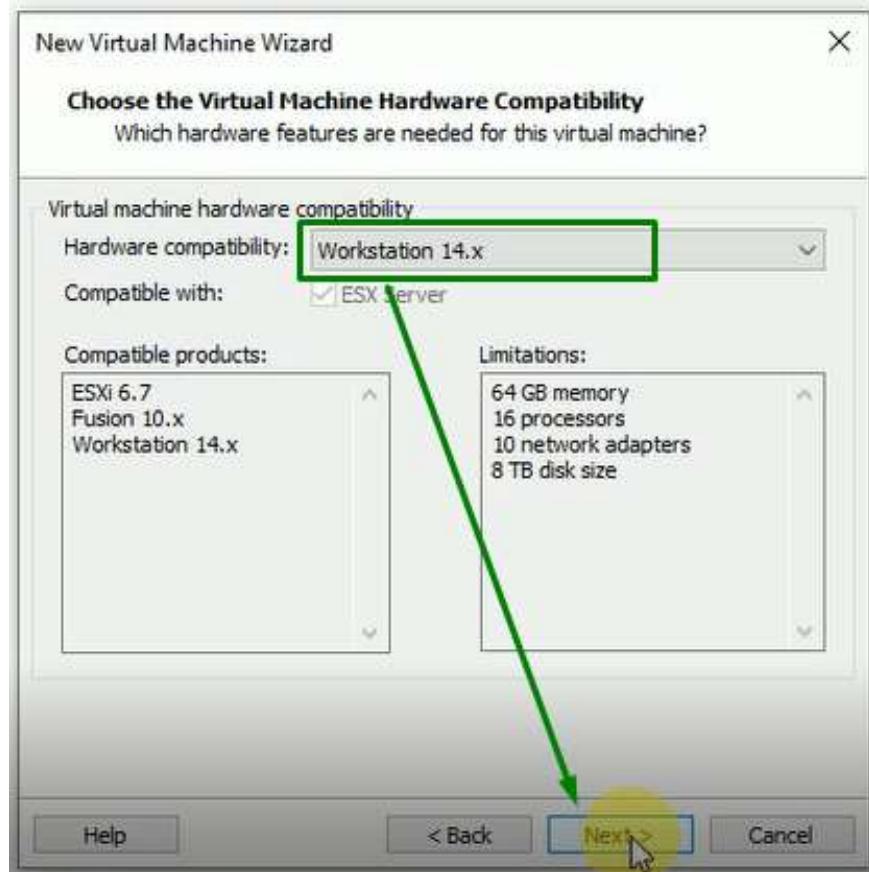
2.1. File => New Virtual Machine



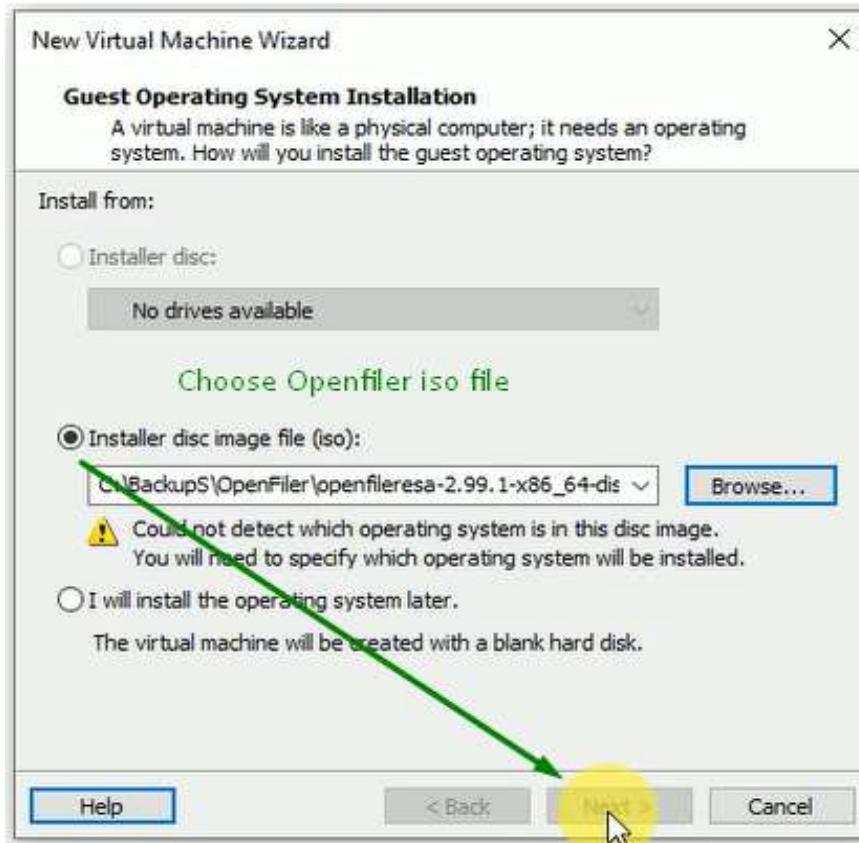
2.2. Choose Custom configuration



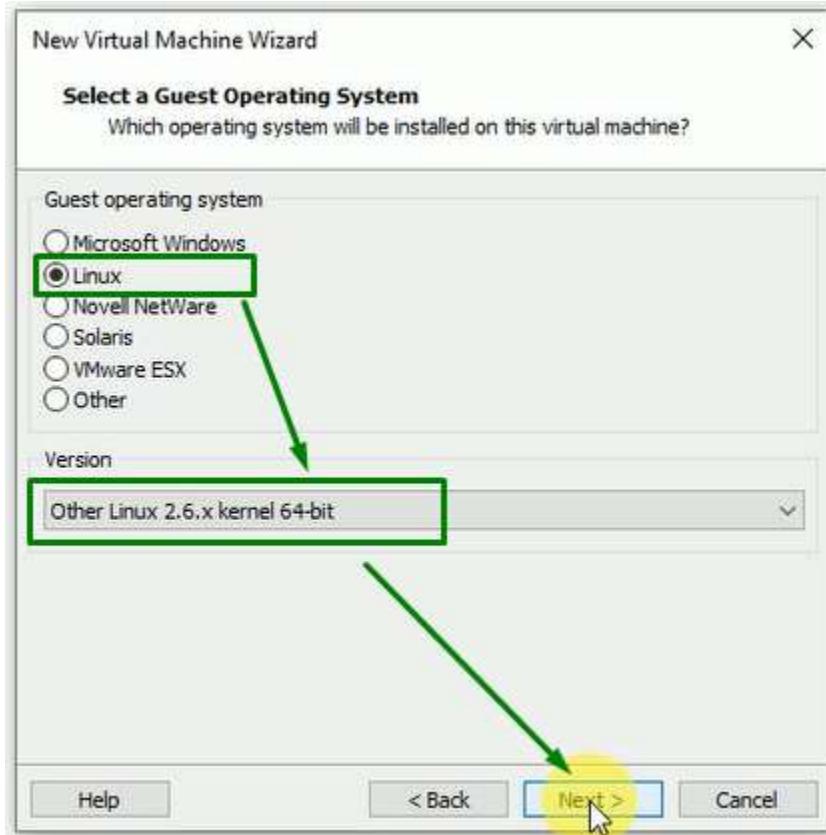
2.3. Choose default Hardware compatibility



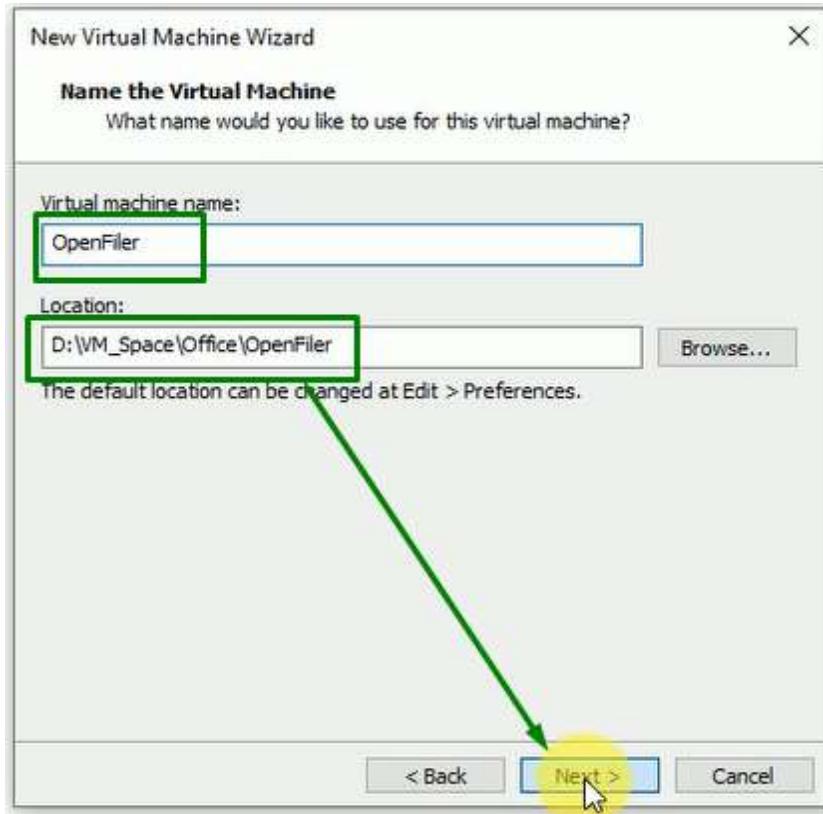
2.4. Choose Openfiler iso file (openfileresa-2.99.1-x86_64-disc1.iso) using Browse



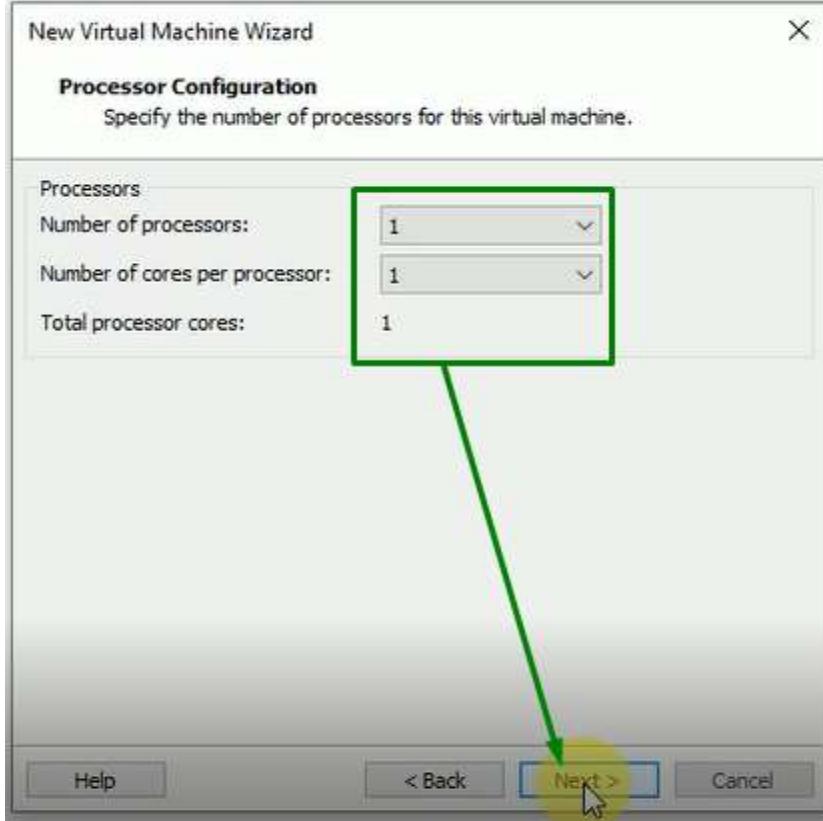
2.5. Choose OS and Version



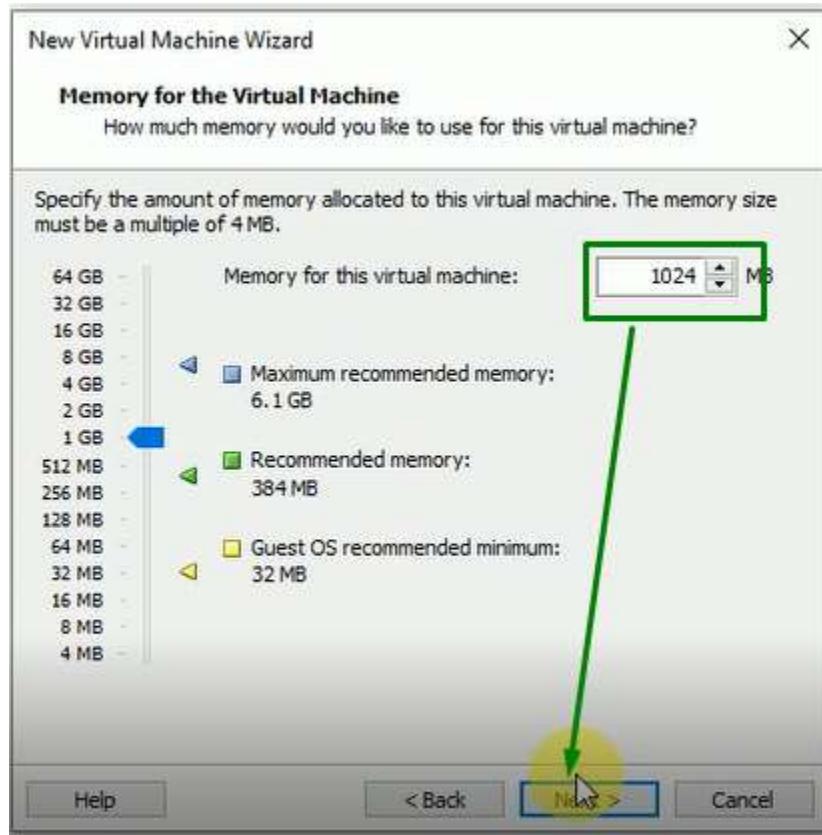
2.6. Provide VM Machine name and location where you want to store



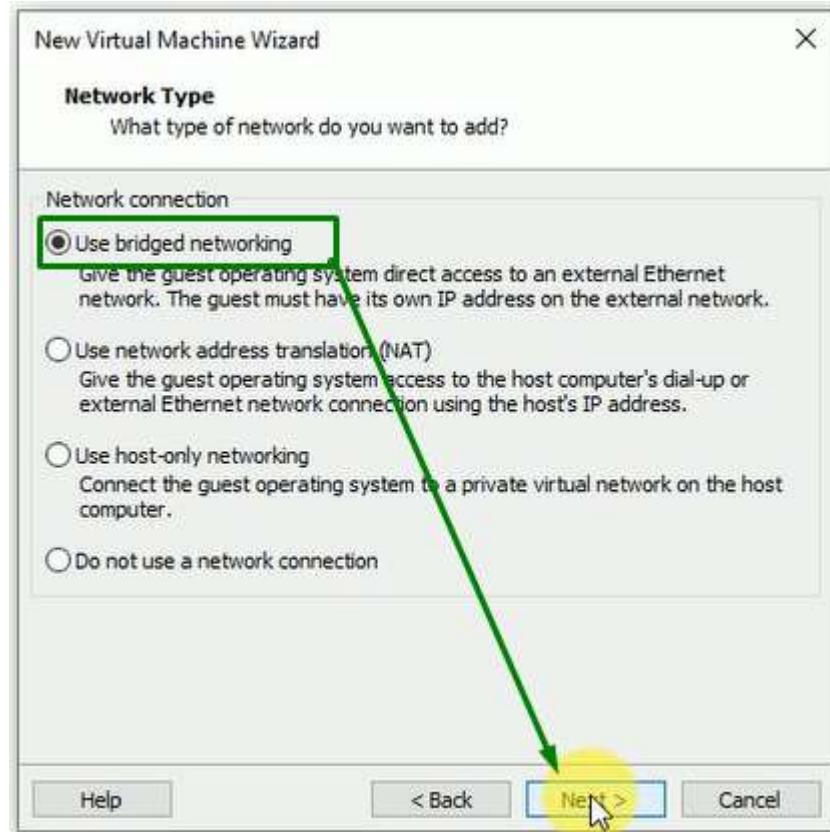
2.7. Select the processors and core as your machine



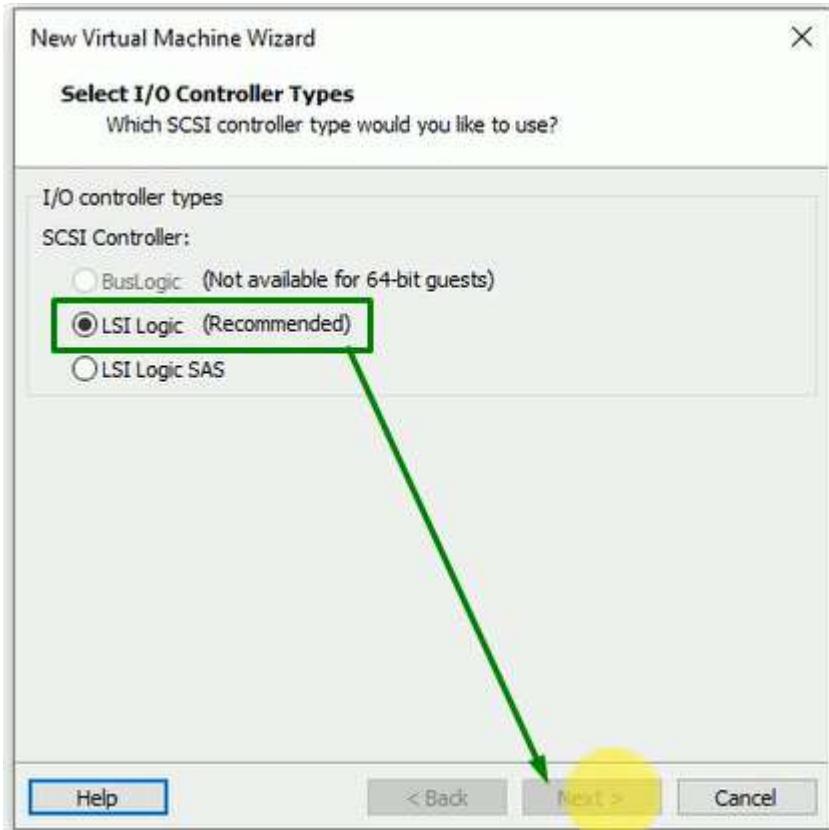
2.8. Put the memory 1GB for Openfiler (Storage)



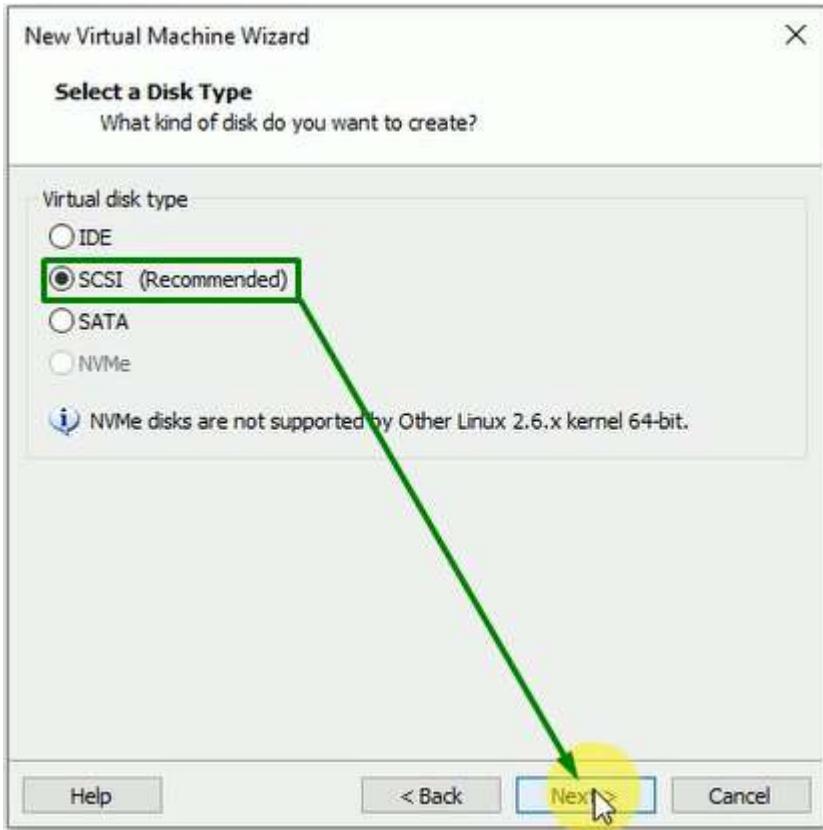
2.9. Choose Bridge Network Connection



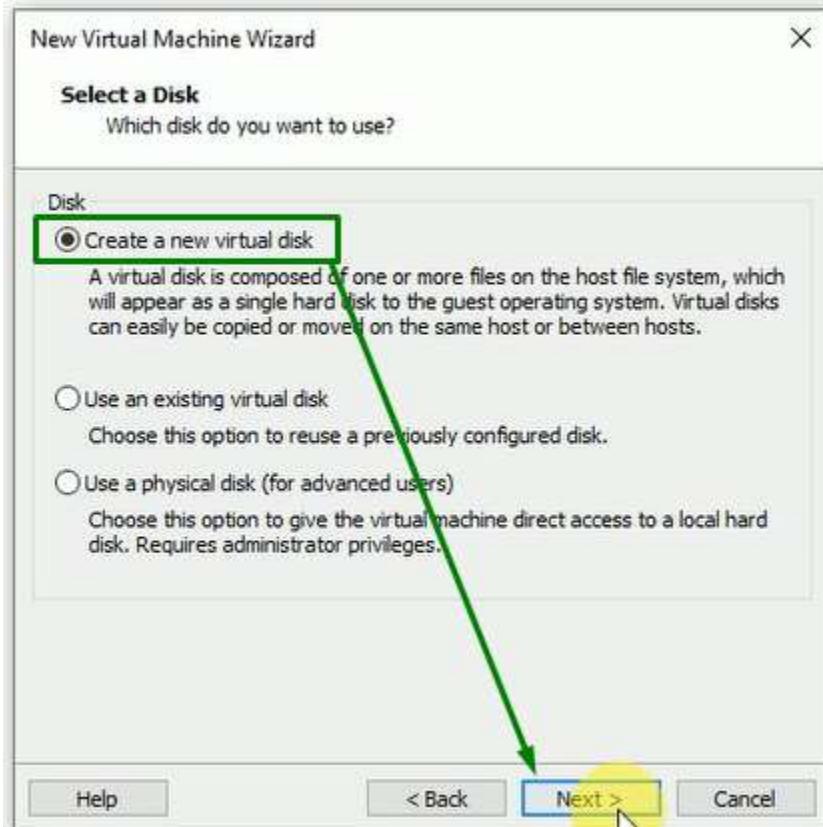
2.10. Select I/O Controller Type as LSI Logic



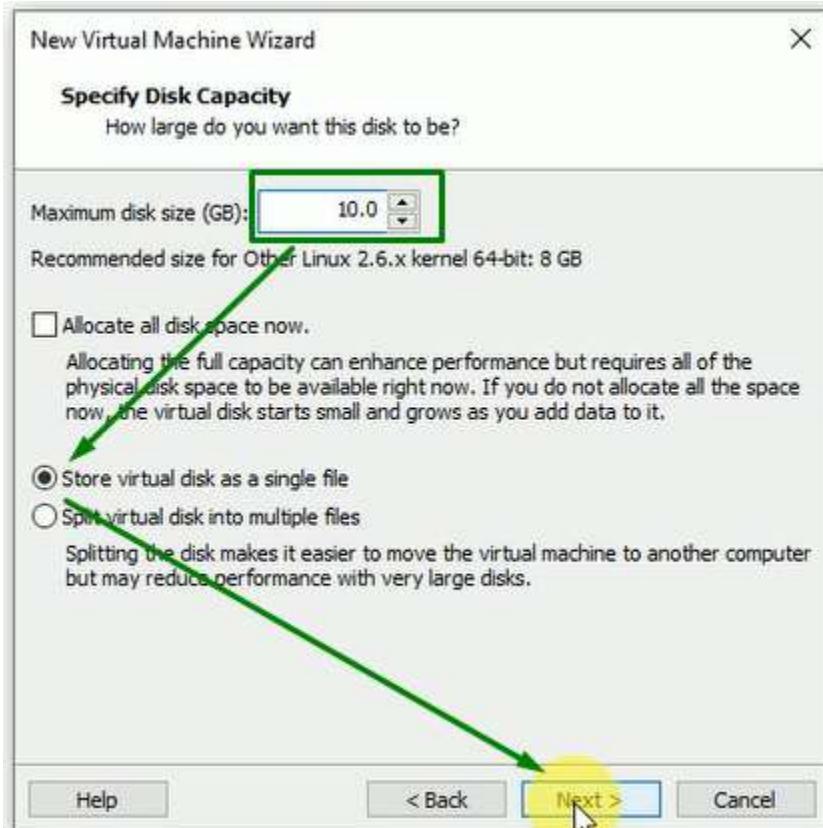
2.11. Select Disk Type as SCSI



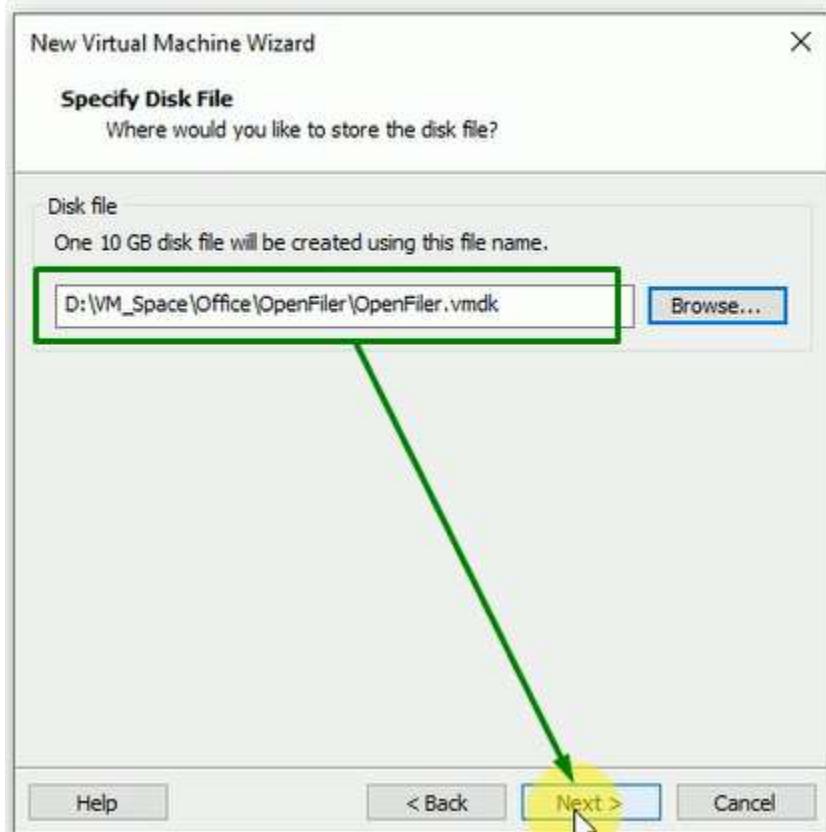
2.12. Create Disk to install Openfiler



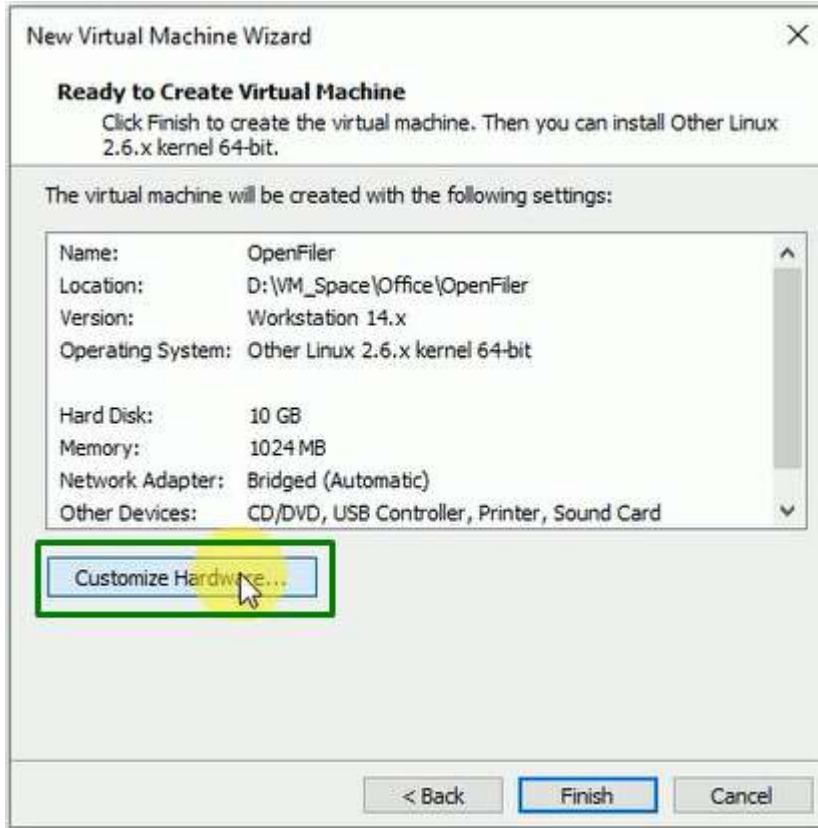
2.13. Put at list 10GB size to install Openfiler



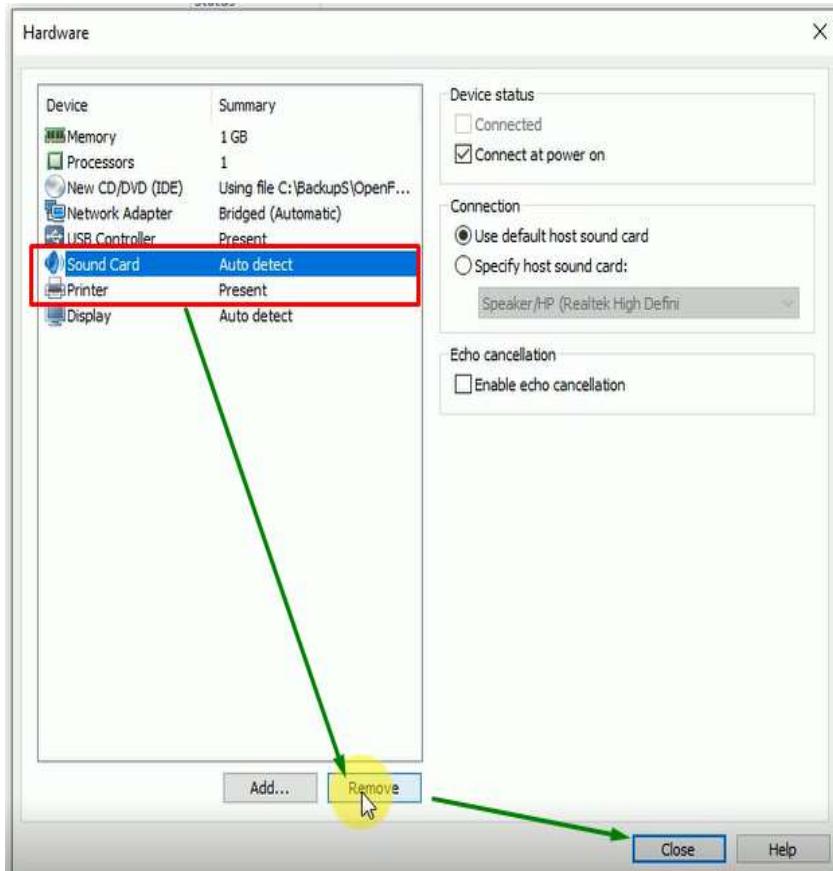
2.14. Provide location of Openfiler disk file



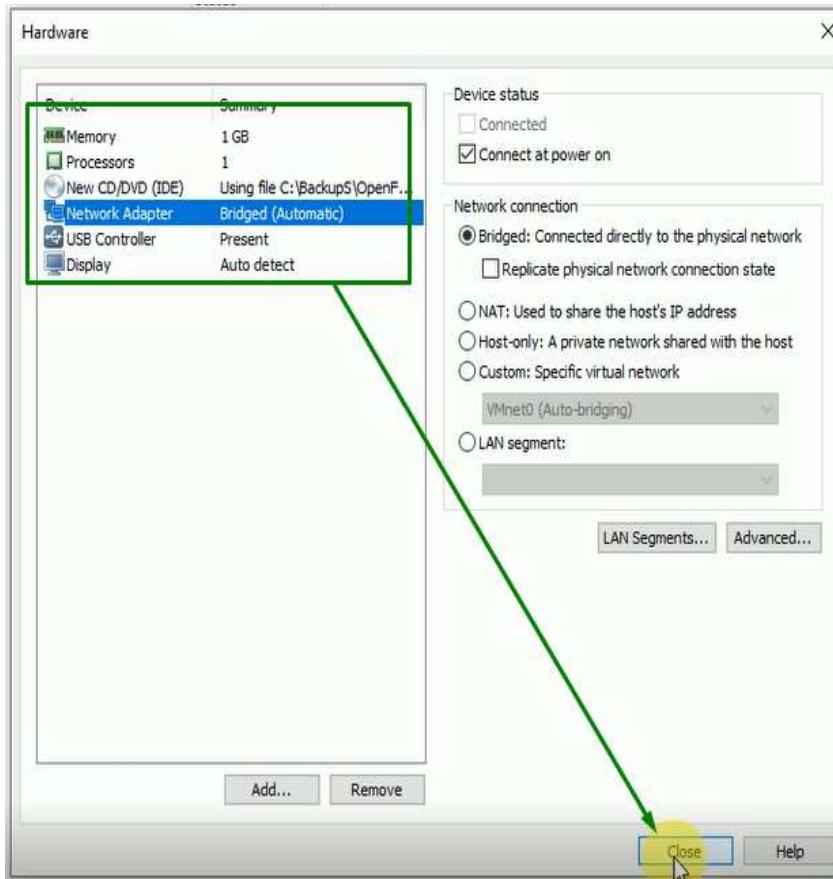
2.15. Click on hardware setting of Openfiler to remove drivers



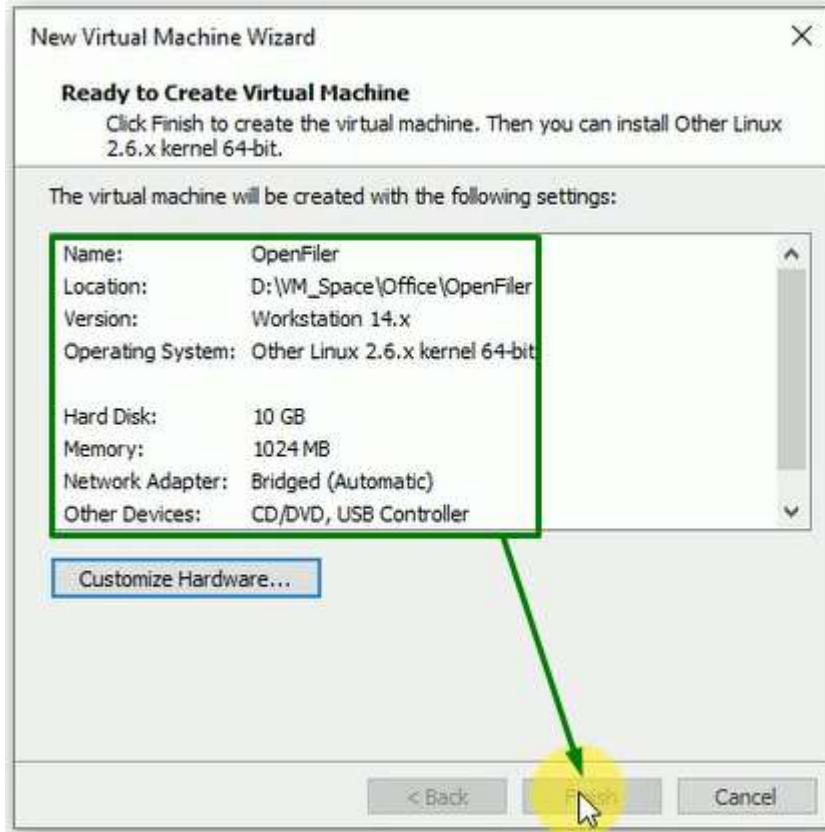
2.16. Remove the unnecessary drivers



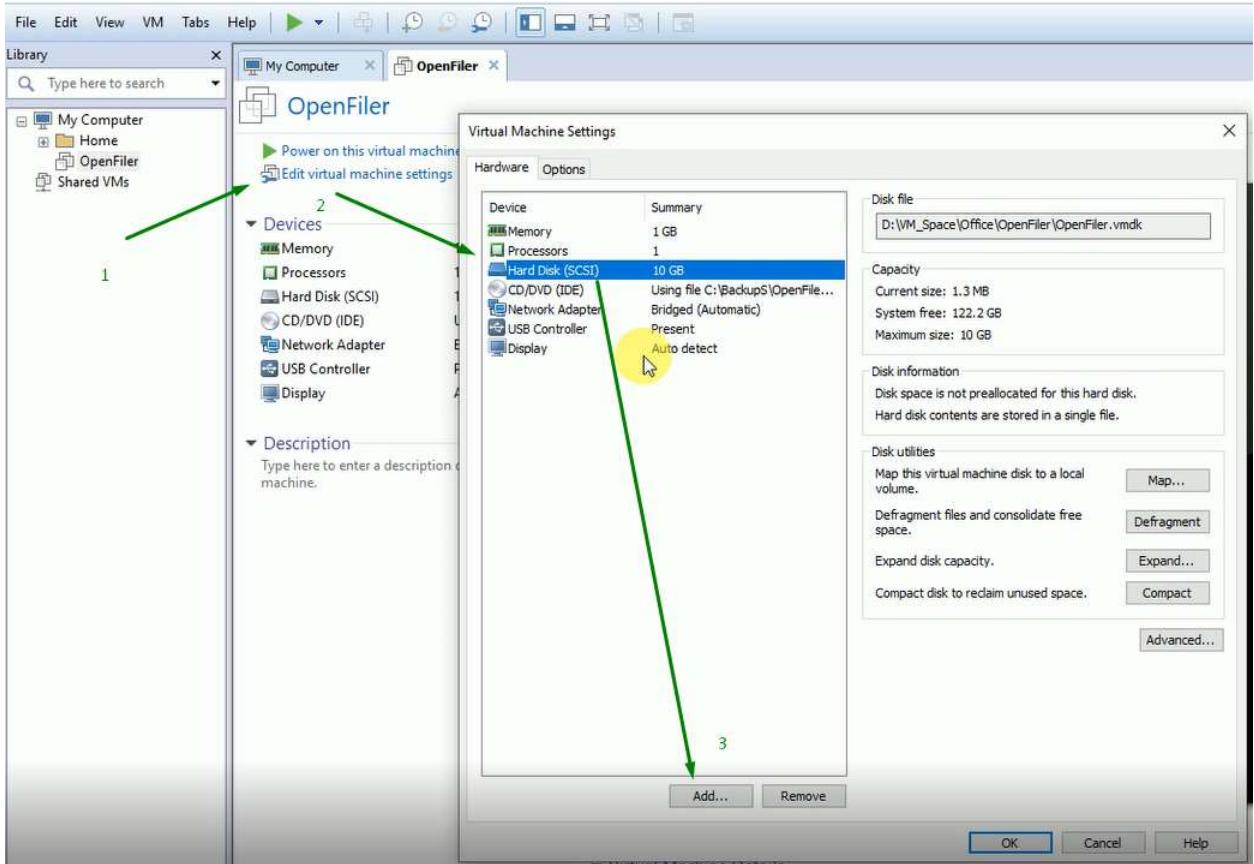
2.17. After removing the unnecessary drivers



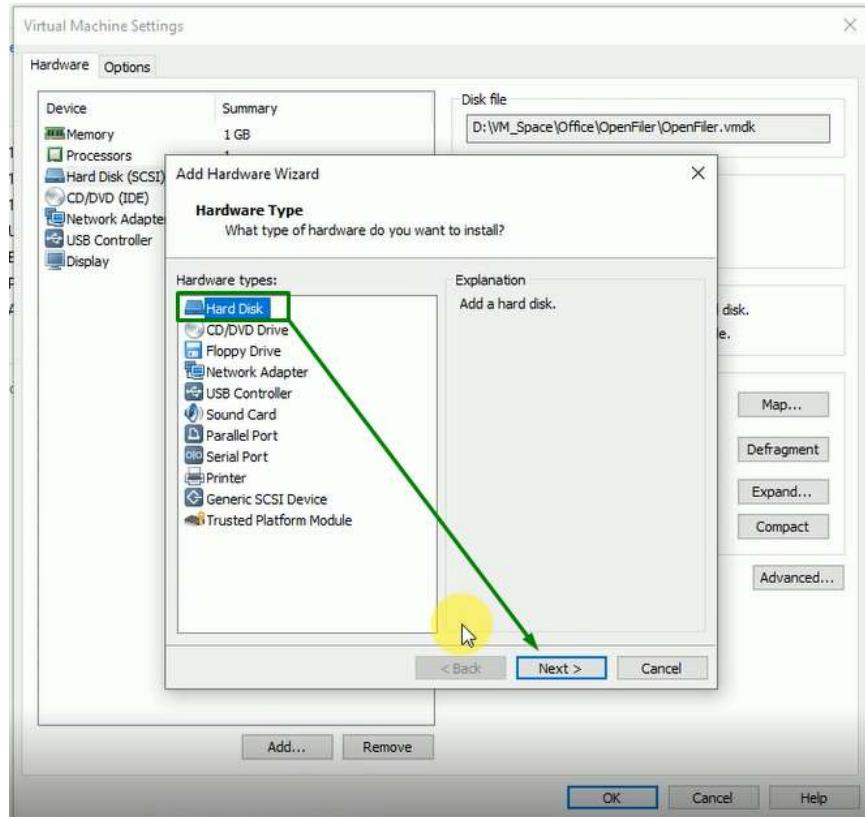
2.18. Verification of new VM machine



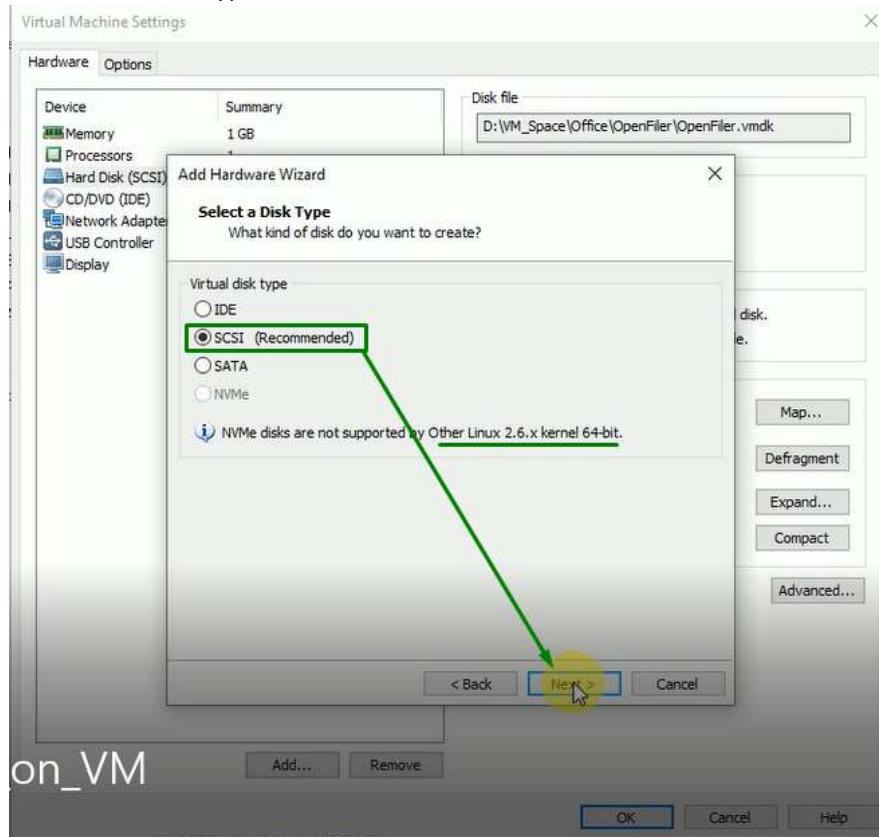
2.19. Adding Hard disk space to create OCR, DATA & FRA



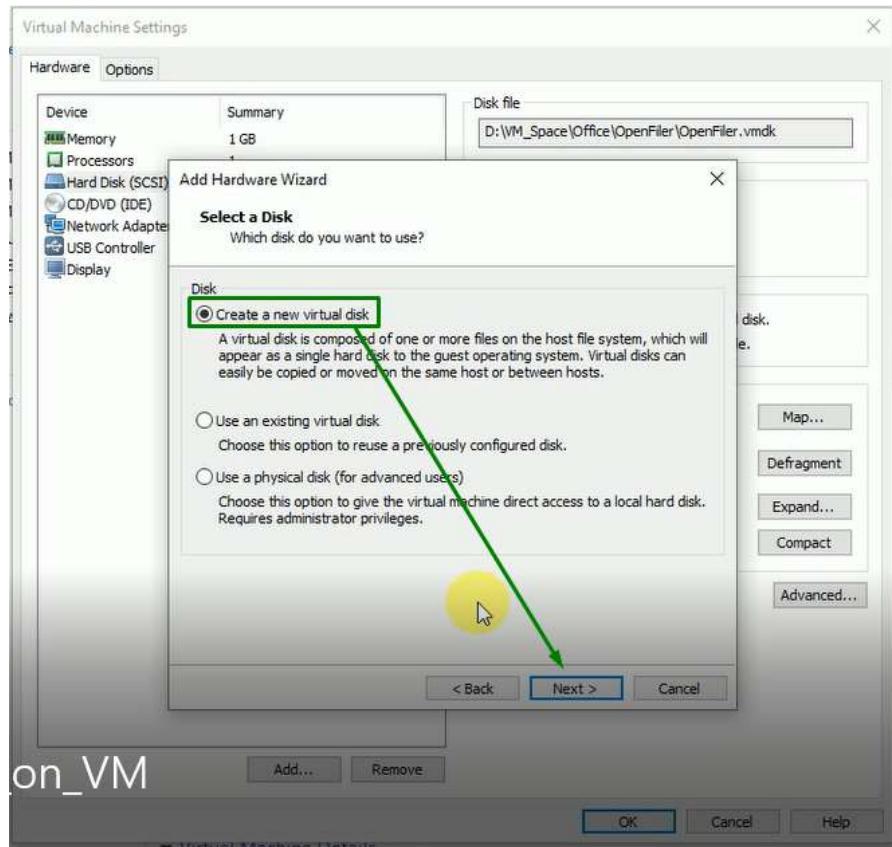
2.20. Run the VM Wizard to add hard disk



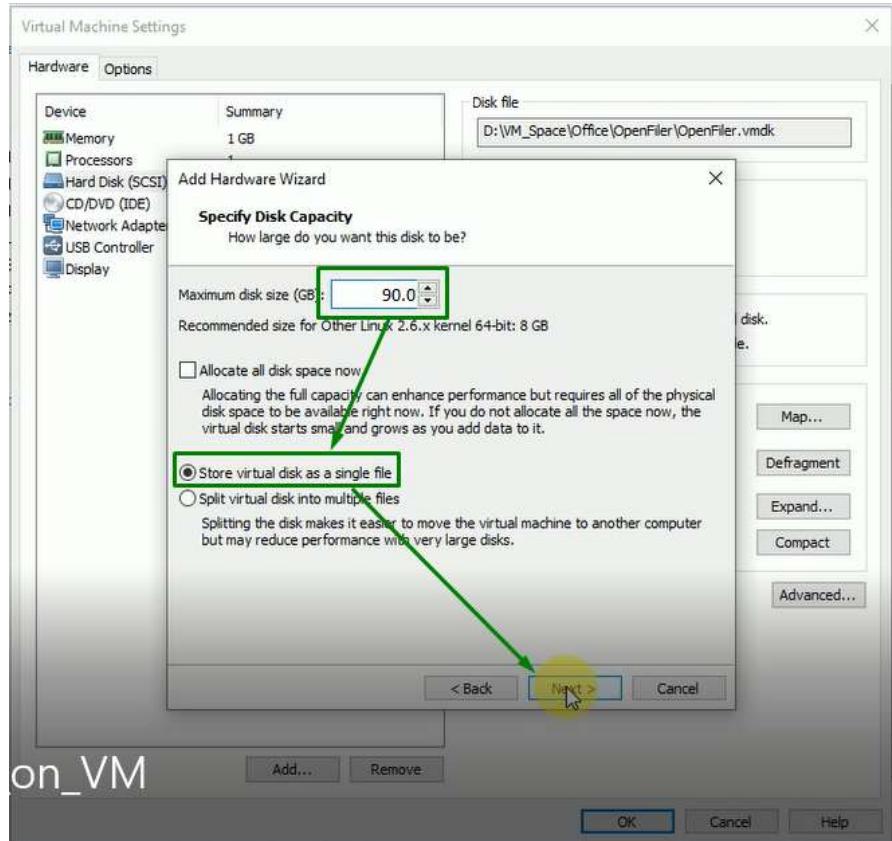
2.21. Select a disk type as SCSI



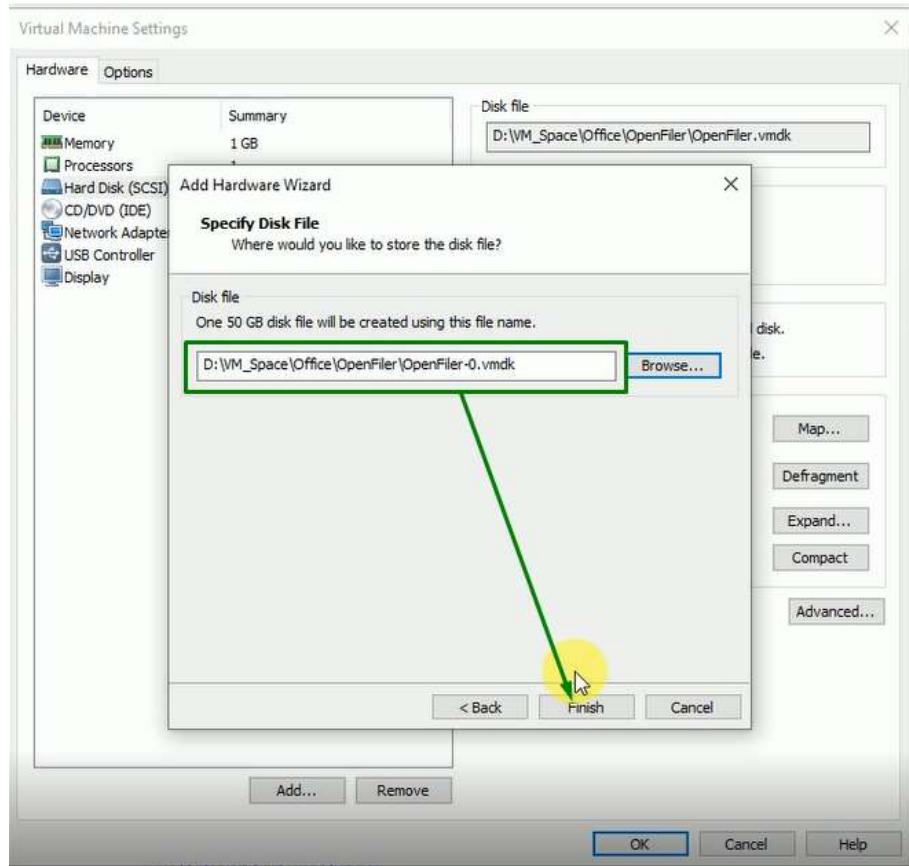
2.22. Select to Create a new virtual disk



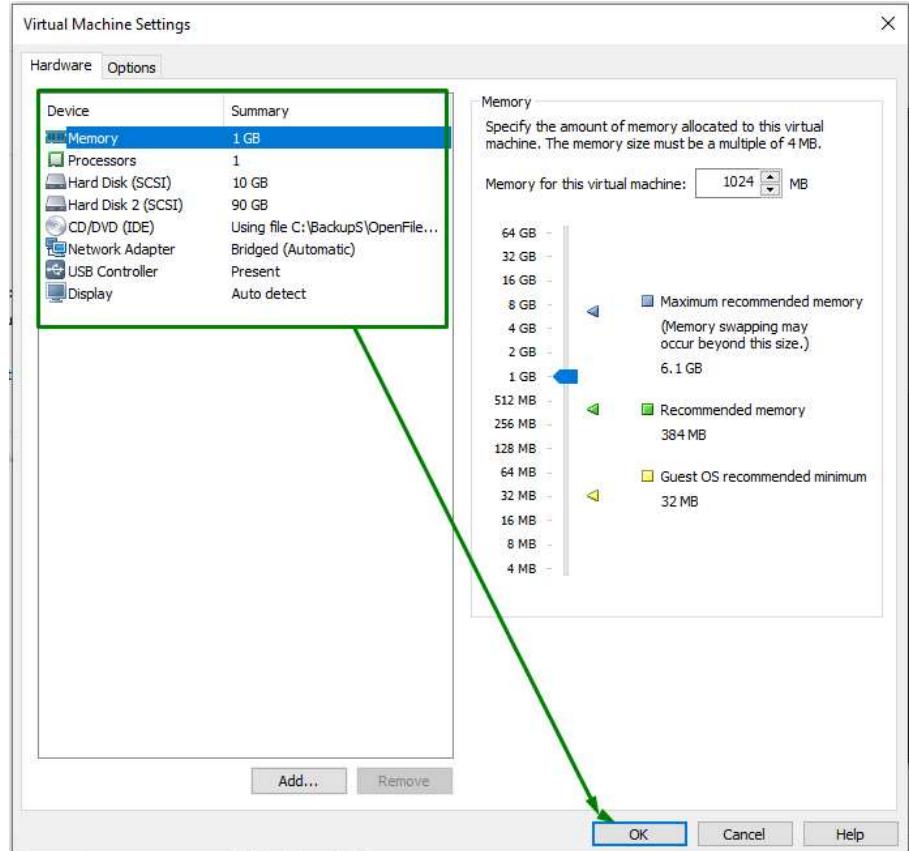
2.23. Select to Create a new virtual disk



2.24. Provide location to store vm disk

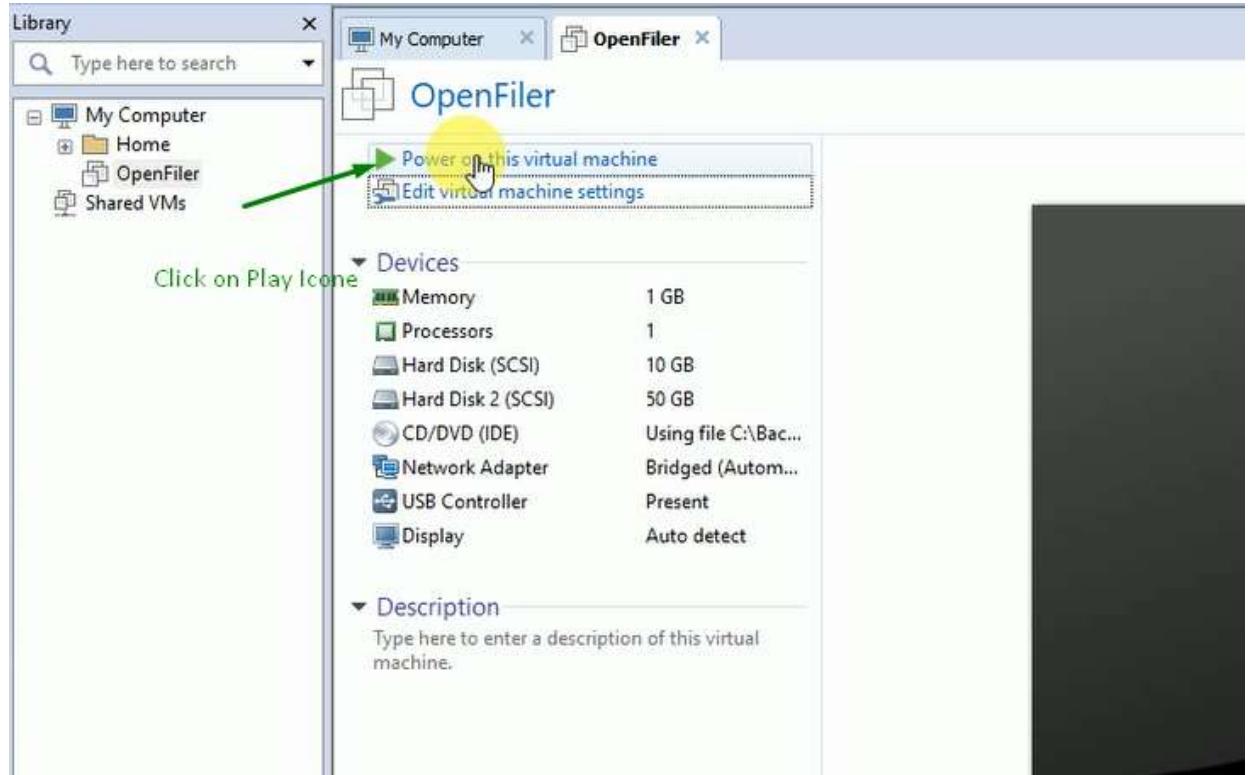


2.25. Verification of Openfiler Configuration

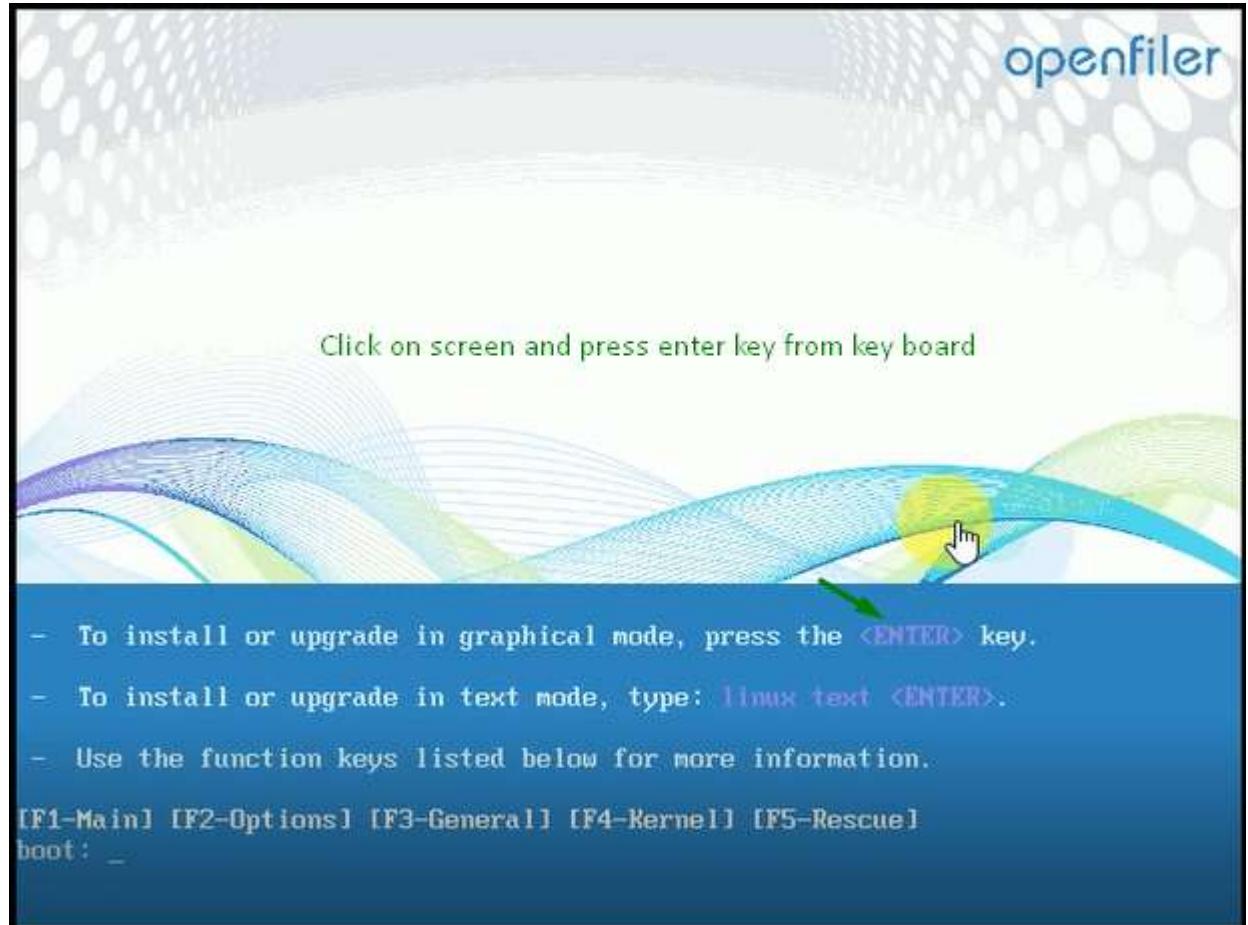


3. Installation of Openfiler over VM machine

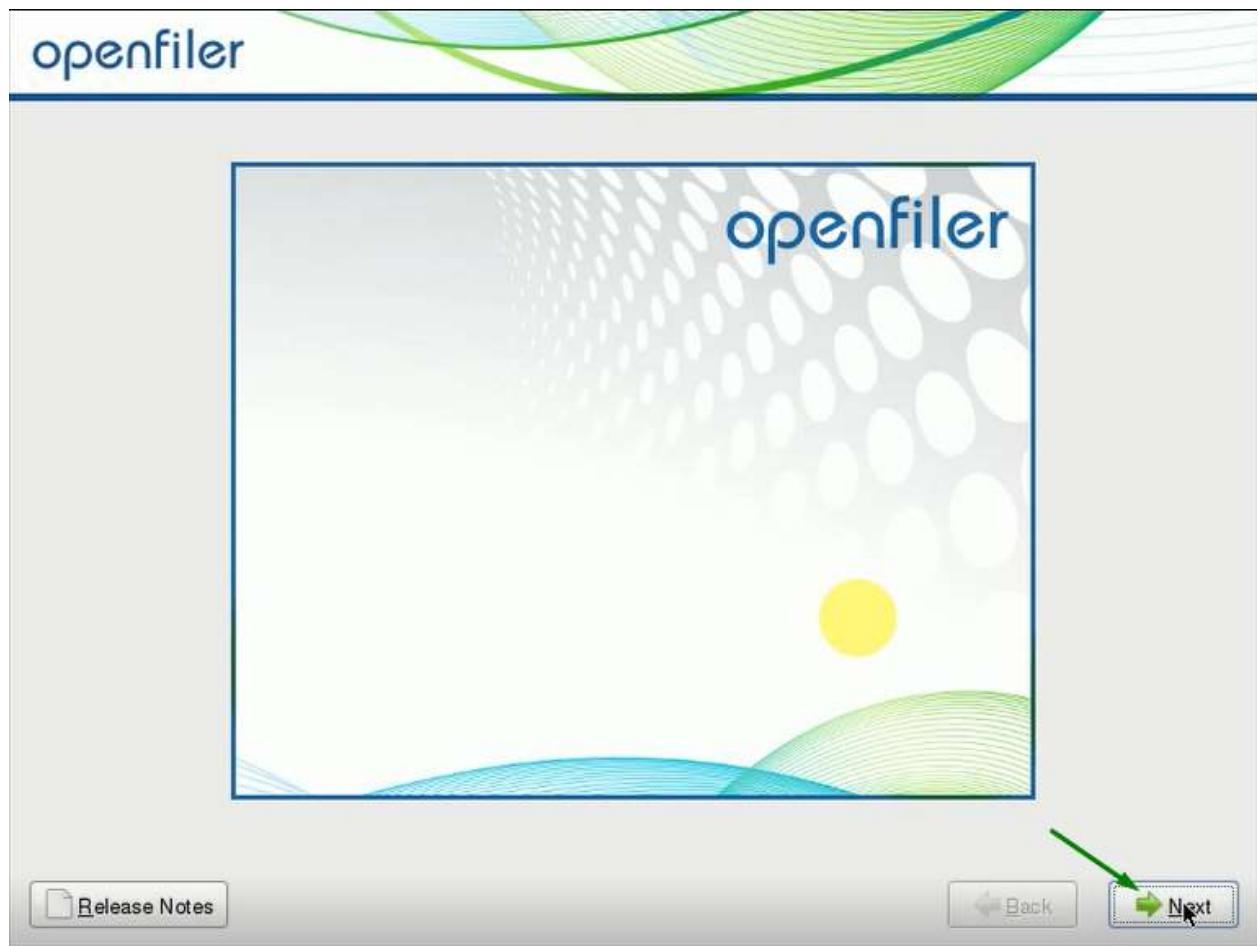
3.1. Power on the Openfiler VM machine to install



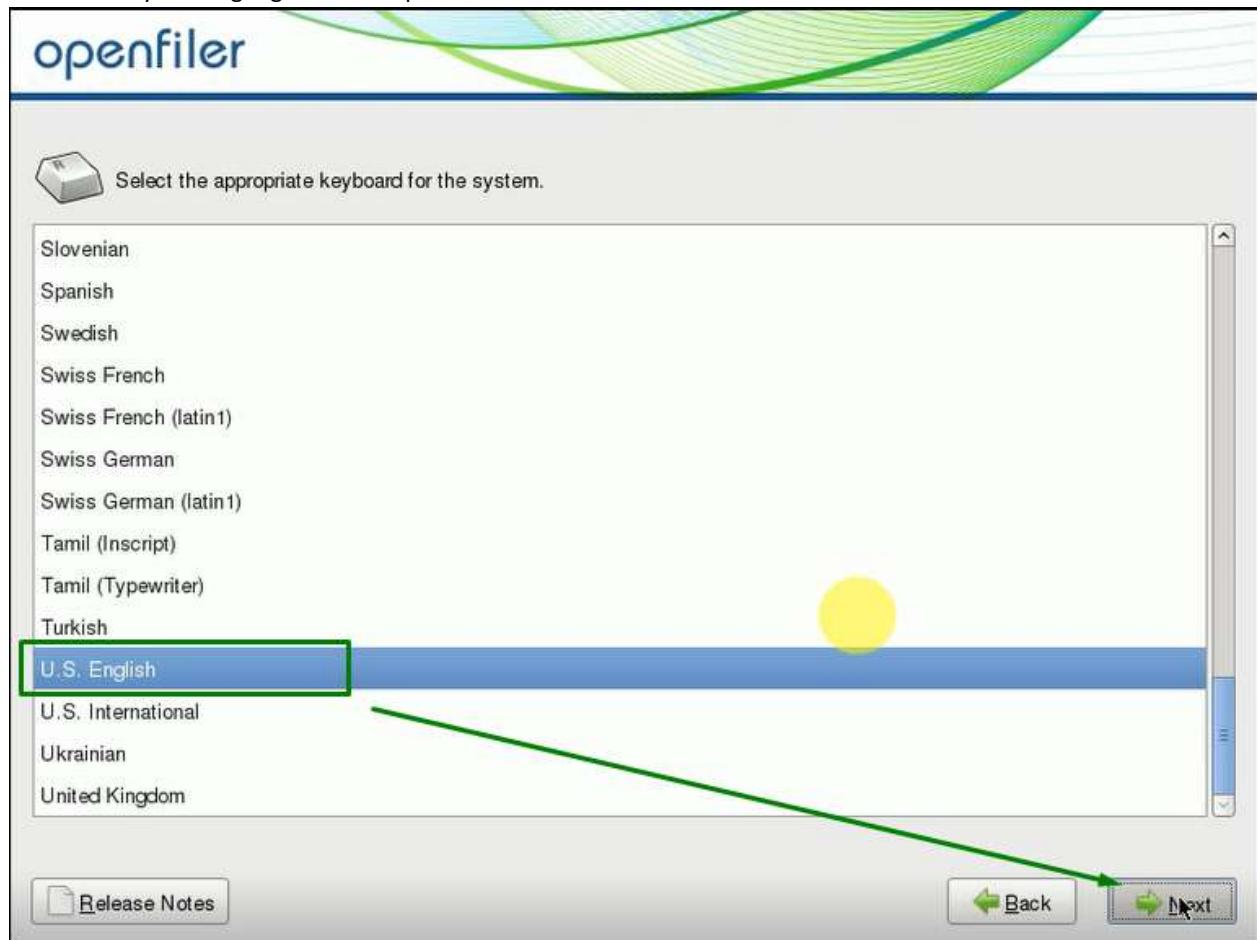
3.2. Proceed to install openfiler by hitting Enter Key



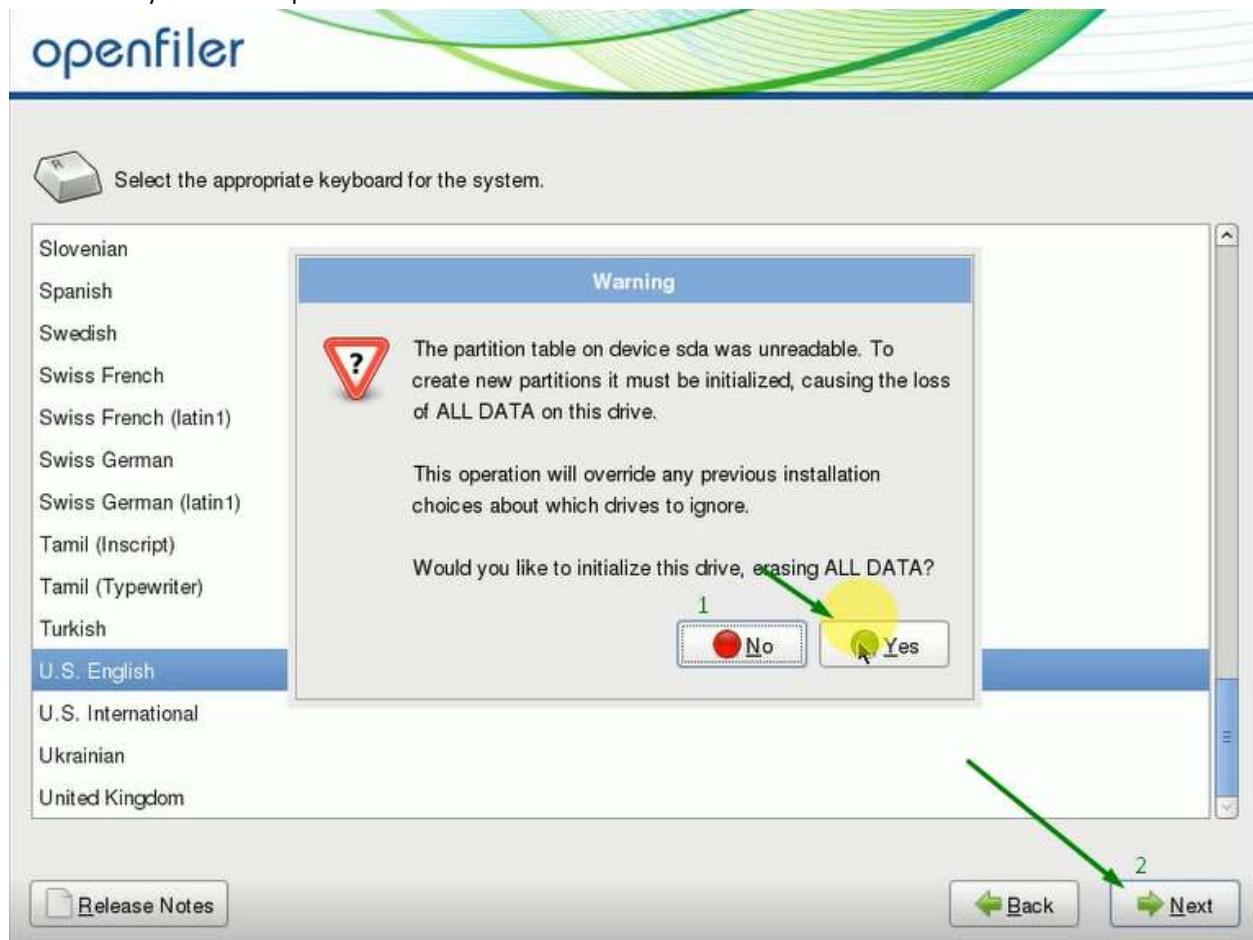
3.3. Proceed to Enter Next Button



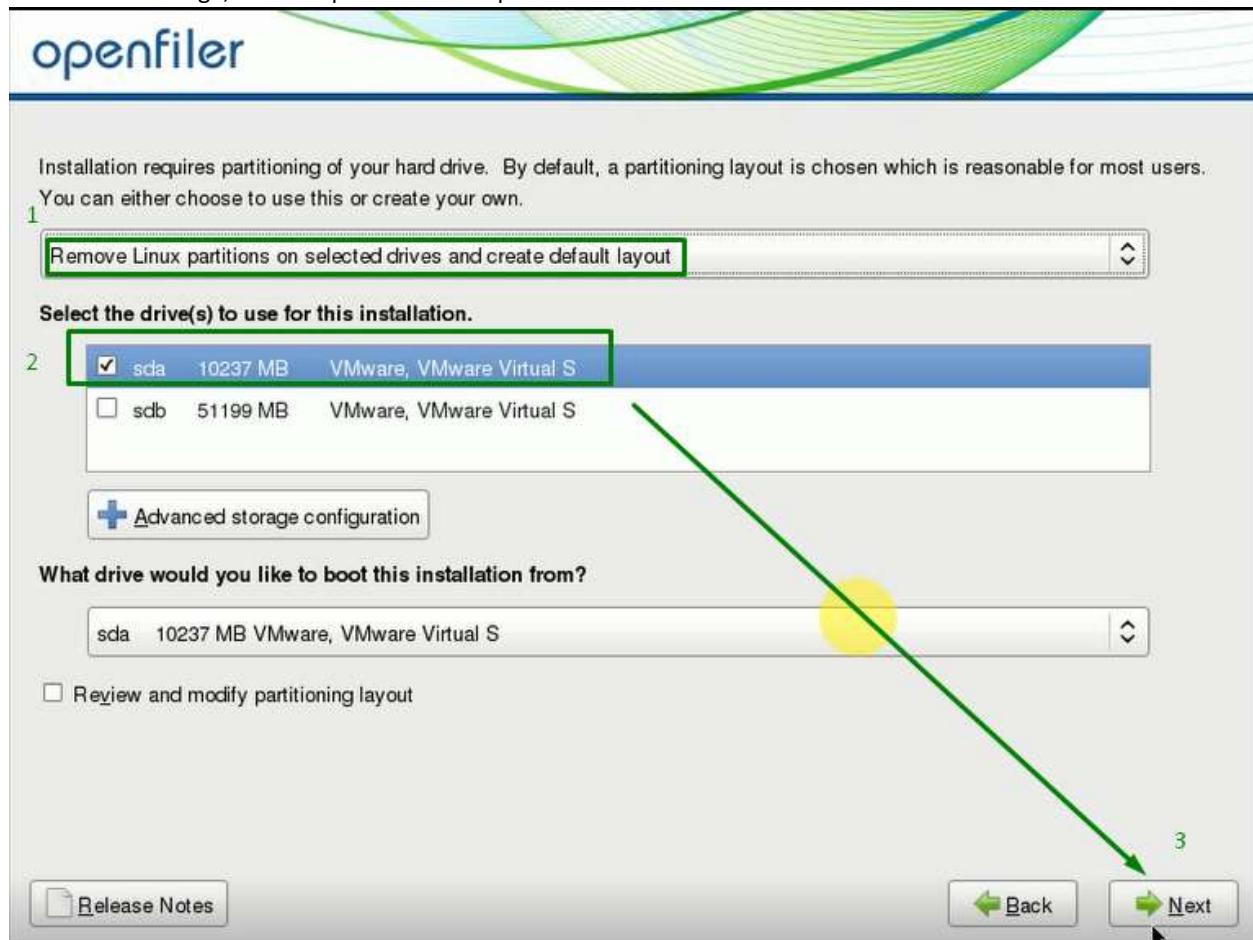
3.4. Choose your language and then proceed to Enter Next Button



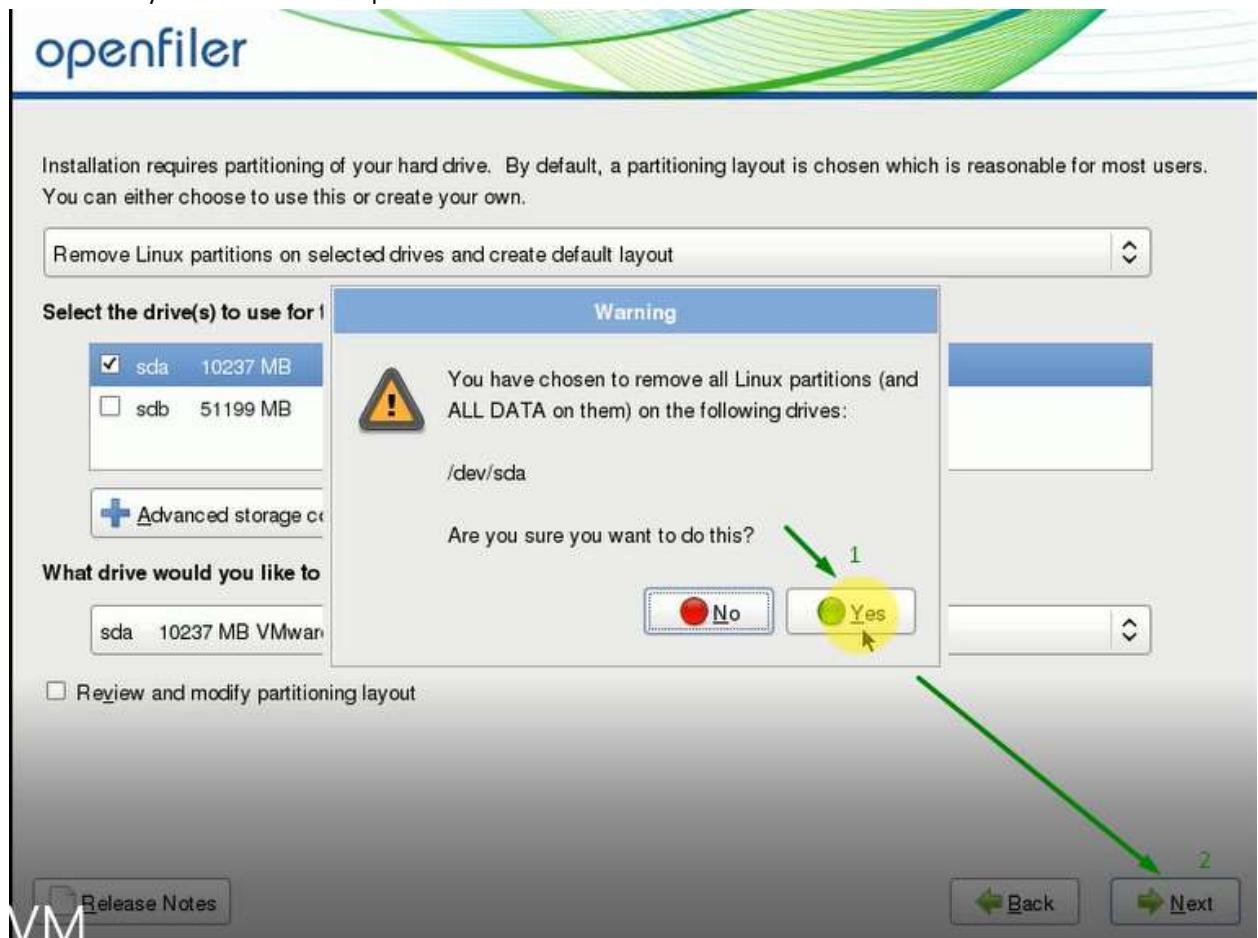
3.5. Click on yes and then proceed to Enter Next Button



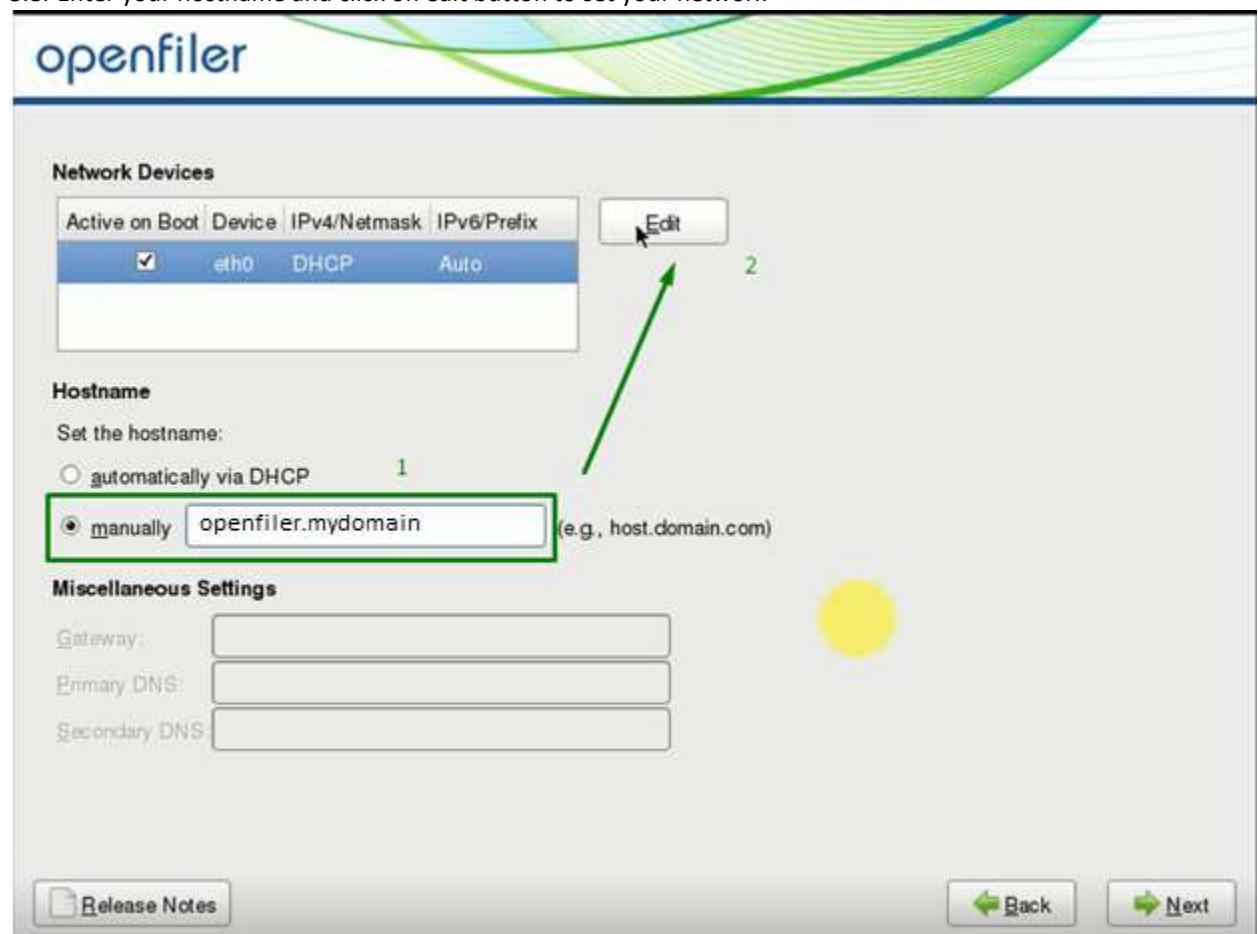
3.6. Choose storage, format option and then proceed to Enter Next Button



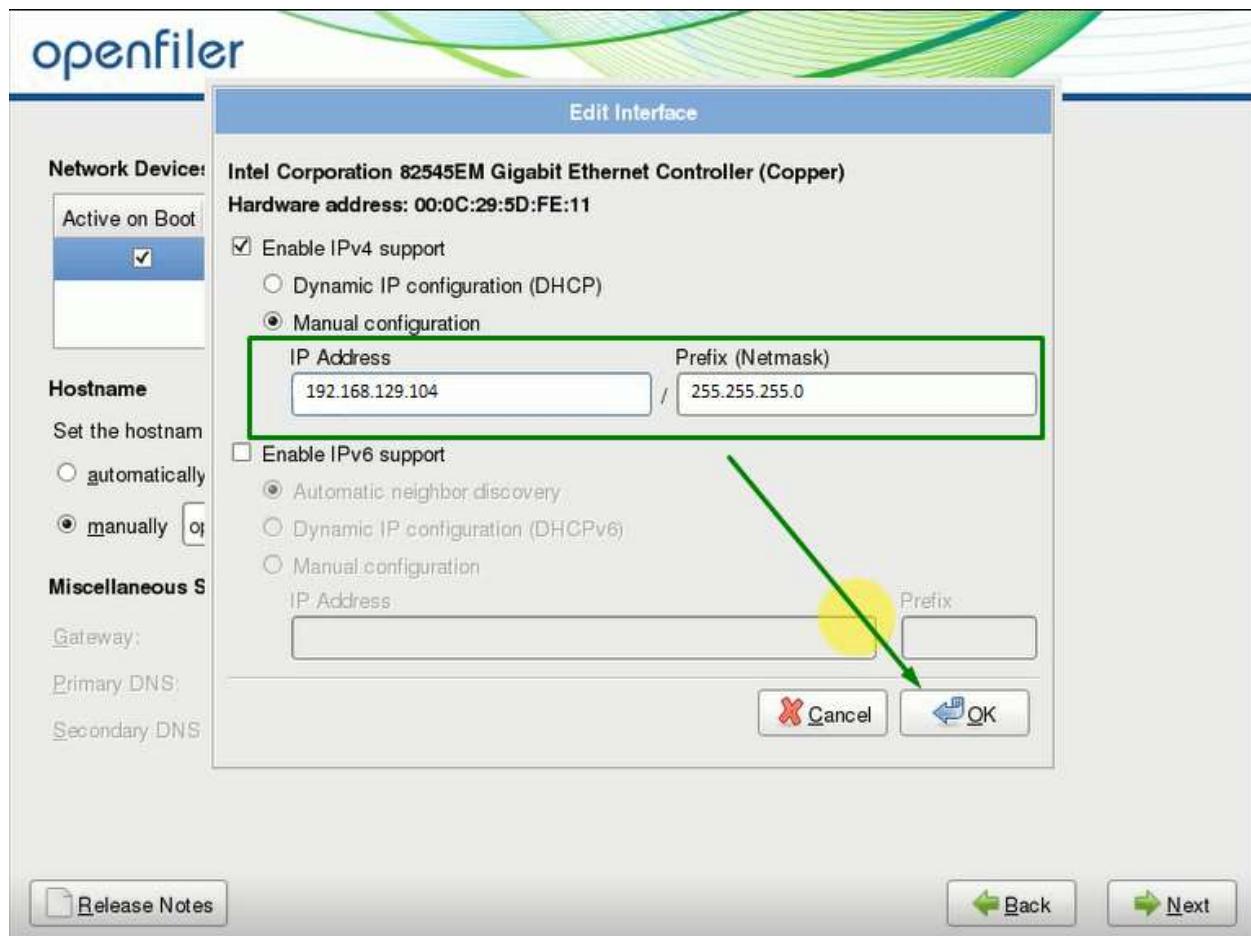
3.7. Click on yes button and then proceed to Enter Next Button



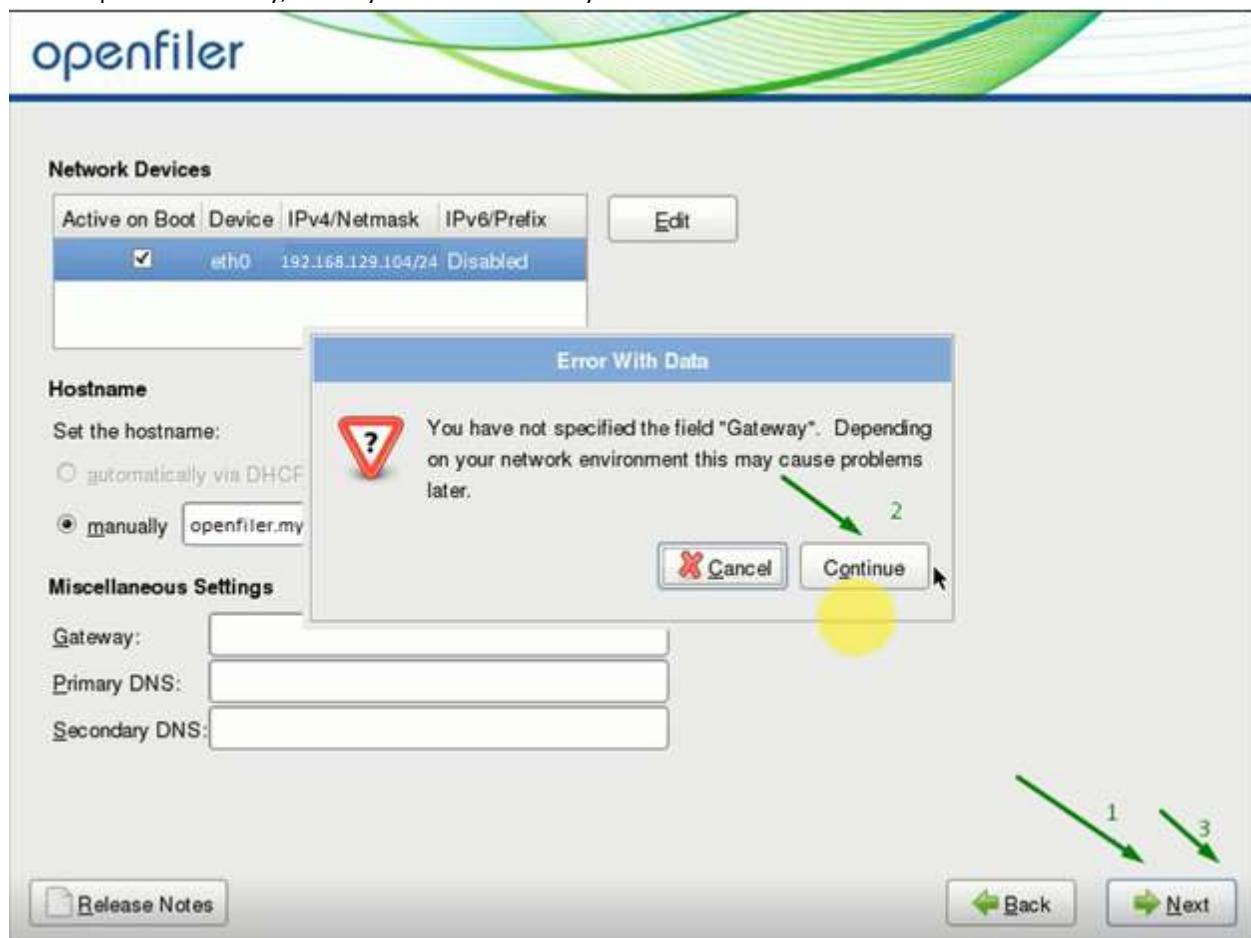
3.8. Enter your hostname and click on edit button to set your network



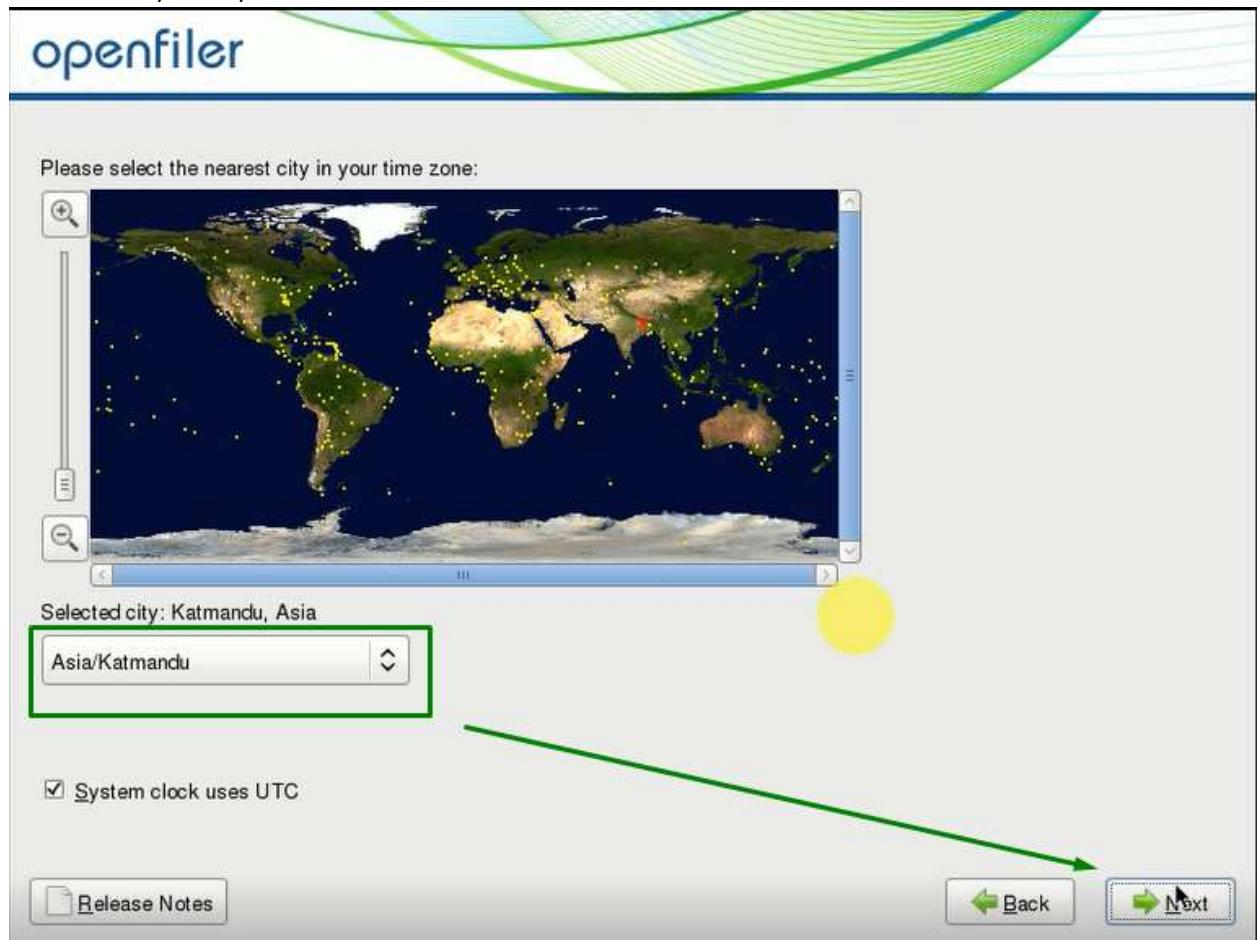
3.9. Set eth0 manual IP and then enter ok button



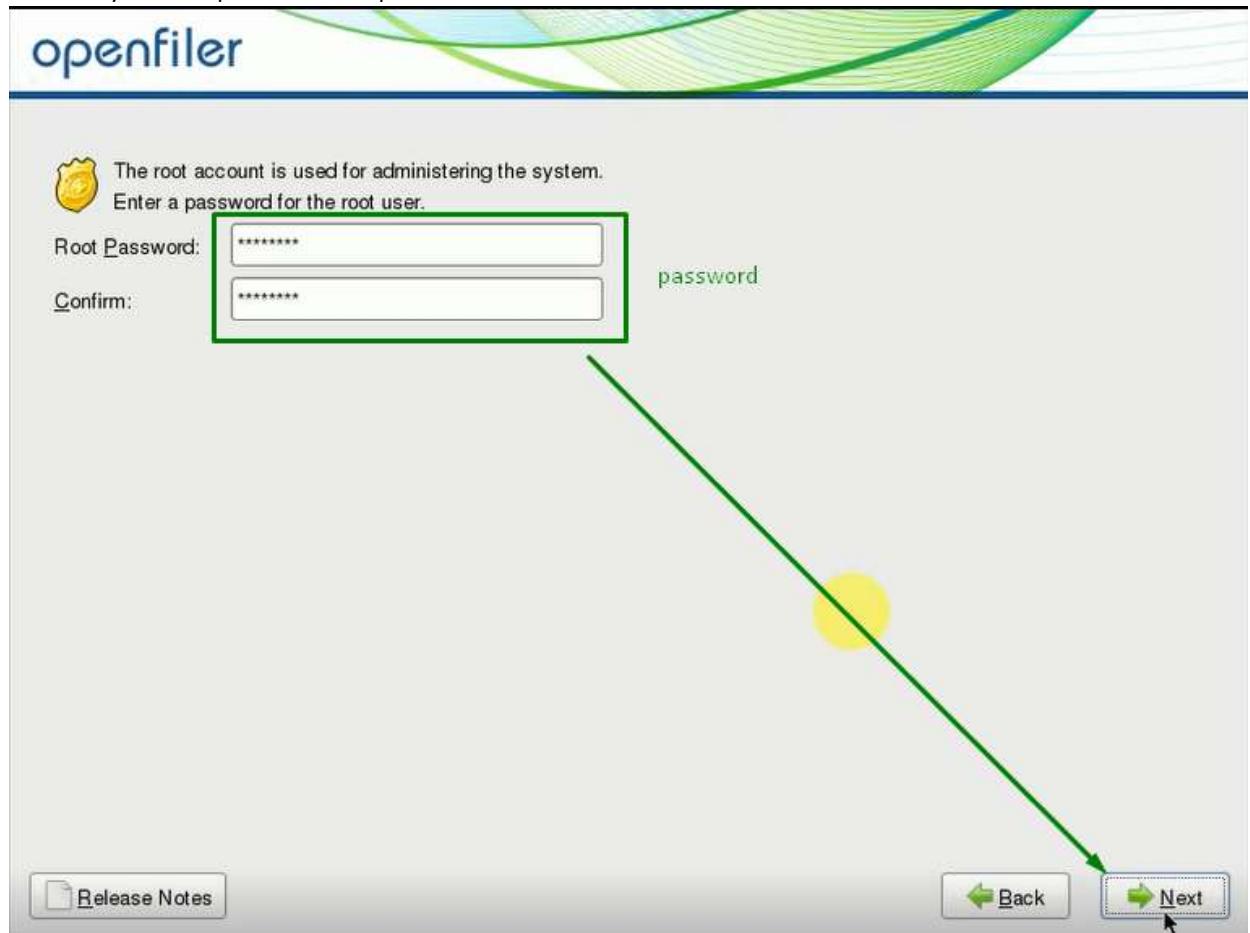
3.10. Skip when Gateway, Primary DNS and Secondary DNS IP asked and then enter ok button



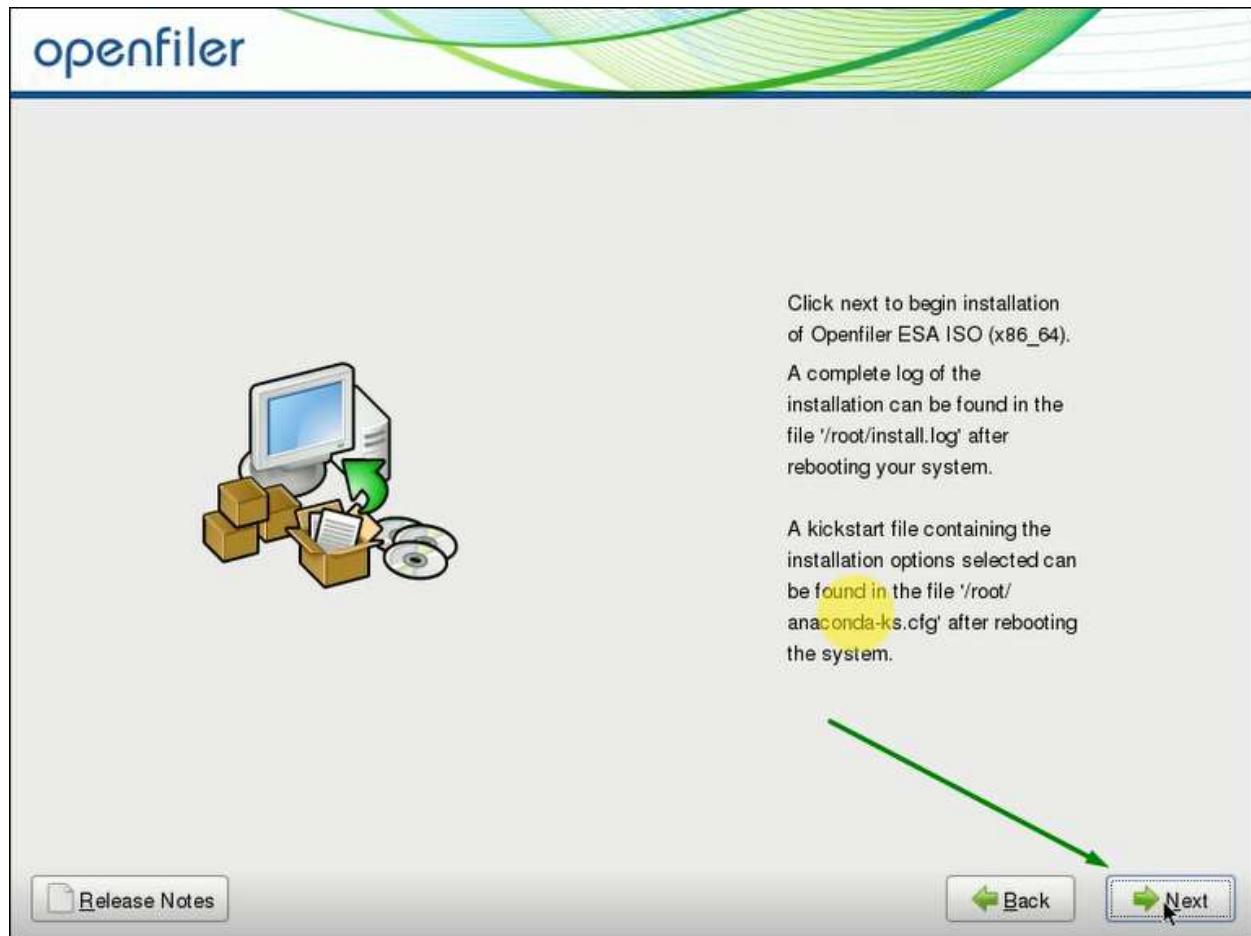
3.11. Choose your city and then enter ok button



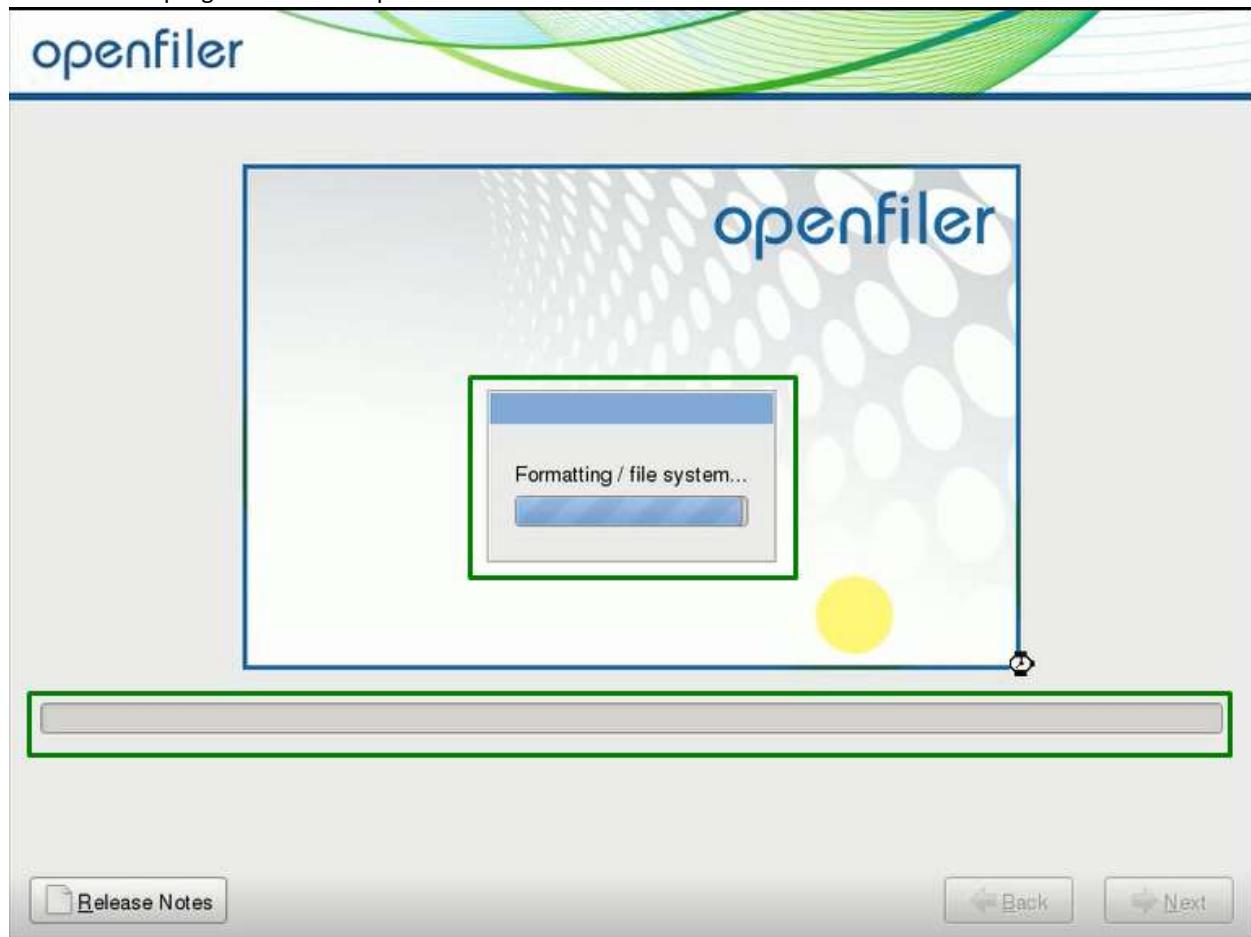
3.12. Set your root password for openfiler and then enter ok button



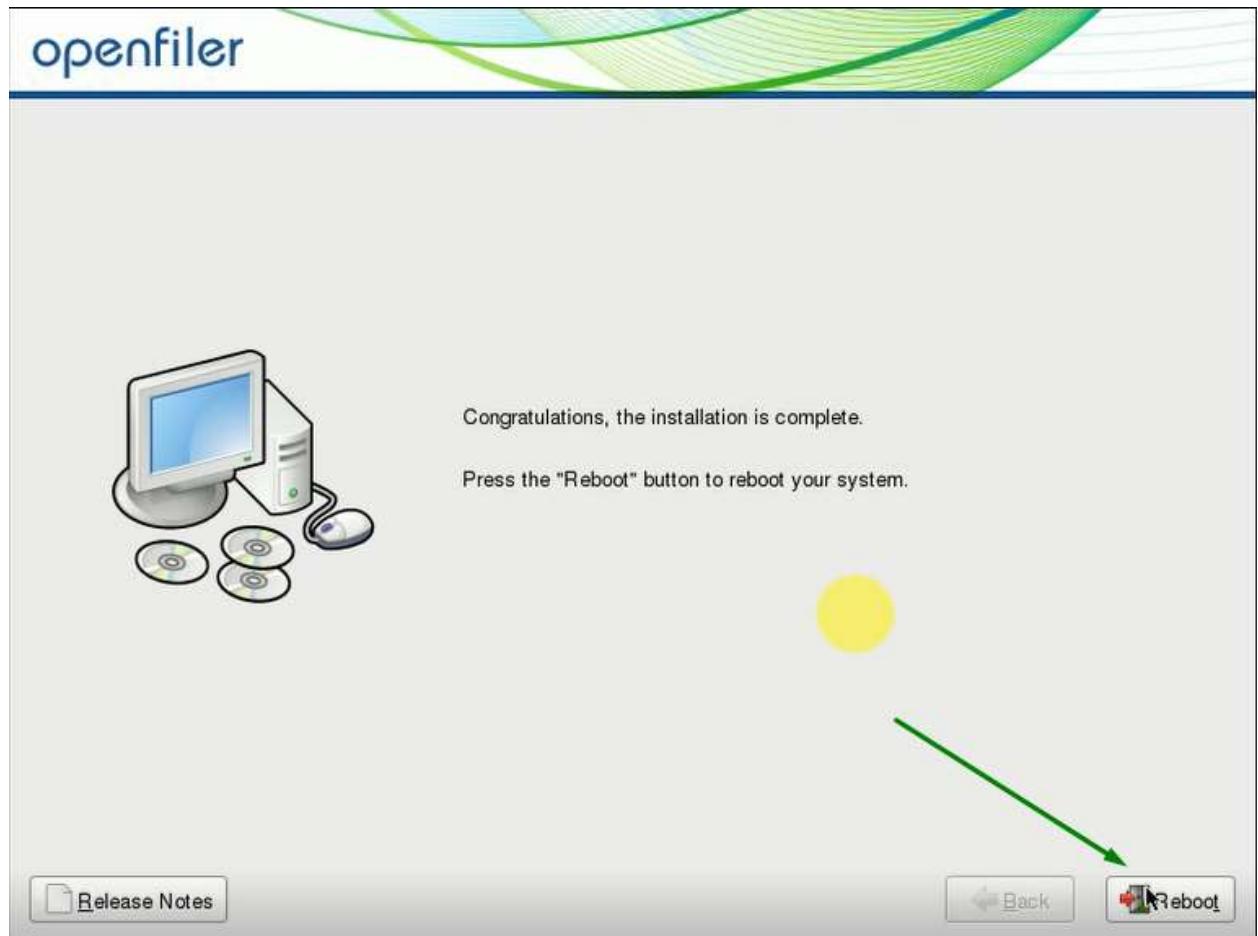
3.13. Proceed to enter ok button



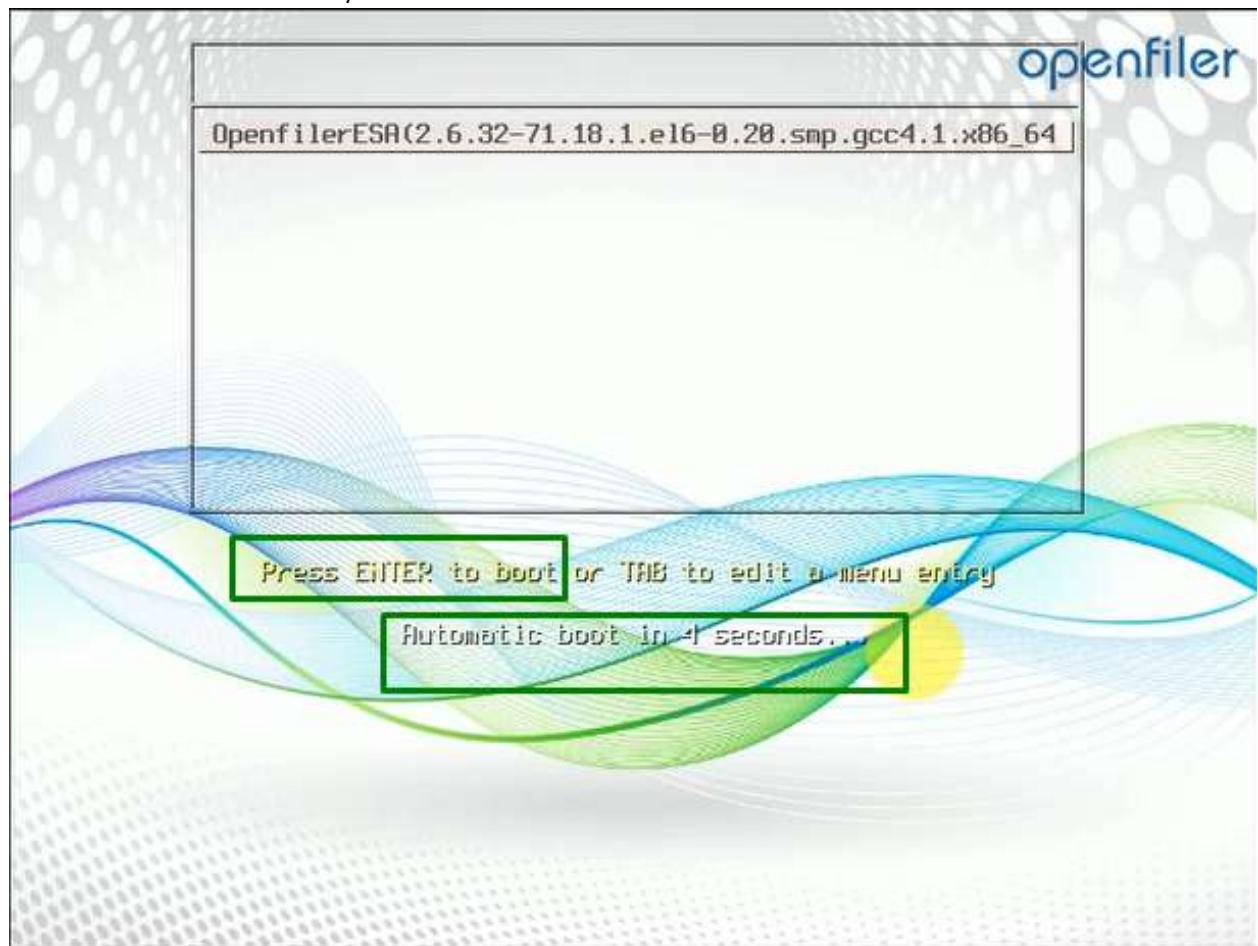
3.14. Wait for progress status of openfiler



3.15. Proceed to enter Reboot button



3.16. Proceed to enter from Key board



3.17. Openfiler provide us url as <https://192.168.129.104:446/>

```
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1

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://192.168.129.104:446/
openfiler login:
```

4. Change the parameter files of Openfiler using root user

4.1. Login as root user

```
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1
SSH-2.0-OpenBSD-OpenSSH_5.5.1p1 Debian-10+dfsg-1

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://192.168.129.104:446/
openfiler login: root
Password:
[root@openfiler ~]#
```

4.2. Verify the storage used by OS

```
[root@openfiler ~]# df -h
/*
Filesystem           Size  Used Avail Use% Mounted on
/dev/sda2            7.5G  1.4G  5.8G  20% /
tmpfs              491M  208K  490M   1% /dev/shm
/dev/sda1            289M  23M  252M   9% /boot
*/
*/
```

4.3. Edit the hosts files to reconfigure

```
[root@openfiler ~]# vi /etc/hosts
/*
# Public
192.168.129.105  rac1.mydomain  rac1
192.168.129.106  rac2.mydomain  rac2

# Private
192.168.1.102  rac1-priv.mydomain  rac1-priv
192.168.1.103  rac2-priv.mydomain  rac2-priv

# Virtual
192.168.129.107  rac1-vip.mydomain  rac1-vip
192.168.129.108  rac2-vip.mydomain  rac2-vip

# Openfiler (SAN/NAS Storage)
192.168.129.104  openfiler.mydomain  openfiler

# SCAN
192.168.129.109  rac-scan.mydomain  rac-scan
192.168.129.110  rac-scan.mydomain  rac-scan
*/
*/
```

4.4. Edit the ifcfg-eth0 files as

```
[root@openfiler ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth0
/*
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=static
IPADDR=192.168.129.104
NETMASK=255.255.255.0
GATEWAY=192.168.129.6
DNS1=192.168.129.16
DNS2=192.168.129.2
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
*/
*/
```

4.5. Restart the OS network to reset

```
[root@openfiler ~]# service network restart
```

4.6. To disabling the firewall

```
[root@openfiler ~]# chkconfig --list iptables
/* iptables 0:off 1:off 2:on 3:on 4:on 5:on 6:off */
[root@openfiler ~]# service iptables stop
/*
iptables: Setting chains to policy ACCEPT: nat mangle filter[...OK...]
iptables: Flushing firewall rules: [...OK...]
iptables: Unloading modules: [...OK...]
*/
[root@openfiler ~]# chkconfig iptables off
[root@openfiler ~]# iptables -F
[root@openfiler ~]# service iptables save
/*
iptables: Saving firewall rules to /etc/sysconfig/iptables:[...OK...]
*/
[root@openfiler ~]# /etc/init.d/iptables stop
/*
iptables: Setting chains to policy filter[...OK...]
iptables: Flushing firewall rules: [...OK...]
iptables: Unloading modules: [...OK...]
*/
[root@openfiler ~]# iptables -L
/*
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
Chain FORWARD (policy ACCEPT)
target     prot opt source               destination
Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
*/
[root@openfiler ~]# chkconfig --list iptables
/*
iptables 0:off 1:off 2:off 3:off 4:off 5:off 6:off
*/
```

4.7. To disabling the ntpd service

```
[root@openfiler ~]# service ntpd stop
[*/
[Shutting down ntpd:..... [FAILED]
*/
[root@openfiler ~]# service ntpd status
[*/
[ntp is stopped
*/
[root@openfiler ~]# chkconfig ntpd off
[root@openfiler ~]# mv /etc/ntp.conf /etc/ntp.conf.backup
[root@openfiler ~]# rm /etc/ntp.conf
[root@openfiler ~]# rm /var/run/ntp.pid
--- To Reboot the OS
[root@openfiler ~]# init 6
```

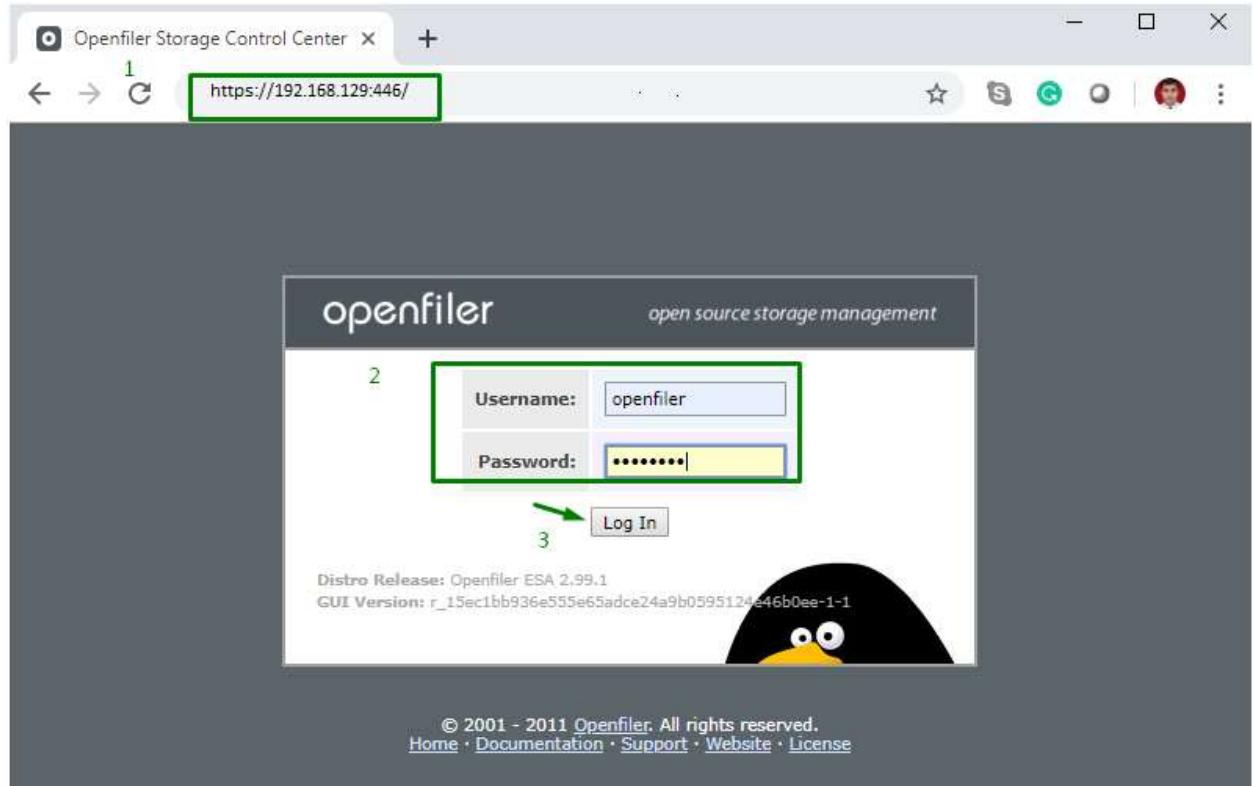
4.8. After reboot verification

```
[root@openfiler ~]# chkconfig --list iptables
iptables      0:off    1:off    2:off    3:off    4:off    5:off    6:off
[root@openfiler ~]#
[root@openfiler ~]# chkconfig --list ntpd
ntpd        0:off    1:off    2:off    3:off    4:off    5:off    6:off
[root@openfiler ~]#
[root@openfiler ~]# ping google.com
PING google.com (74.125.68.113) 56(84) bytes of data.
64 bytes from sc-in-f113.1e100.net (74.125.68.113): icmp_seq=1 ttl=56 time=95.6
ms
^C
--- google.com ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 95.617/95.617/95.617/0.000 ms
[root@openfiler ~]#
[root@openfiler ~]# _
```

```
[root@openfiler ~]# cat /etc/sysconfig/network
NETWORKING=yes
HOSTNAME= openfiler.mydomain
[root@openfiler ~]#
[root@openfiler ~]#
[root@openfiler ~]# _
```

5. Configure Openfiler using URL <https://192.168.129.104:446/>

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

The screenshot shows the "Manage Services" interface. A green arrow labeled "1" points to the "Services" tab in the top navigation bar. A green box labeled "2" highlights the "iSCSI Target" row in the table. The table columns are Service, Boot Status, Modify Boot, Current Status, and Start / Stop. The "iSCSI Target" row shows "Enabled" in the Boot Status column and "Running" in the Current Status column. The "Start / Stop" column for this row contains "Stop". Other services listed include CIFS Server, NFS Server, RSync Server, HTTP/Dav Server, LDAP Container, and FTP Server, among others.

Service	Boot Status	Modify Boot	Current Status	Start / Stop
CIFS Server	Disabled	Enable	Stopped	Start
NFS Server	Disabled	Enable	Stopped	Start
RSync Server	Disabled	Enable	Stopped	Start
HTTP/Dav Server	Disabled	Enable	Running	Stop
LDAP Container	Disabled	Enable	Stopped	Start
FTP Server	Disabled	Enable	Stopped	Start
iSCSI Target	Enabled	Disable	Running	Stop
UPS Manager	Disabled	Enable	Stopped	Start
UPS Monitor	Disabled	Enable	Stopped	Start
iSCSI Initiator	Disabled	Enable	Stopped	Start
ACPI Daemon	Enabled	Disable	Running	Stop
SCST Target	Disabled	Enable	Stopped	Start
FC Target	Disabled	Enable	Stopped	Start
Cluster Manager	Disabled	Enable	Stopped	Start

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:	openfiler.mydomain
Primary DNS:	192.168.129.16
Secondary DNS:	192.168.129.2
Gateway:	

Network Interface Configuration

Interface	Boot Protocol	IP Address	Network Mask	Speed	MTU	Link	Edit
eth0	Static	192.168.129.104	255.255.255.0	1000Mb/s	1500	Yes	

[Create bonded interface](#)

Network Access Configuration

Delete	Name	Network/Host	Netmask	Type
	rac1	192.168.129.105	255.255.255.255	Share
	rac2	192.168.129.106	255.255.255.255	Share
New			0.0.0.0	

Step 1 points to the System tab in the top navigation bar.
Step 2, **Step 3**, **Step 4**, and **Step 5** point to the rows for rac1 and rac2 in the Network Access Configuration table.
Step 5 also points to the 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

Volume Group Management

Volume Group Name	Size	Allocated	Free	Members	Add physical storage	Delete VG
-------------------	------	-----------	------	---------	----------------------	-----------

Create a new volume group

No existing physical volumes were found, or all existing physical volumes are used. You can create new physical volumes.

Step 1 points to the Volumes tab in the top navigation bar.
Step 2 points to the warning message about physical volumes.

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

Edit Disk	Type	Description	Size	Label type	Partitions
/dev/sda	SCSI	VMware, VMware Virtual S	10.00 GB	msdos	3 (view)
/dev/sdb	SCSI	VMware, VMware Virtual S	90.00 GB	msdos	0 (view)

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](#)

Step 1: Mode (Primary), Starting cylinder (1), Ending cylinder (6527), Space (90.00 GB)

Step 2: Partition Type (Physical volume), Create button

5.7. Now your Physical volume looks like

The screenshot shows the 'Edit partitions in /dev/sdb' interface. At the top, there's a navigation bar with tabs: Status, System, Volumes (highlighted), Cluster, Quota, Shares, Services, and Accounts. Below the navigation bar is a table titled 'Edit partitions in /dev/sdb (6527 cylinders with "msdos" label)'. The table has columns: Device, Type, Number, Start cyl, End cyl, Blocks, Size, Type, and Delete. A single row is present: '/dev/sdb1 Linux Physical Volume (8x8e) 1 1 6225 89980928 85.81 GB Primary Delete'. To the right of the table is a pie chart divided into two segments: 'Free (5%)' and 'sdb1 (95%)'. A yellow cursor arrow points towards the 'Delete' link in the table row. Below the table is a message: 'Back to the list of physical storage devices'. At the bottom, there's a button labeled 'Create a partition in /dev/sdb'.

5.8. Now you have to click over Add Volume link

This screenshot is similar to the previous one, showing the 'Edit partitions in /dev/sdb' interface. The 'Volumes section' sidebar on the right contains links: Manage Volumes, Volume Groups, Block Devices, Add Volume (which is highlighted with a green box and has a green arrow pointing to it), iSCSI Targets, and Software RAID. The main area shows the same physical volume table and pie chart as the previous screenshot. A yellow cursor arrow points towards the 'Create a partition in /dev/sdb' button at the bottom.

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

The screenshot shows the 'Volume Group Management' interface. At the top, there's a navigation bar with tabs: Volume Group Name, Size, Allocated, Free, Members, Add physical storage (highlighted), and Delete VG. Below the navigation bar is a section titled 'Create a new volume group'. It includes a note: 'Valid characters for volume group name: A-Z a-z 0-9 _ + -' with a lightbulb icon. The process is divided into three steps: Step 1: 'Volume group name (no spaces)' with input field 'racstore'. Step 2: 'Select physical volumes to add' with checkbox checked for '/dev/sdb1 85.81 GB'. Step 3: 'Add volume group' button, which is highlighted with a yellow circle and a yellow cursor arrow. A green arrow points from the 'Add physical storage' tab in the navigation bar to the 'Add volume group' button.

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

The screenshot shows the 'Volume Group Management' page. At the top, there is a table with columns: Volume Group Name, Size, Allocated, Free, Members, Add physical storage, and Delete VG. A single row is present for 'racstore'. To the right of the table is a vertical sidebar titled 'Volumes section' with options like 'Manage Volumes', 'Volume Groups', 'Block Devices', and 'Add volume' (which has a green arrow pointing to it). Below the table is a section titled 'Create a new volume group' containing a warning message: 'No existing physical volumes were found, or all existing physical volumes are used. You can [create new physical volumes](#)'. On the far right, another sidebar titled 'Support resources' lists 'Report bug', 'Get support', 'Forums', and 'Admin Guide'.

5.11. Then it looks like

The screenshot shows the 'Select Volume Group' interface. It features a lightbulb icon and the text 'Please select a volume group to create a volume in.' Below this is a dropdown menu set to 'racstore' with a 'Change' button next to it. The main area is titled 'Block storage statistics for volume group "racstore"' and contains a table with three columns: Total Space, Used Space, and Free Space. The data is as follows:

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

Below the table is a pie chart showing 100% free space, with a yellow circle and cursor icon highlighting the chart area.

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-zA-Z,0-9]):

Step 1 Volume Description: oracle cluster registry

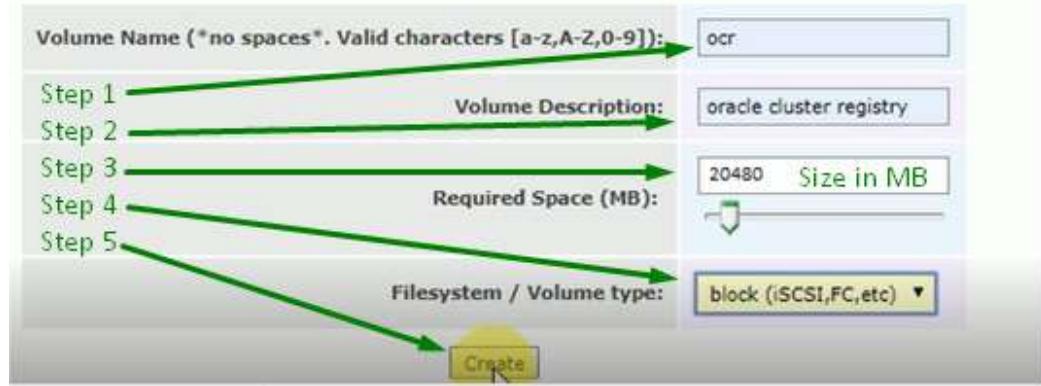
Step 2

Step 3 Required Space (MB): 20480 Size in MB

Step 4

Step 5 Filesystem / Volume type: block (iSCSI,FC,etc) ▾

Create



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

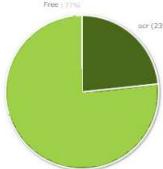
Select Volume Group

Please select a volume group to display.

racstore ▾ Change

Step 1

Volumes in volume group "racstore" (87872 MB)


Free : 77% ocr (23%)

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	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create

0 MB allocated to snapshots
85824MB of free space left

Volumes section

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

Support resources

- Report bug
- Get support
- Forums
- Admin Guide

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

Create a volume in "racstore"

Volume Name (*no spaces*. Valid characters [a-z,A-Z,0-9]):	<input type="text" value="data1"/>
Step 1	Volume Description:
Step 2	<input type="text" value="oracle database"/>
Step 3	Required Space (MB):
Step 4	<input type="text" value="40960"/> Size in MB
Step 5	Filesystem / Volume type:
	<input type="button" value="block (iSCSI,FC,etc) ▾"/>
	<input type="button" value="Create"/>

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

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	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create
data1	oracle database	40960 MB	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create
0 MB allocated to snapshots									
44864 MB of free space left									

Support resources

- Report bug
- Get support
- Forums
- Admin Guide

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]):	<input type="text" value="fra1"/>
Step 1	Volume Description:
Step 2	<input type="text" value="oracle fast recovery area"/>
Step 3	Required Space (MB):
Step 4	<input type="text" value="25024"/> Size in MB
Step 5	Filesystem / Volume type:
	<input type="button" value="block (iSCSI,FC,etc) ▾"/>
	<input type="button" value="Create"/>

5.17. Finally “racstore” looks like

Select Volume Group

Please select a volume group to display.

racstore ▾ Change

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	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create
data1	oracle database	40960 MB	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create
fra1	oracle fast recovery area	25024 MB	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create

0 MB allocated to snapshots

1408 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	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create
data1	oracle database	40960 MB	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create
fra1	oracle fast recovery area	25024 MB	iSCSI	Not applicable	Not applicable	Not applicable	In use	Edit	Create

0 MB allocated to snapshots

1408 MB of free space left

ISCSI Targets

Support resources

- Report bug
- Get support
- Forums
- Admin Guide

5.19. Configure iSCSI Target IQN

Target Configuration LUN Mapping Network ACL CHAP Authentication

Add new iSCSI Target

Target IQN Add Change as iqn.0001.com.openfiler:tsn.24dd819562 Add

Volumes section

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

Support resources

- Banner links

5.20. Configure iSCSI Target IQN for OCR

The screenshot shows the 'Add new iSCSI Target' interface. Step 1 highlights the 'Target IQN' input field containing 'iqn.openfiler:ocr'. Step 2 highlights the 'Add' button.

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 transition from the 'Add new iSCSI Target' screen to the 'Select iSCSI Target' screen. Step 2 points to the 'Network ACL' tab in the top navigation bar. Step 1 highlights the 'Change' button next to the 'iqn.openfiler:ocr' dropdown in the 'Select iSCSI Target' screen.

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 'iSCSI host access configuration for target "iqn.openfiler:ocr"' screen. Step 4 points to the 'Target Configuration' tab in the top navigation bar. Step 1 and Step 2 point to the 'Access' dropdown menus for 'rac1' and 'rac2' respectively, which are set to 'Allow'. Step 3 points to the 'Update' button at the bottom right.

5.23. Configure iSCSI Target IQN for DATA

The screenshot shows the 'Add new iSCSI Target' interface. Step 1 highlights the 'Target IQN' input field containing 'iqn.openfiler:tsn.09fc7e6dae4b'. Step 2 highlights the 'Add' button. A note above says '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.

The screenshot shows the transition from the 'Add new iSCSI Target' screen to the 'Select iSCSI Target' screen for the DATA target. Step 2 points to the 'Network ACL' tab in the top navigation bar. Step 1 highlights the 'Change' button next to the 'iqn.openfiler:data1' dropdown in the 'Select iSCSI Target' screen.

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.

The screenshot shows the 'iSCSI host access configuration for target "iqn.openfiler:data1"' interface. It includes tabs for Target Configuration, LUN Mapping, Network ACL, and CHAP Authentication. The Network ACL tab is selected. A table lists two hosts: rac1 (IP 192.168.129.105, Netmask 255.255.255.255) and rac2 (IP 192.168.129.106, Netmask 255.255.255.255). Both hosts have their 'Access' dropdown set to 'Allow'. An 'Update' button is at the bottom right. Step 1 points to the 'Access' dropdown for rac1, Step 2 points to the 'Access' dropdown for rac2, Step 3 points to the 'Update' button, and Step 4 points to the 'Target Configuration' tab at the top left.

5.26. Configure iSCSI Target IQN for FRA

The screenshot shows the 'Add new iSCSI Target' interface. It includes tabs for Target Configuration, LUN Mapping, Network ACL, and CHAP Authentication. The Target Configuration tab is selected. A 'Target IQN' input field contains 'iqn.2006-01.com.openfiler:tsn.e964722358a3'. An 'Add' button is next to it. Step 1 points to the 'Target IQN' input field, and Step 2 points to the 'Add' button.

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

The screenshot shows the 'Select iSCSI Target' interface. It includes tabs for Target Configuration, LUN Mapping, Network ACL, and CHAP Authentication. The Network ACL tab is selected. A dropdown menu shows 'iqn.openfiler:fra1' with a 'Change' button next to it. Step 1 points to the dropdown menu, and Step 2 points to the 'Network ACL' tab at the top left.

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.

The screenshot shows the 'iSCSI host access configuration for target "iqn.openfiler:fra1"' interface. It includes tabs for Target Configuration, LUN Mapping, Network ACL, and CHAP Authentication. The Network ACL tab is selected. A table lists two hosts: rac1 (IP 192.168.129.105, Netmask 255.255.255.255) and rac2 (IP 192.168.129.106, Netmask 255.255.255.255). Both hosts have their 'Access' dropdown set to 'Allow'. An 'Update' button is at the bottom right. Step 1 points to the 'Access' dropdown for rac1, Step 2 points to the 'Access' dropdown for rac2, Step 3 points to the 'Update' button, and Step 4 points to the 'Target Configuration' tab at the top left.

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

Add new iSCSI Target

Select iSCSI Target

Step 1: Click on the 'Change' button for 'iqn.openfiler:ocr'.

Step 2: Click on the 'LUN Mapping' tab.

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

LUNs mapped to target: iqn.openfiler:ocr

Map New LUN to Target: "iqn.openfiler:ocr"

Name	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Map LUN
oracle cluster registry	/dev/racstore/ocr	write-thru	FX7TRx-zv2D-zaTL	FX7TRx-zv2D-zaTL	blockio	Map
oracle database	/dev/racstore/data1	write-thru	Z5a7T1-2rtk-CSQ8	Z5a7T1-2rtk-CSQ8	blockio	Map
oracle fast recovery area	/dev/racstore/fra1	write-thru	qKd0zX-nbC5-6Z11	qKd0zX-nbC5-6Z11	blockio	Map

Step 1: Click on the 'Map' button for the first row.

Step 2: Verify the 'LUNs mapped to target' section shows 'iqn.openfiler:ocr'.

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

Target Configuration

LUN Mapping

Network ACL

CHAP Authentication

LUNs mapped to target: iqn.openfiler:ocr

LUN Id.	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Unmap LUN
0	/dev/racstore/ocr	write-thru	FX7TRx-zv2D-zaTL	FX7TRx-zv2D-zaTL	blockio	Unmap

Map New LUN to Target: "iqn.openfiler:ocr"

Name	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Map LUN
oracle database	/dev/racstore/data1	write-thru	Z5a7T1-2rtk-CSQ8	Z5a7T1-2rtk-CSQ8	blockio	Map
oracle fast recovery area	/dev/racstore/fra1	write-thru	qKd0zX-nbC5-6Z11	qKd0zX-nbC5-6Z11	blockio	Map

Step 1: Click on the 'Map LUN' tab.

Step 2: Verify the 'LUNs mapped to target' section shows 'iqn.openfiler:ocr'.

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

The screenshot shows two stacked interface sections. The top section is titled 'Add new iSCSI Target' with tabs for 'Target Configuration', 'LUN Mapping', 'Network ACL', and 'CHAP Authentication'. A green arrow labeled 'Step 2' points up from the bottom section to this tab. The bottom section is titled 'Select iSCSI Target' and contains a message 'Please select an iSCSI target to display and/or edit.' Below this is a dropdown menu showing 'iqn.openfiler:data1' with a 'Change' button next to it. A green arrow labeled 'Step 1' points to the 'Change' button.

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

The screenshot shows the 'Map New LUN to Target' interface. At the top, it says 'LUNs mapped to target: iqn.openfiler:data1' and below that is a warning message 'No LUNs mapped to this target'. In the main table, there are three entries: 'oracle cluster registry', 'oracle database', and 'oracle fast recovery area'. The 'oracle database' row has its 'LUN Path' field set to '/dev/racstore/data1'. A green arrow labeled 'Step 1' points to the 'Map' button in the 'Map LUN' column for the 'oracle database' row.

Name	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Map LUN
oracle cluster registry	/dev/racstore/ocr	write-thru	fx7TRx-zv2D-zaTL	fx7TRx-zv2D-zaTL	blockio	<input type="button" value="Map"/>
oracle database	/dev/racstore/data1	write-thru	Z5a7T1-2rtk-CSQ8	Z5a7T1-2rtk-CSQ8	blockio	<input type="button" value="Map"/> Step 1
oracle fast recovery area	/dev/racstore/fra1	write-thru	qKd0zX-nbCS-6Z11	qKd0zX-nbCS-6Z11	blockio	<input type="button" value="Map"/>

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

The screenshot shows the 'Map New LUN to Target' interface again. At the top, it says 'LUNs mapped to target: iqn.openfiler:data1'. In the main table, the 'oracle database' row has its 'LUN Path' field set to '/dev/racstore/data1'. A green arrow labeled 'Step 1' points to the 'Unmap' button in the 'Unmap LUN' column for the 'oracle database' row. Another green arrow points from the 'Map LUN' column of the 'oracle database' row to the 'Map' button in the 'Map LUN' column of the 'oracle fast recovery area' row.

LUN Id.	LUN Path	R/W Mode	SCSI Serial No.	SCSI Id.	Transfer Mode	Unmap LUN
0	/dev/racstore/data1	write-thru	Z5a7T1-2rtk-CSQ8	Z5a7T1-2rtk-CSQ8	blockio	<input type="button" value="Unmap"/>
						<input type="button" value="Map"/>

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

The screenshot shows two tabs at the top: 'Target Configuration' and 'LUN Mapping'. A green arrow labeled 'Step 2' points from the 'Target Configuration' tab to the 'Add new iSCSI Target' section. In the 'Select iSCSI Target' section, there is a dropdown menu with 'iqn.openfiler:fra1' selected, and a 'Change' button next to it. A green arrow labeled 'Step 1' points from the 'Change' button to the 'iqn.openfiler:fra1' dropdown.

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

The screenshot shows the 'Target Configuration' tab selected. In the 'Map New LUN to Target' section, there is a table with three rows. The third row has 'oracle fast recovery area' as the name, '/dev/racstore/fra1' as the LUN Path, and 'write-thru' as the R/W Mode. A green arrow labeled 'Step 1' points from the 'Map' button in the 'Map LUN' column of this row to the 'Map' button in the same column of the first row, which is highlighted with a yellow circle.

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

The screenshot shows the 'Target Configuration' tab selected. In the 'LUNs mapped to target: iqn.openfiler:fra1' section, there is a table with one row. The row has '0' as the LUN Id, '/dev/racstore/fra1' as the LUN Path, and 'write-thru' as the R/W Mode. A green arrow labeled 'Step 1' points from the 'Unmap LUN' button in the 'Unmap LUN' column of this row to the 'Map' button in the 'Map LUN' column of the 'Map New LUN to Target' section below. The 'Map New LUN to Target' section has a yellow circle around its 'Map' button.

5.38. Verify the iSCSI service.

Service	Boot Status	Modify Boot	Current Status	Start / Stop
CIFS Server	Disabled	Enable	Stopped	Start
NFS Server	Disabled	Enable	Stopped	Start
RSync Server	Disabled	Enable	Stopped	Start
HTTP Dav Server	Disabled	Enable	Running	Stop
LDAP Container	Disabled	Enable	Stopped	Start
FTP Server	Disabled	Enable	Stopped	Start
iSCSI Target	Enabled	Disable	Running	Stop
UPS Manager	Disabled	Enable	Stopped	Start
UPS Monitor	Disabled	Enable	Stopped	Start
iSCSI Initiator	Disabled	Enable	Stopped	Start
ACPI Daemon	Enabled	Disable	Running	Stop
SCST Target	Disabled	Enable	Stopped	Start
FC Target	Disabled	Enable	Stopped	Start
Cluster Manager	Disabled	Enable	Stopped	Start

5.39. Log out from URL of openfiler.

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.

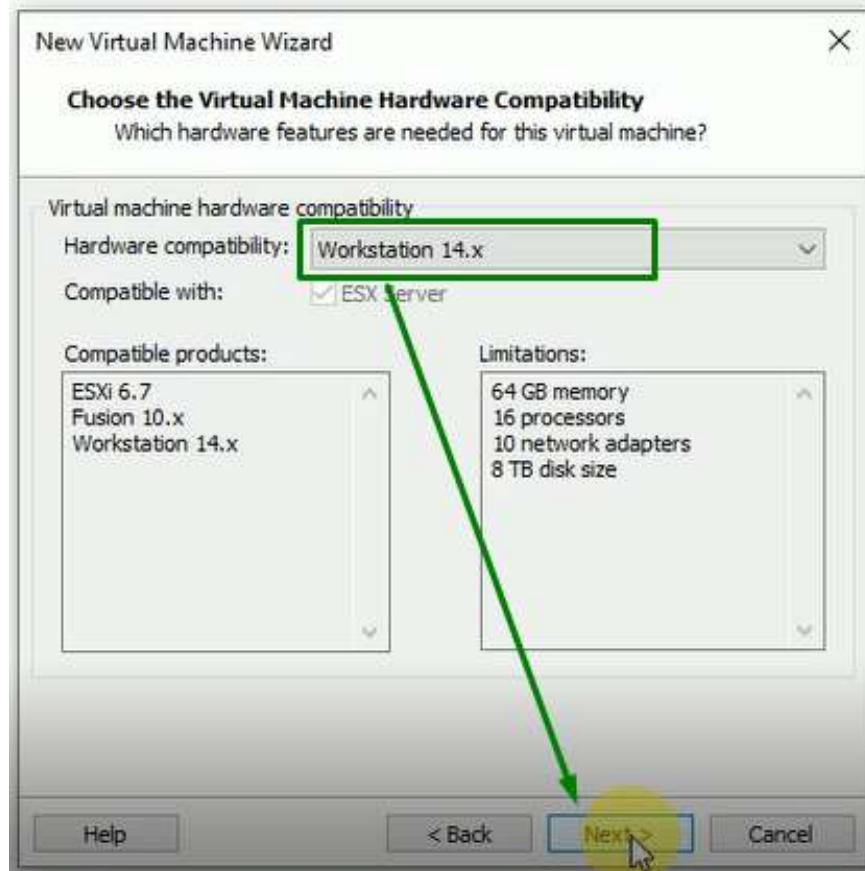
1. OS Installation for RAC1 (VM 2)

1.1. New Virtual machine setup

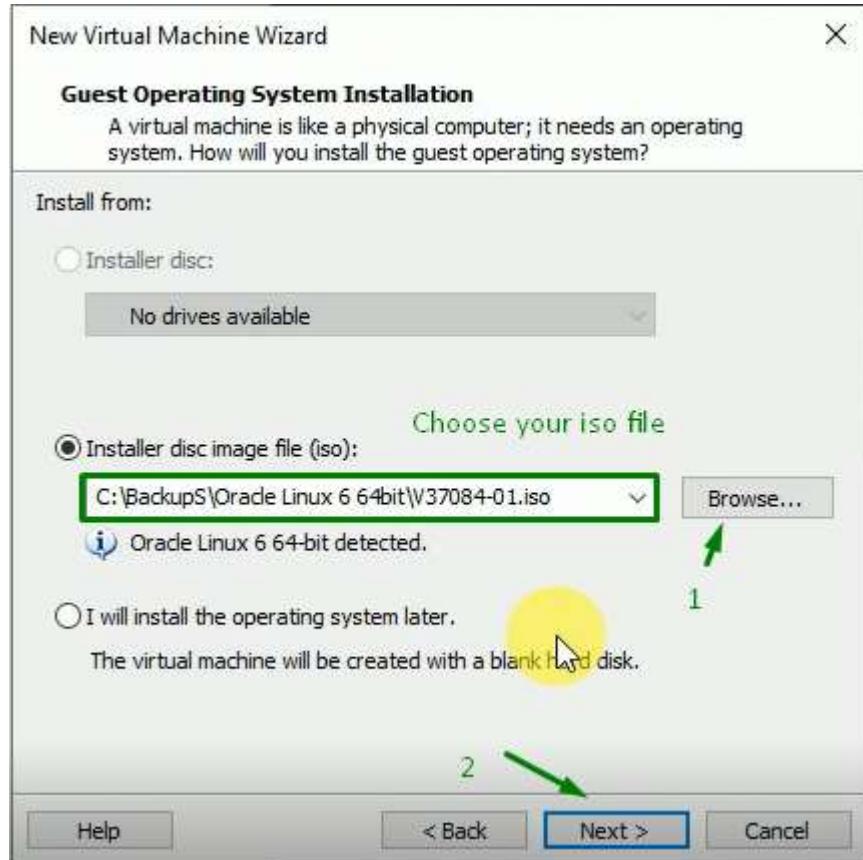
1.2. Choose Custom setting then click on Next button



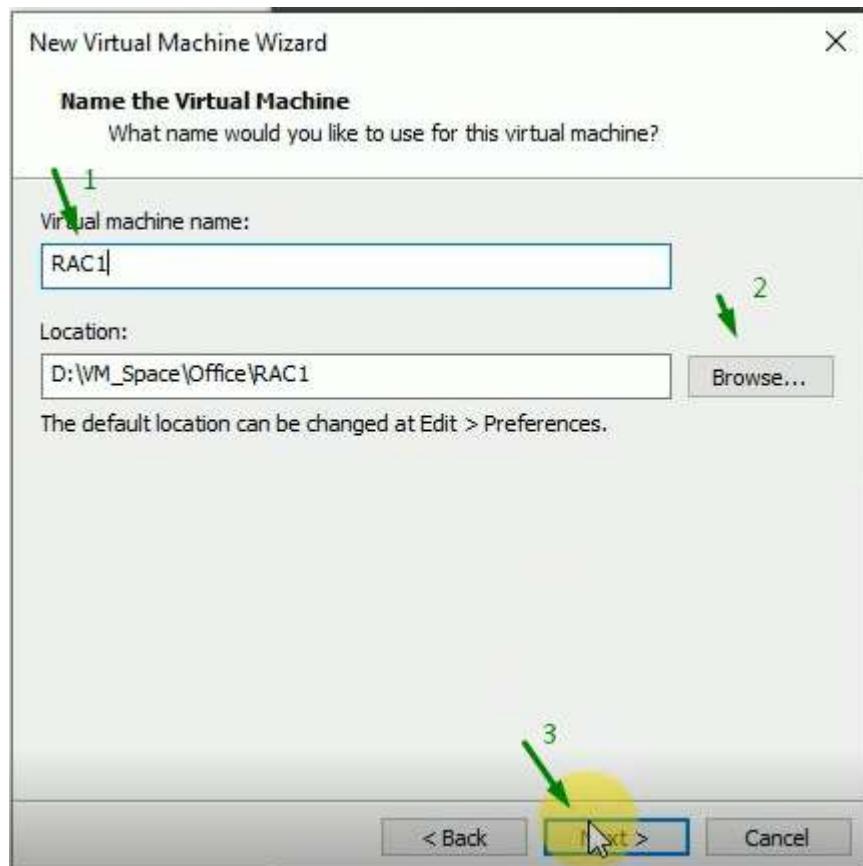
1.3. Choose Hardware default compatibility then click on Next button



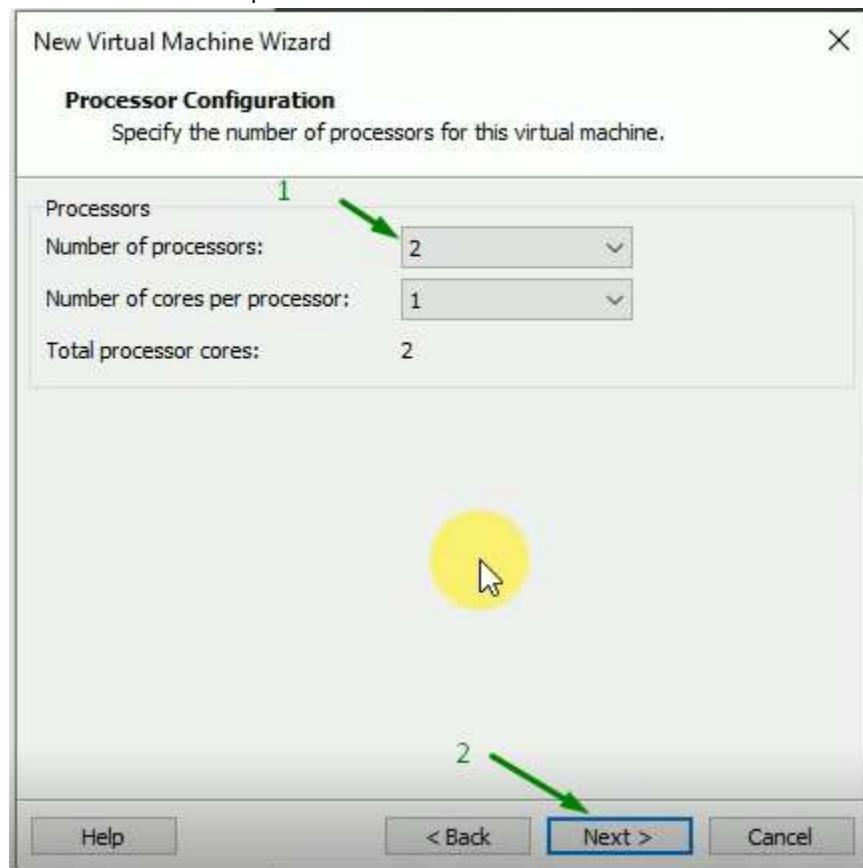
1.4. Choose Oracle Linux Server 6.10 iso file (V37084-01.iso) then click on Next button



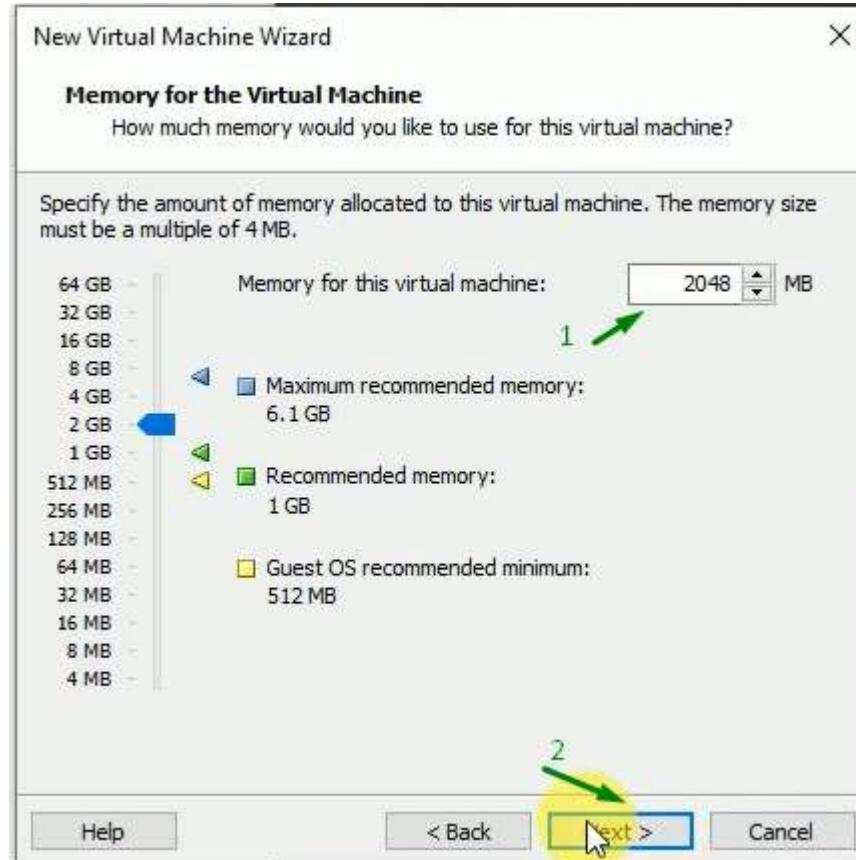
1.5. Put your machine named as RAC1 and provide a location where you want to store/create VM space then click on Next button



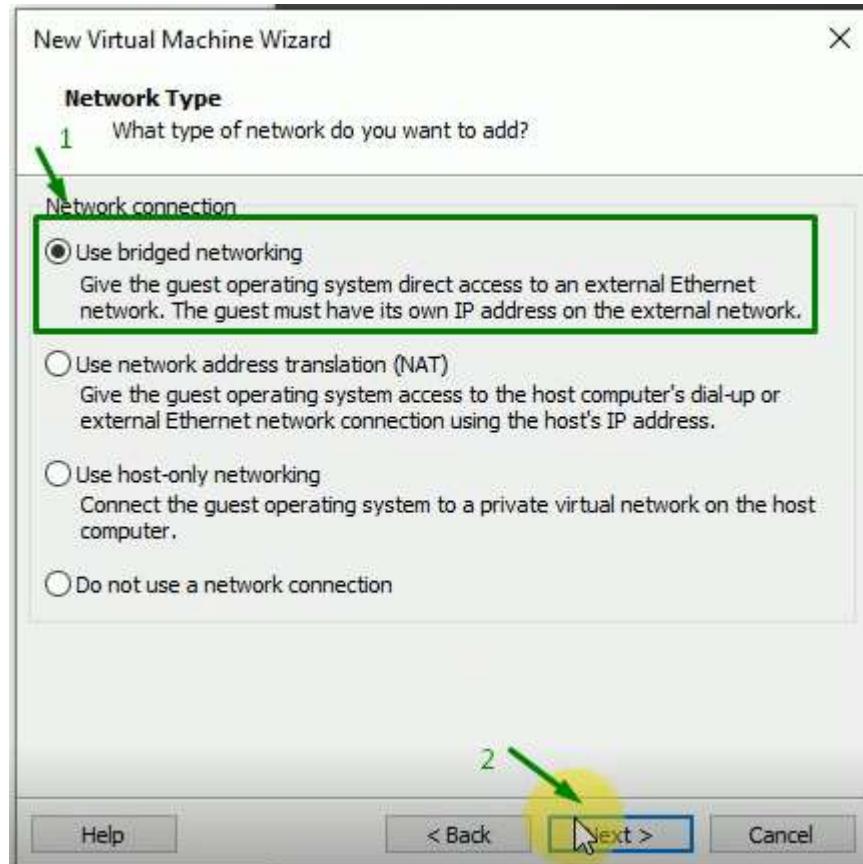
1.6. Select Number of processors then click on Next button



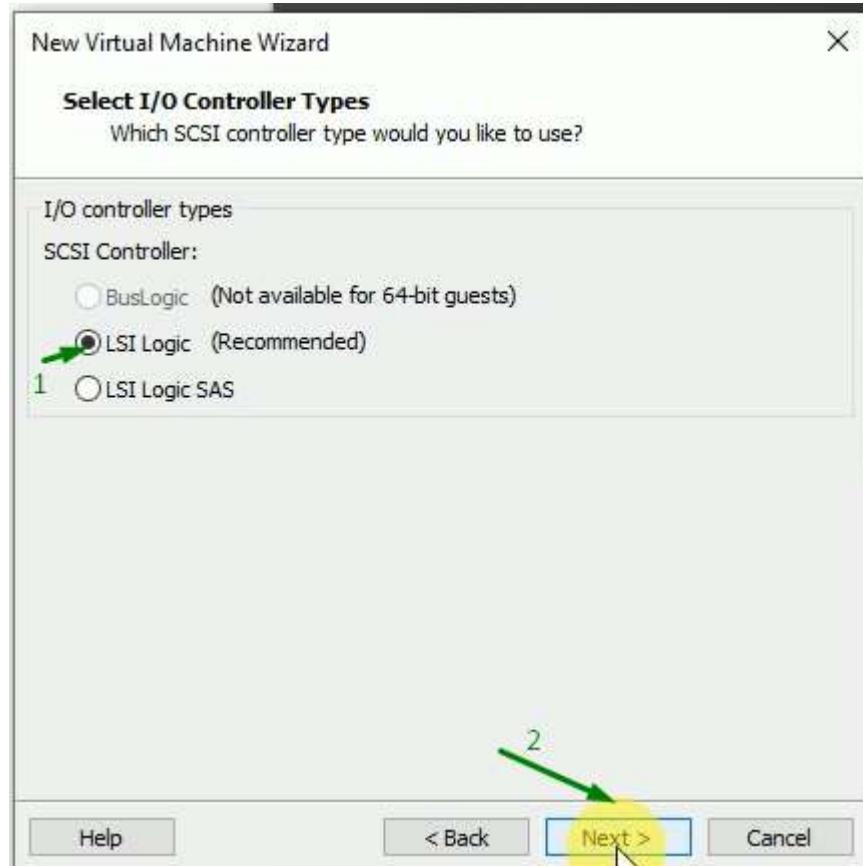
1.7. Put ram as 2GB then click on Next button.



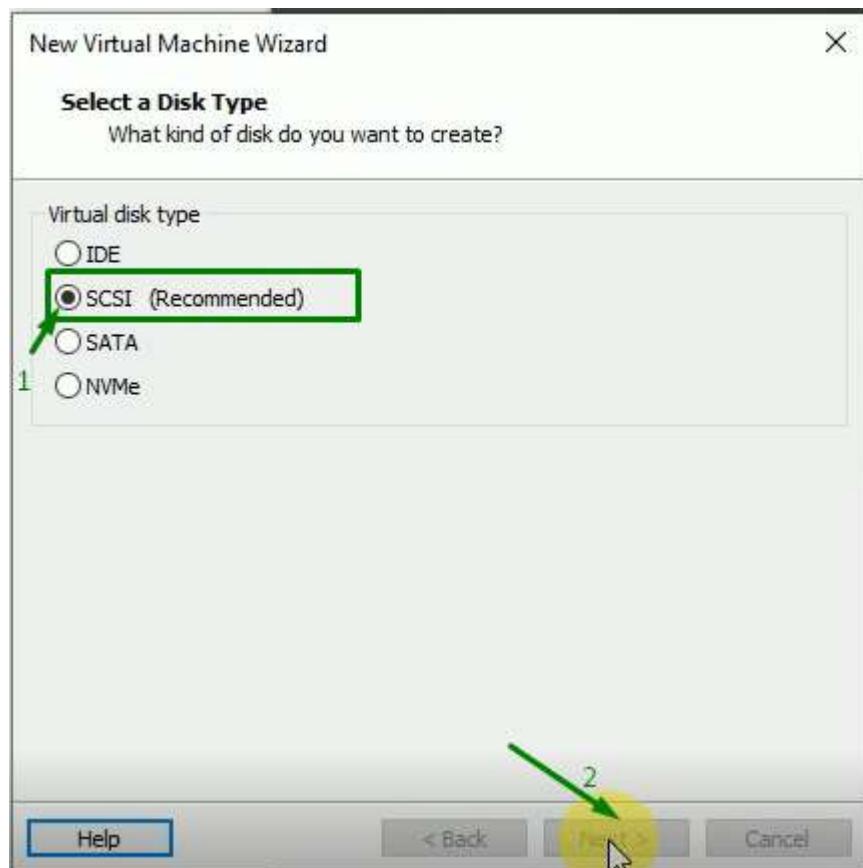
1.8. Select Network connection as bridge then click on Next button.



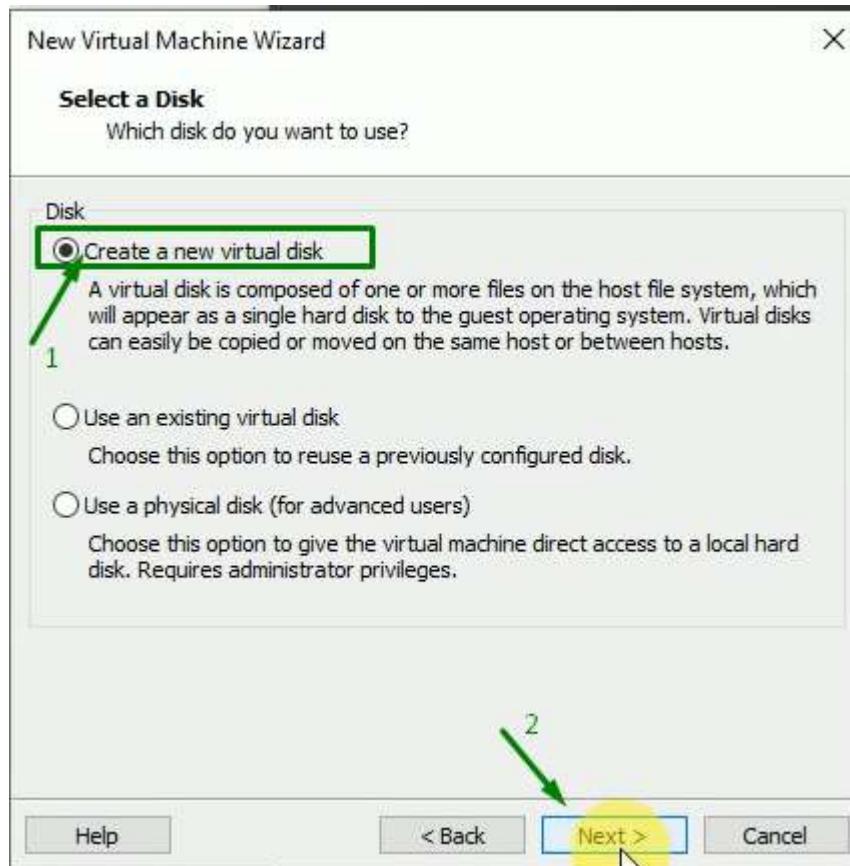
1.9. Select LSI Logic then click on Next button.



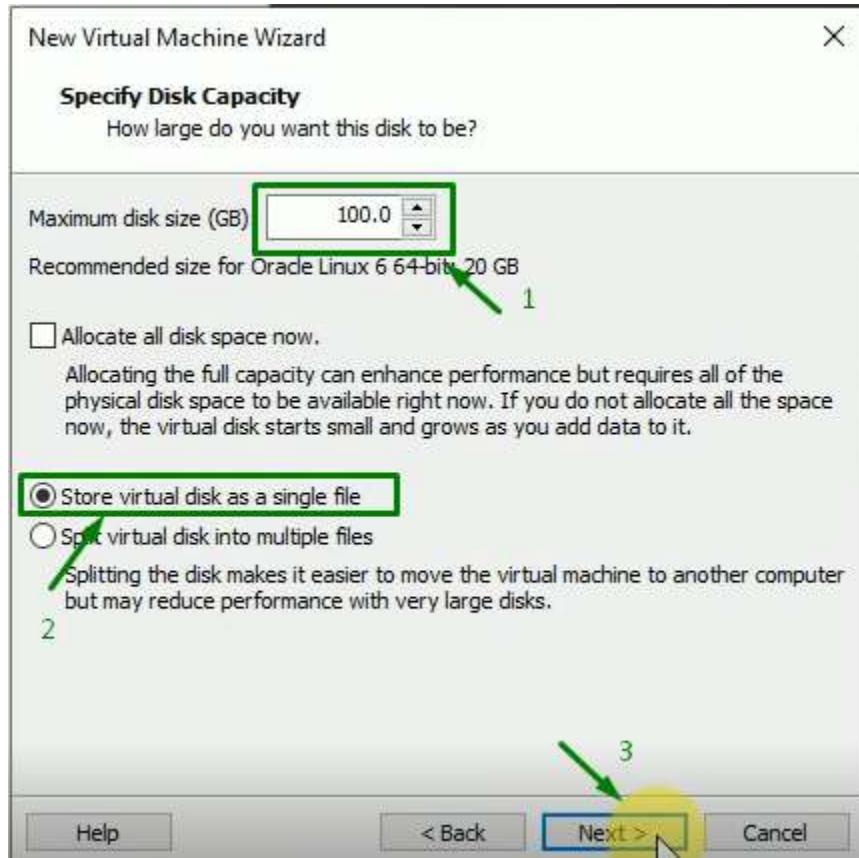
1.10. Select SCSI then click on Next button.



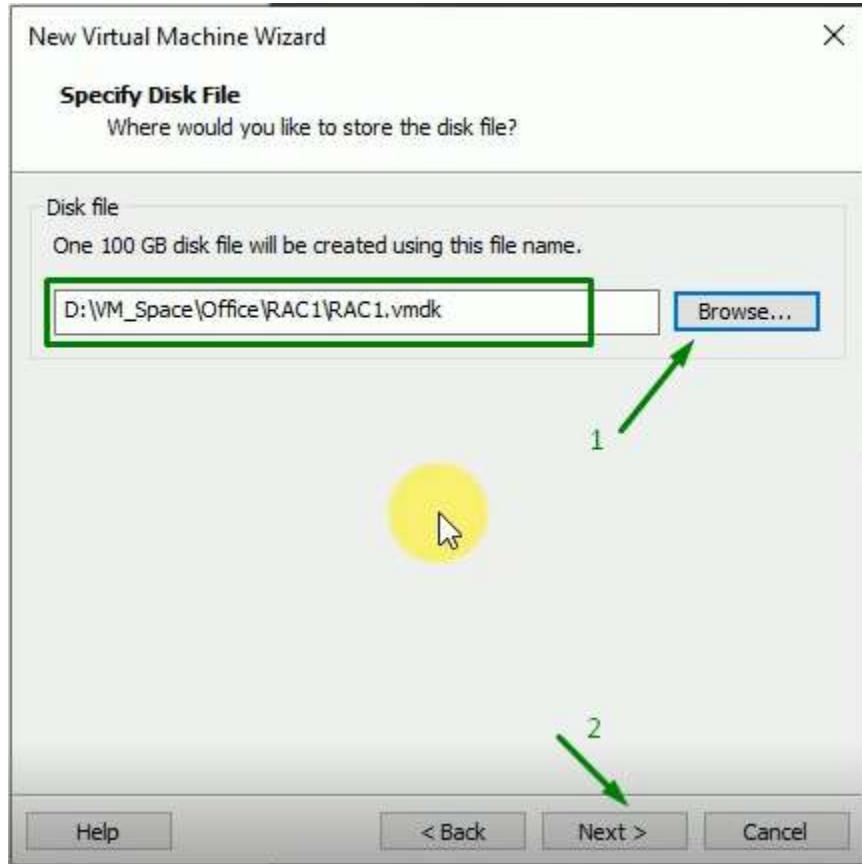
1.11. Select create a new virtual disk then click on Next button.



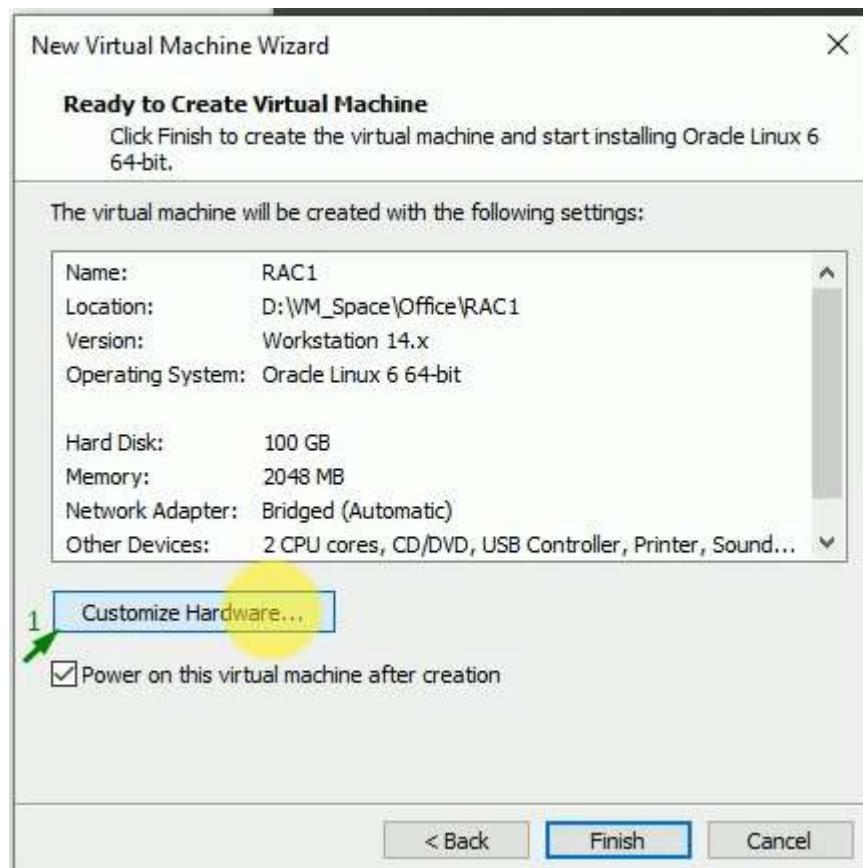
1.12. Put 11GB and select Store virtual disk as a single file then click on Next button.



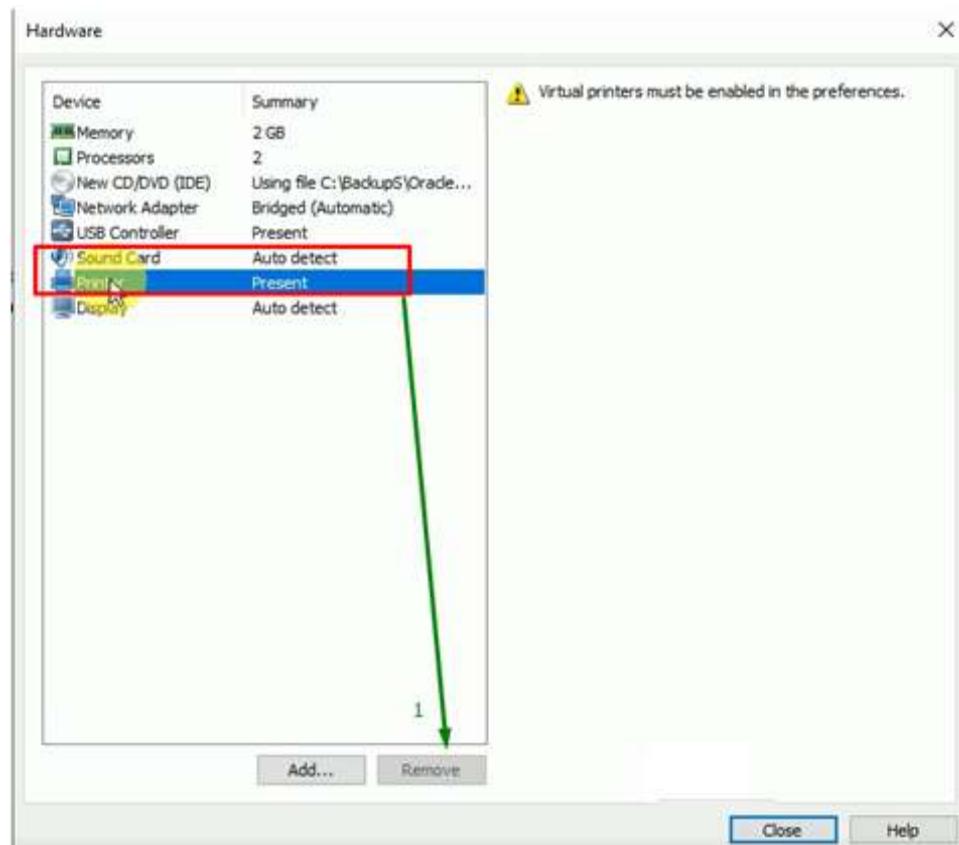
1.13. Select location to Store virtual disk as a single file then click on Next button.



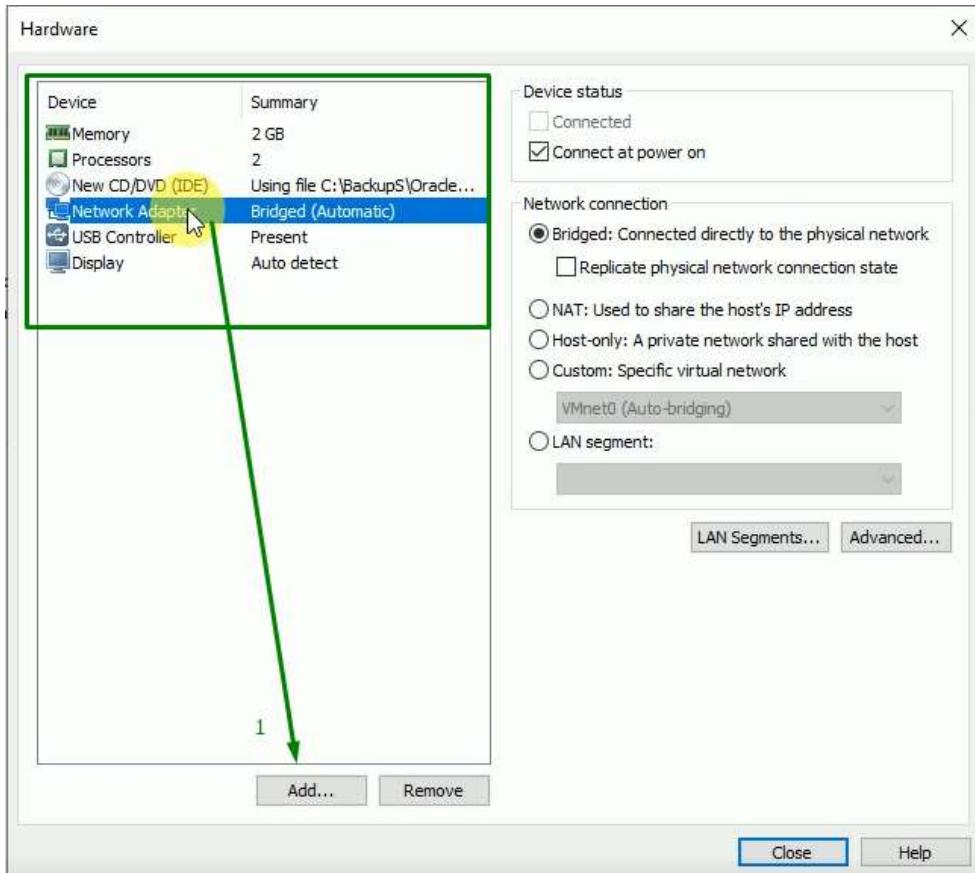
1.14. Click on Customize hardware.



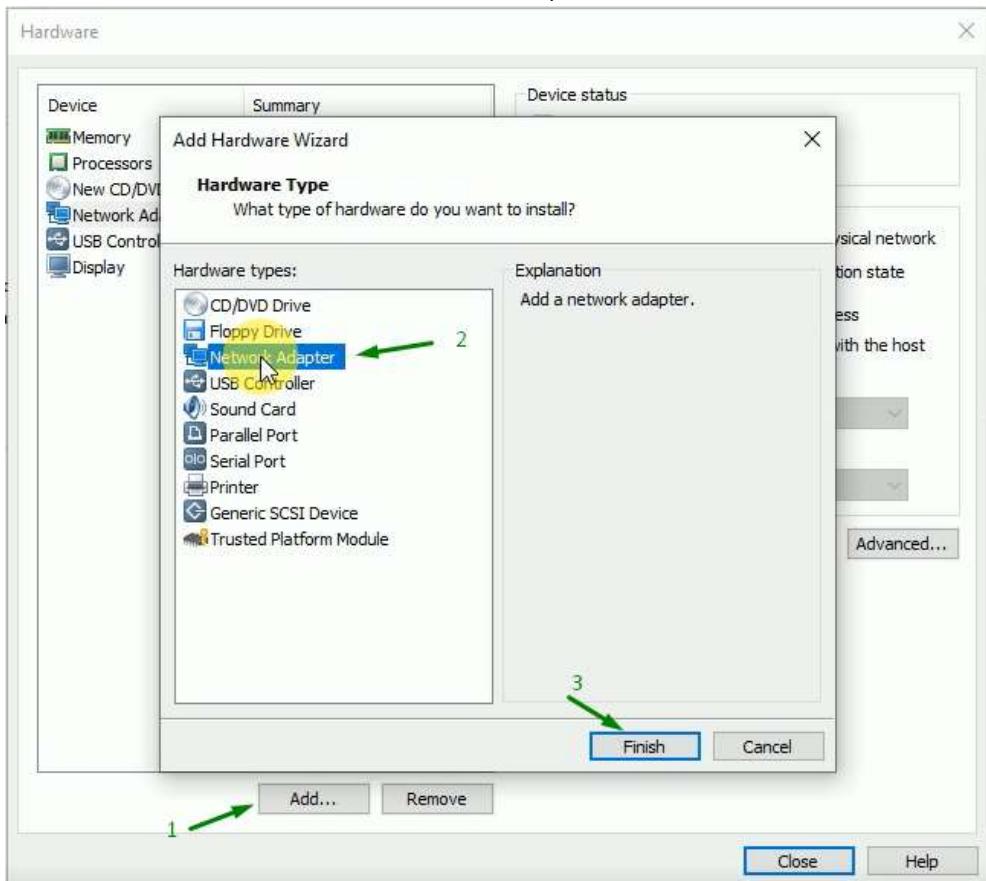
1.15. Remove the unnecessary hardware's.



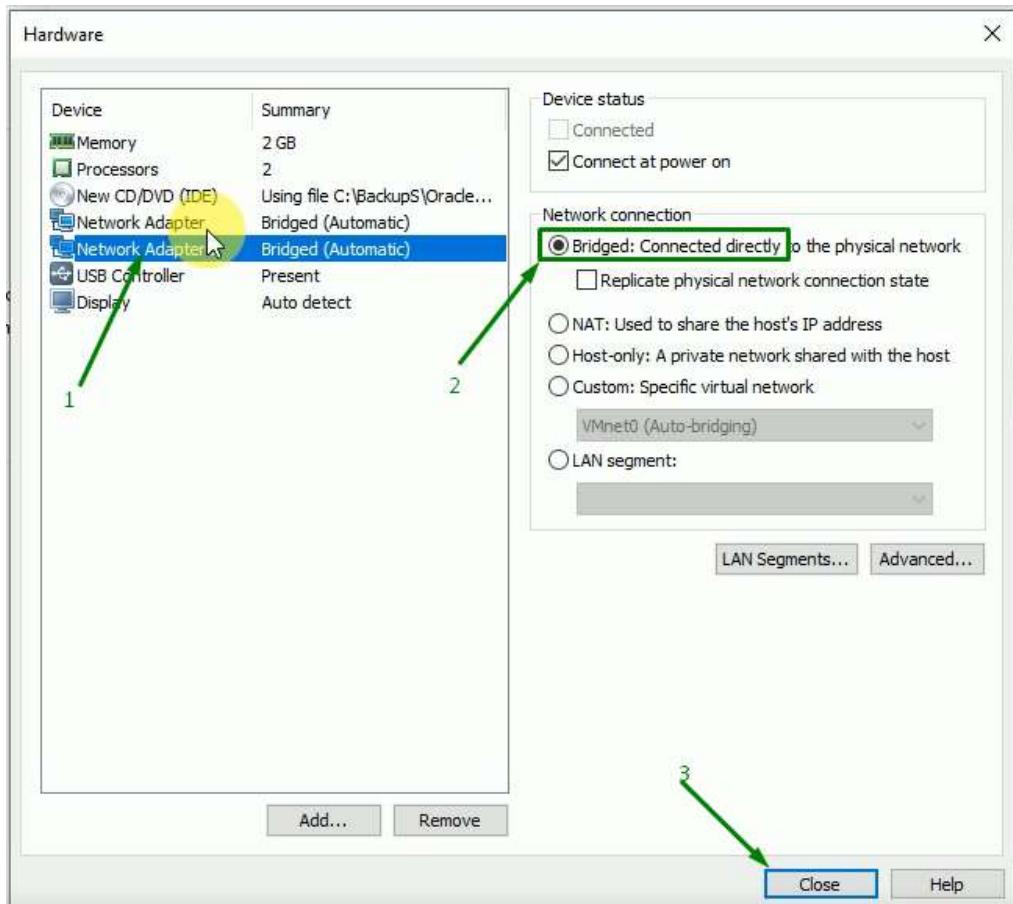
1.16. Add Network Adapter.



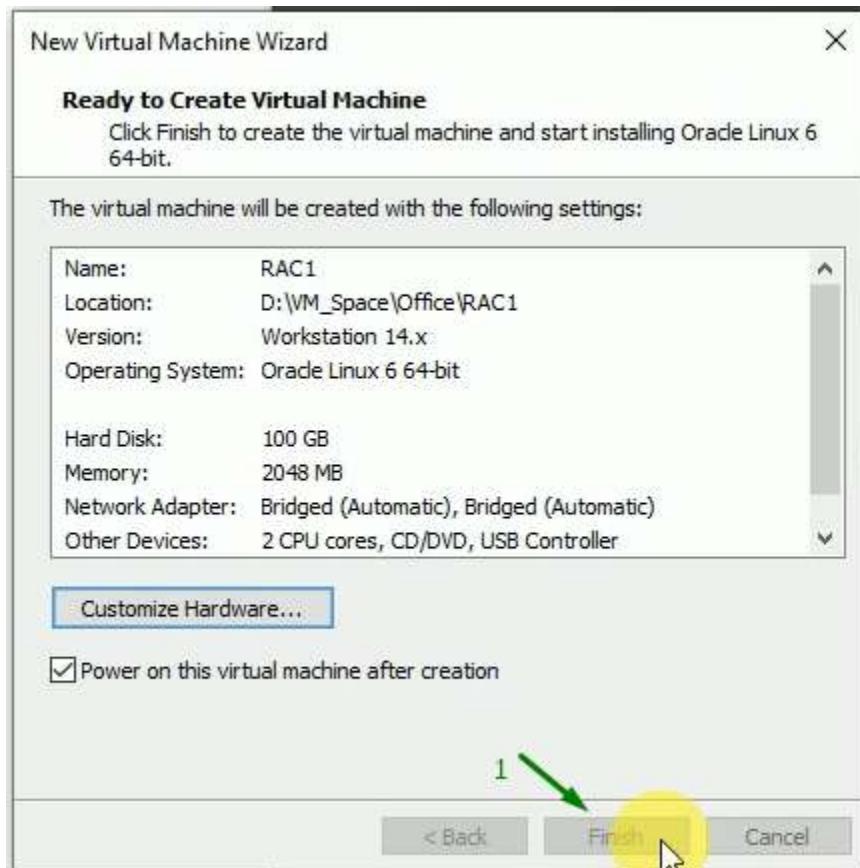
1.17. Click on Add Button then select network Adaptor then click on Finish button.



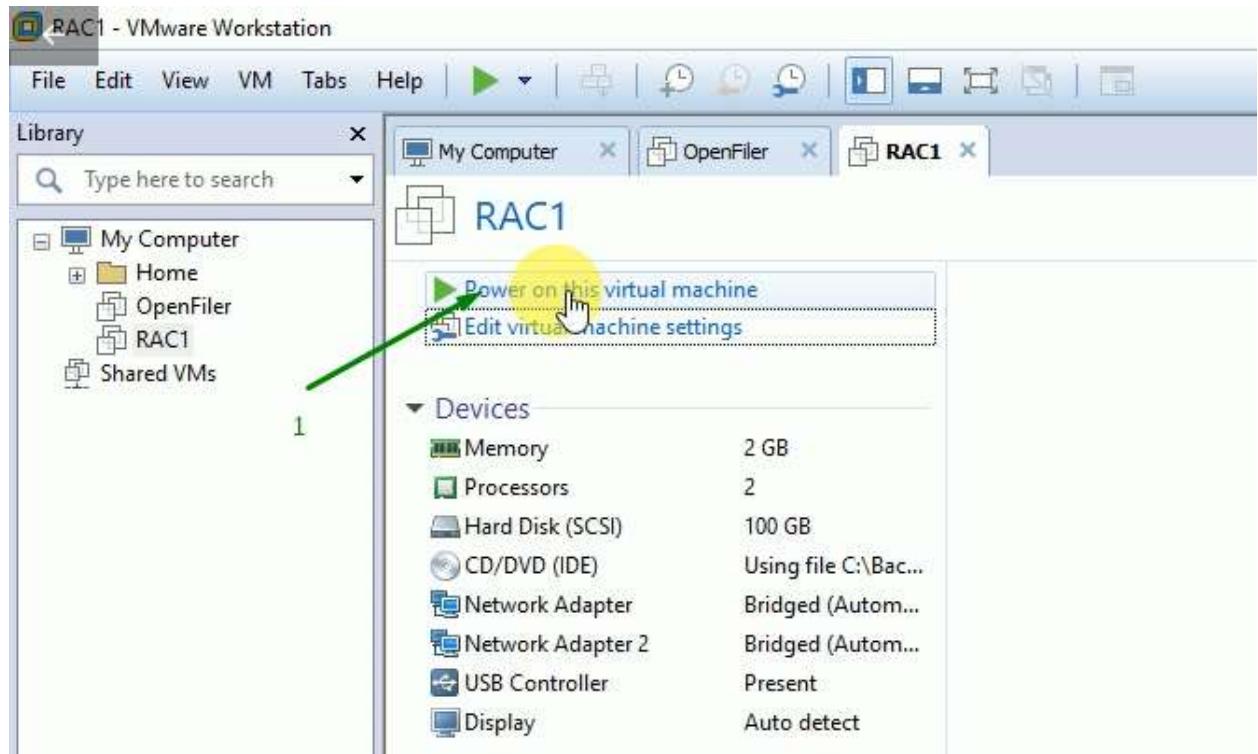
1.18. Select network Adaptor then change the Network connection as Bridge then click on Close button.



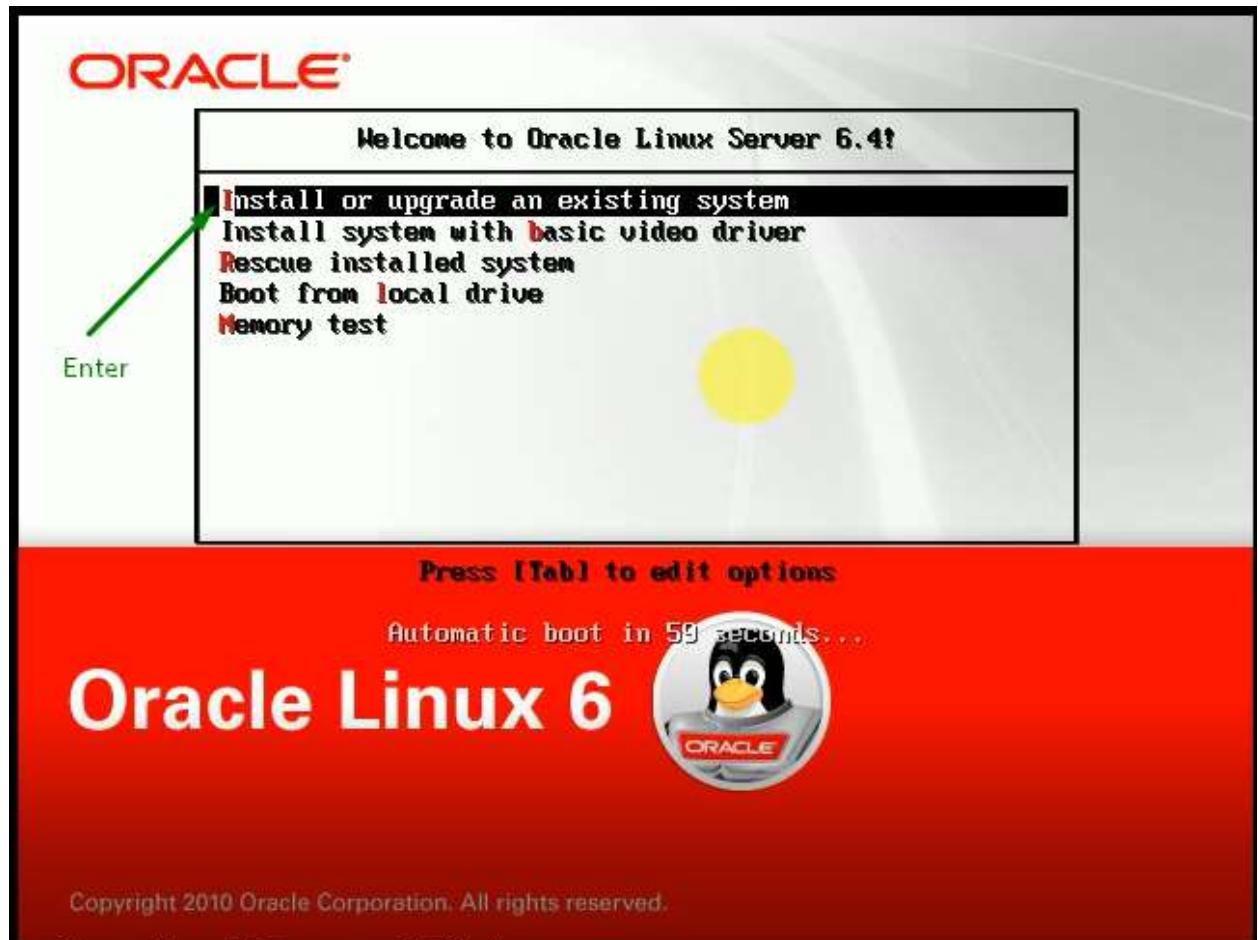
1.19. Click on Finish button.



1.20. Click on Power on button.



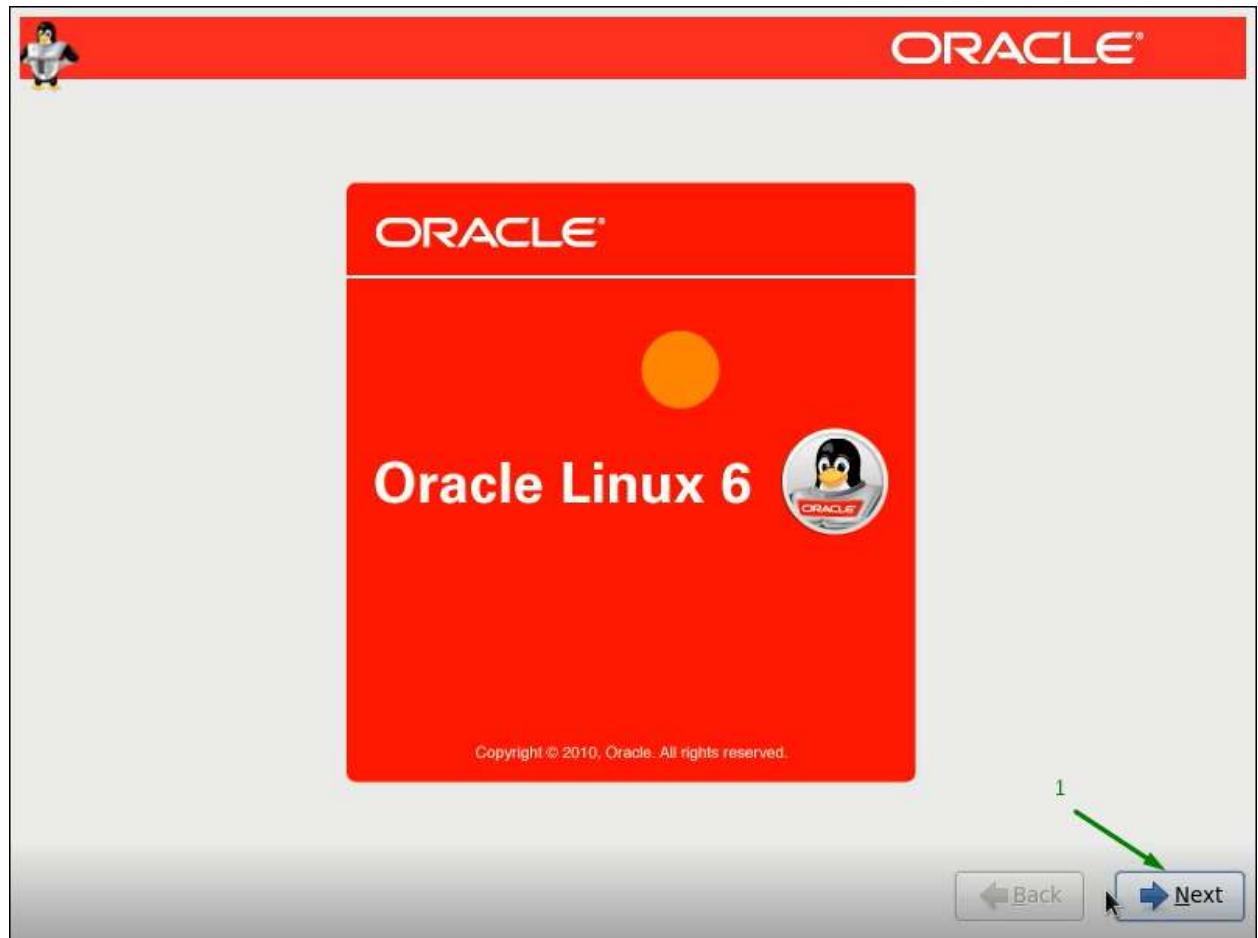
1.21. Install Oracle Linux Server.



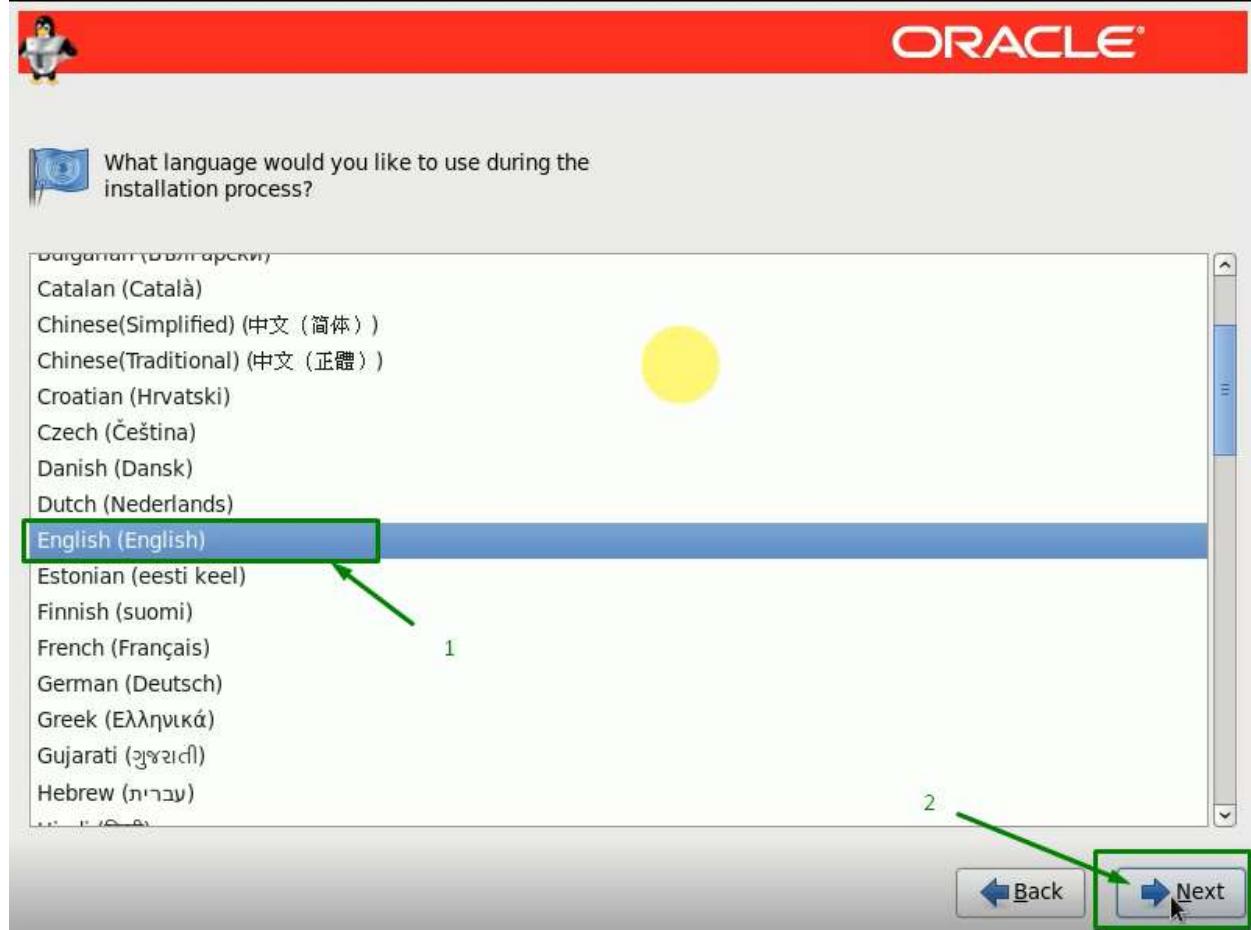
1.22. Click on Skip tab using Keyboard.



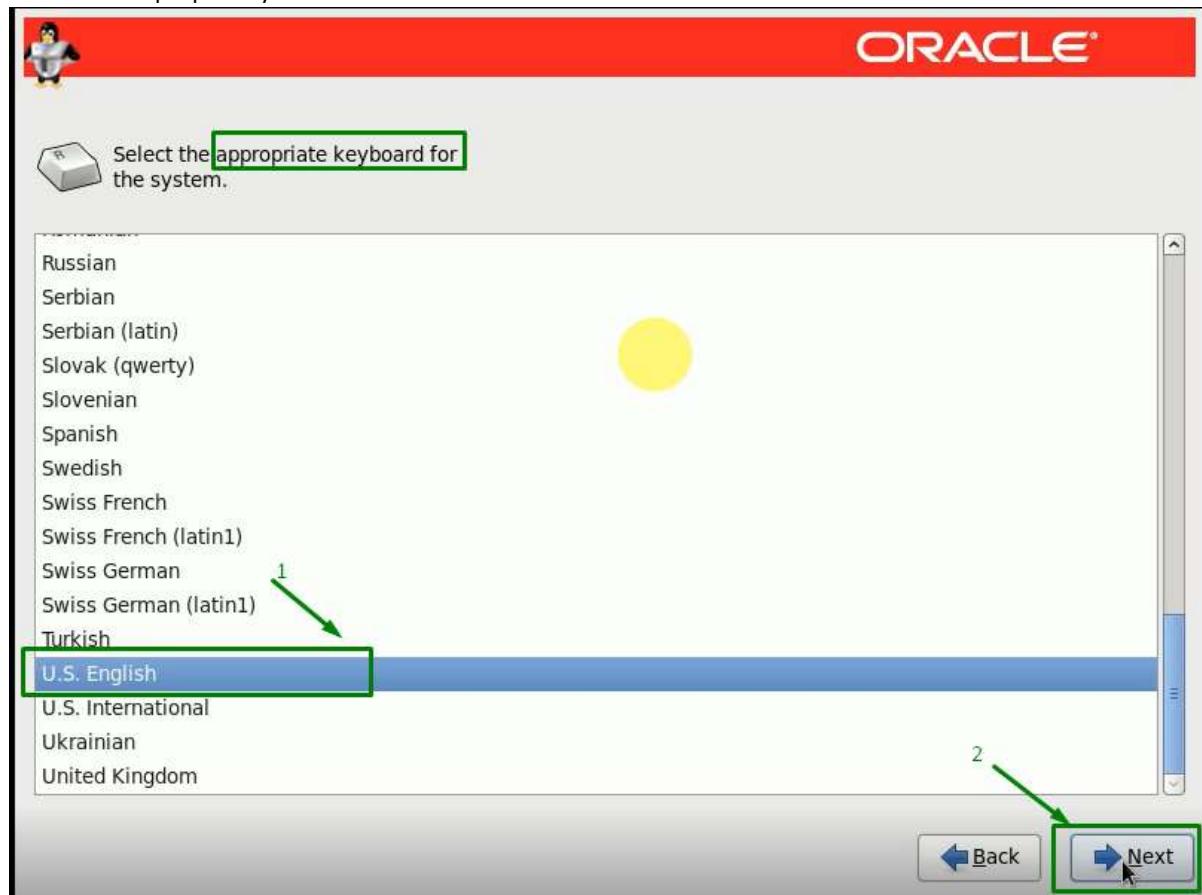
1.23. Click on Next button.



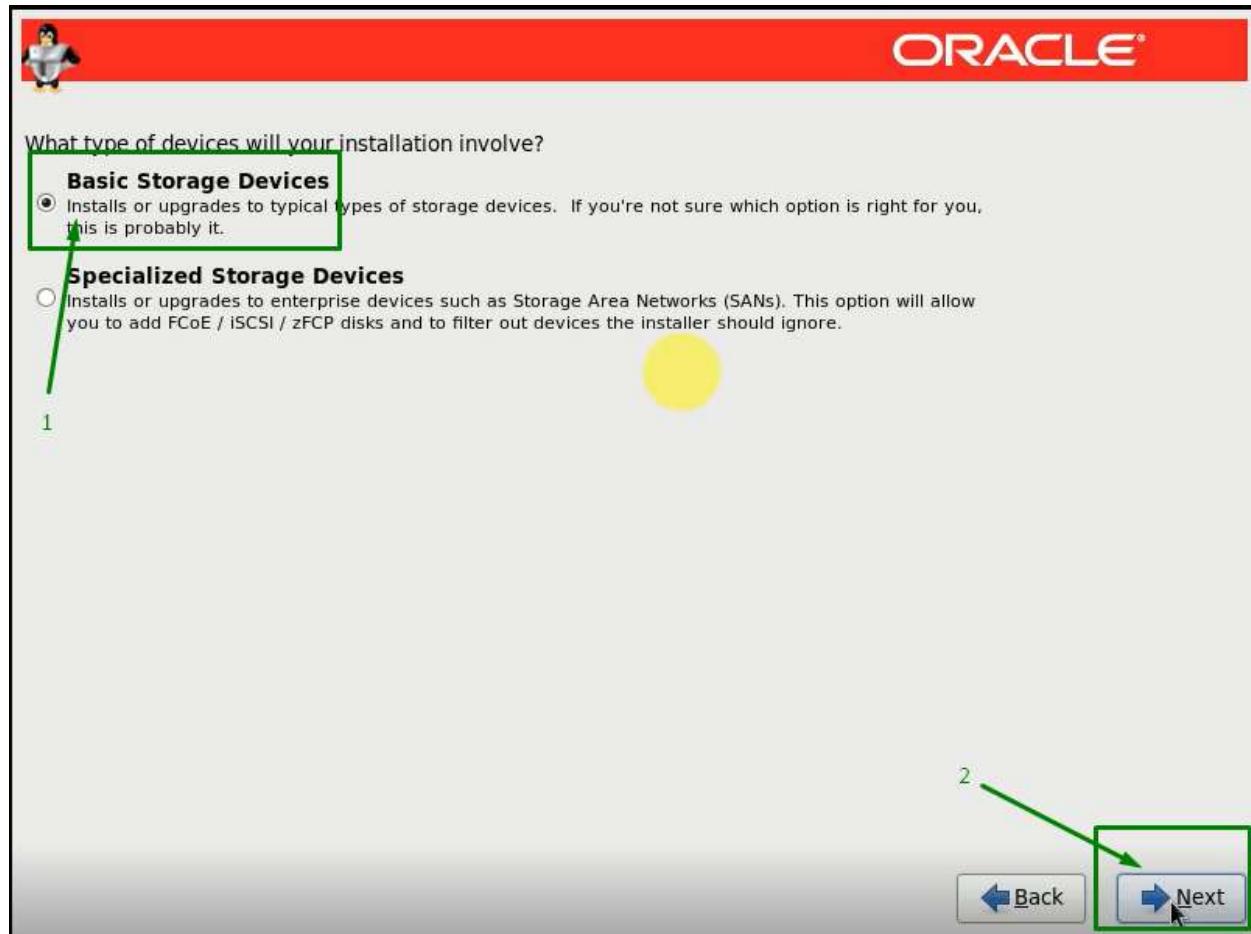
1.24. Choose proper language then Click on Next button.



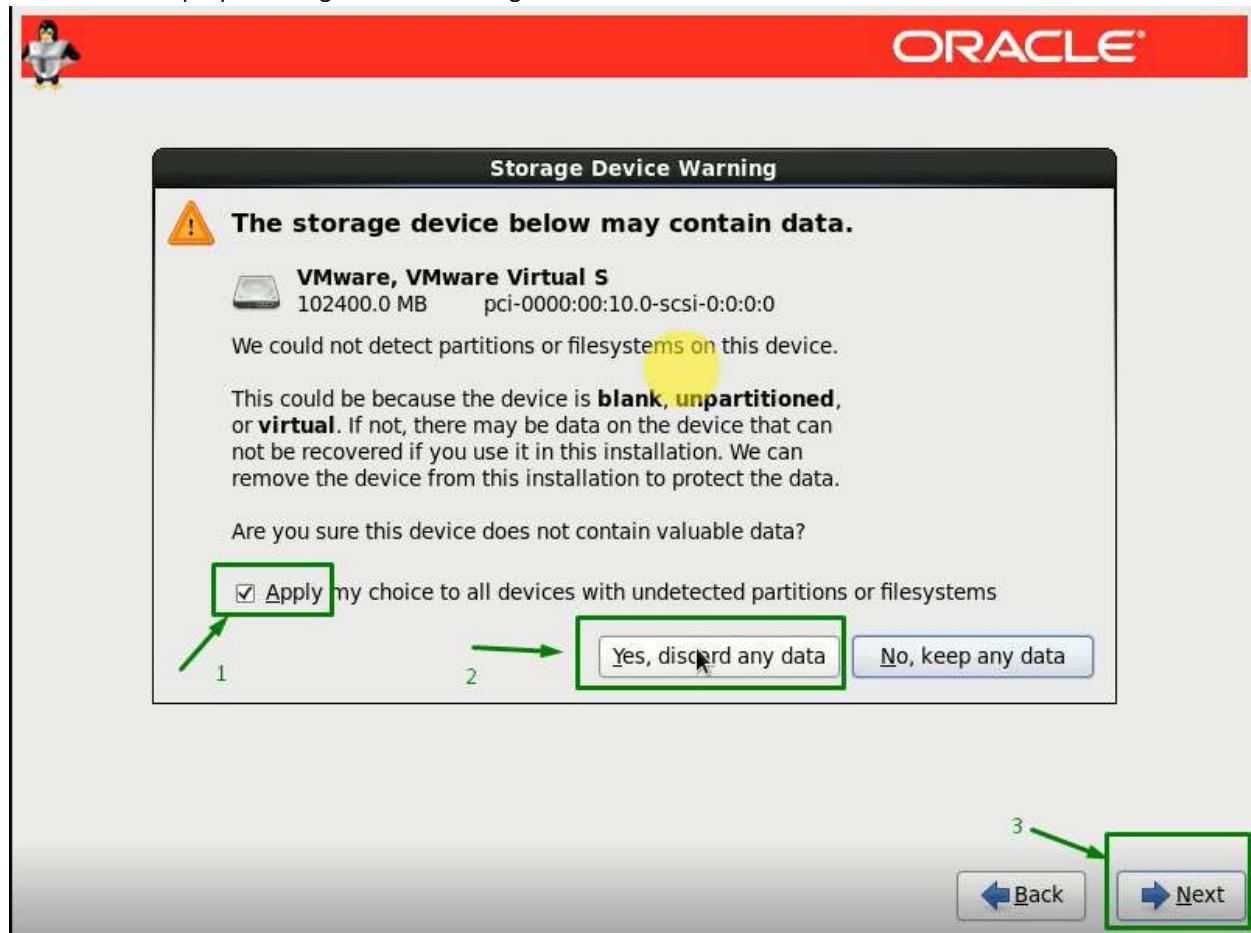
1.25. Choose proper keyboard then Click on Next button.



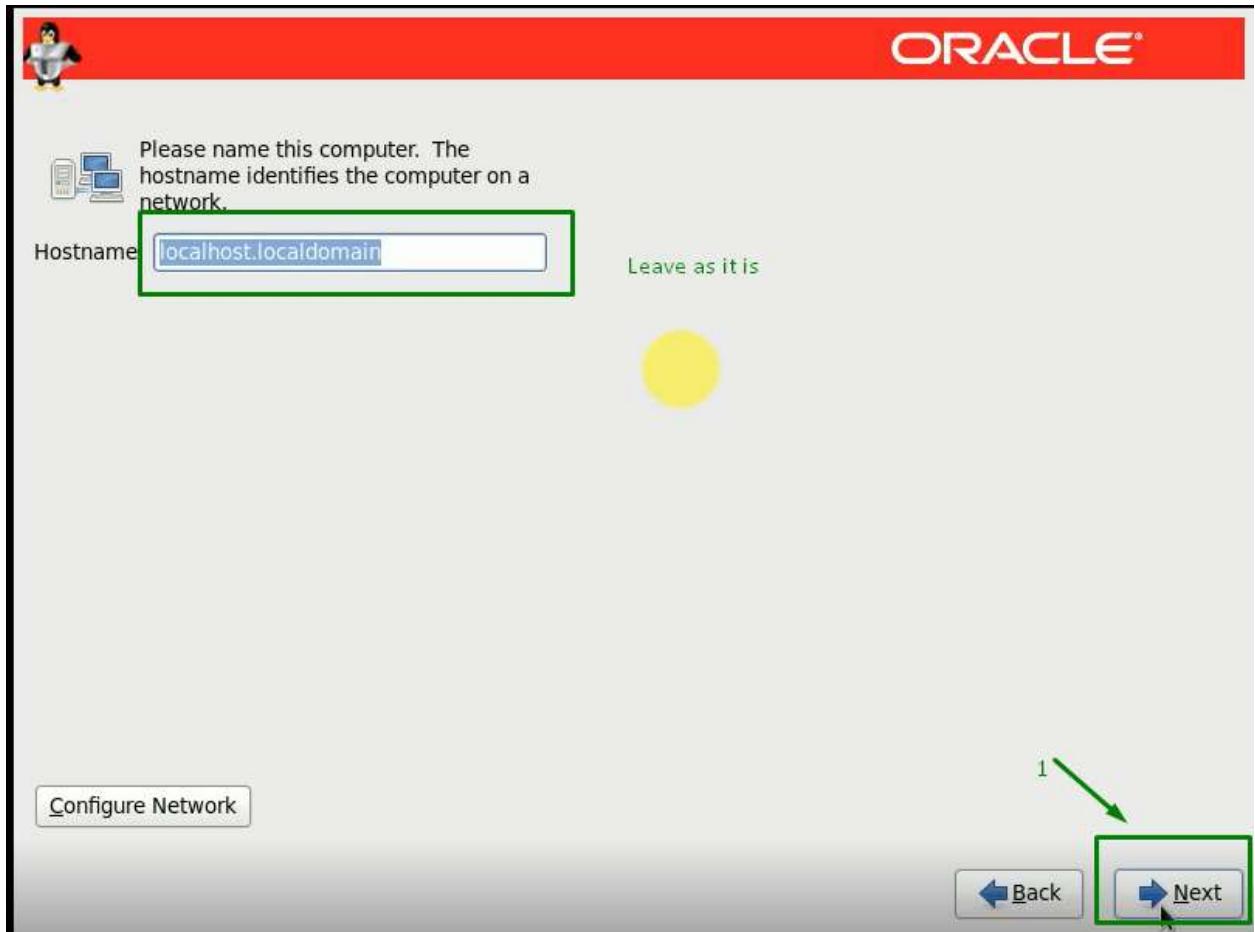
1.26. Select Basic Storage then Click on Next button.



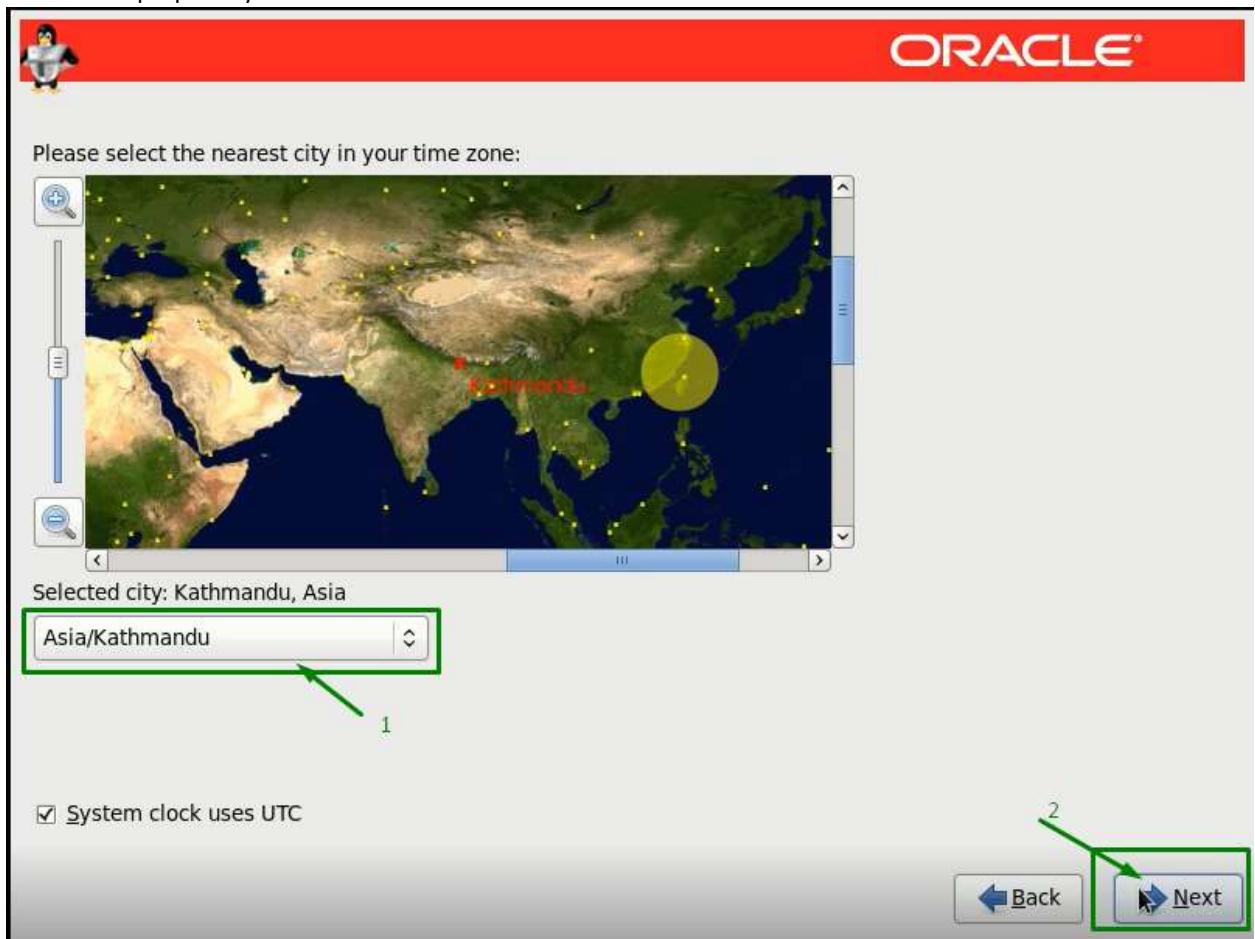
1.27. Select the proper Storage Device Warning then Click on Next button.



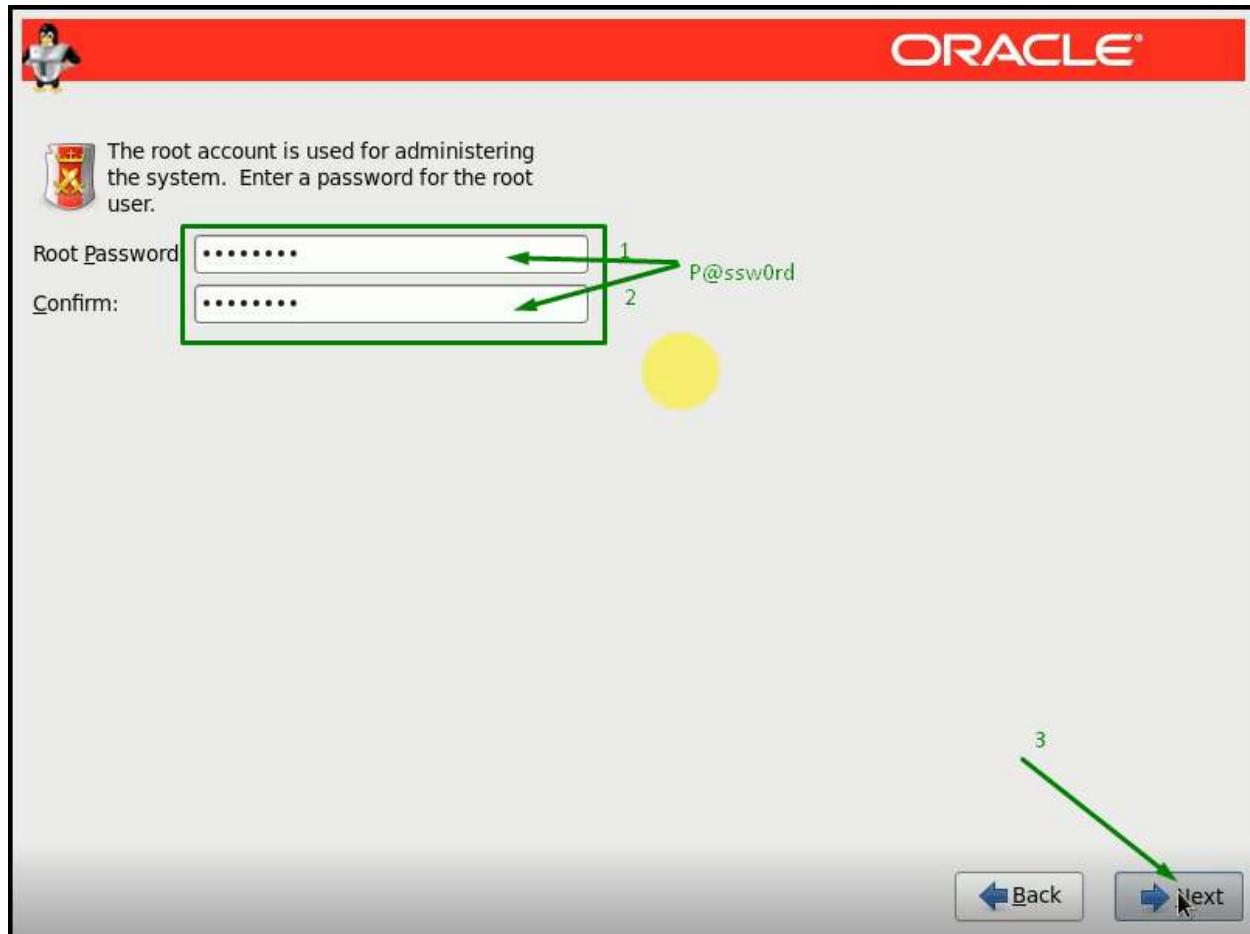
1.28. Click on Next button.



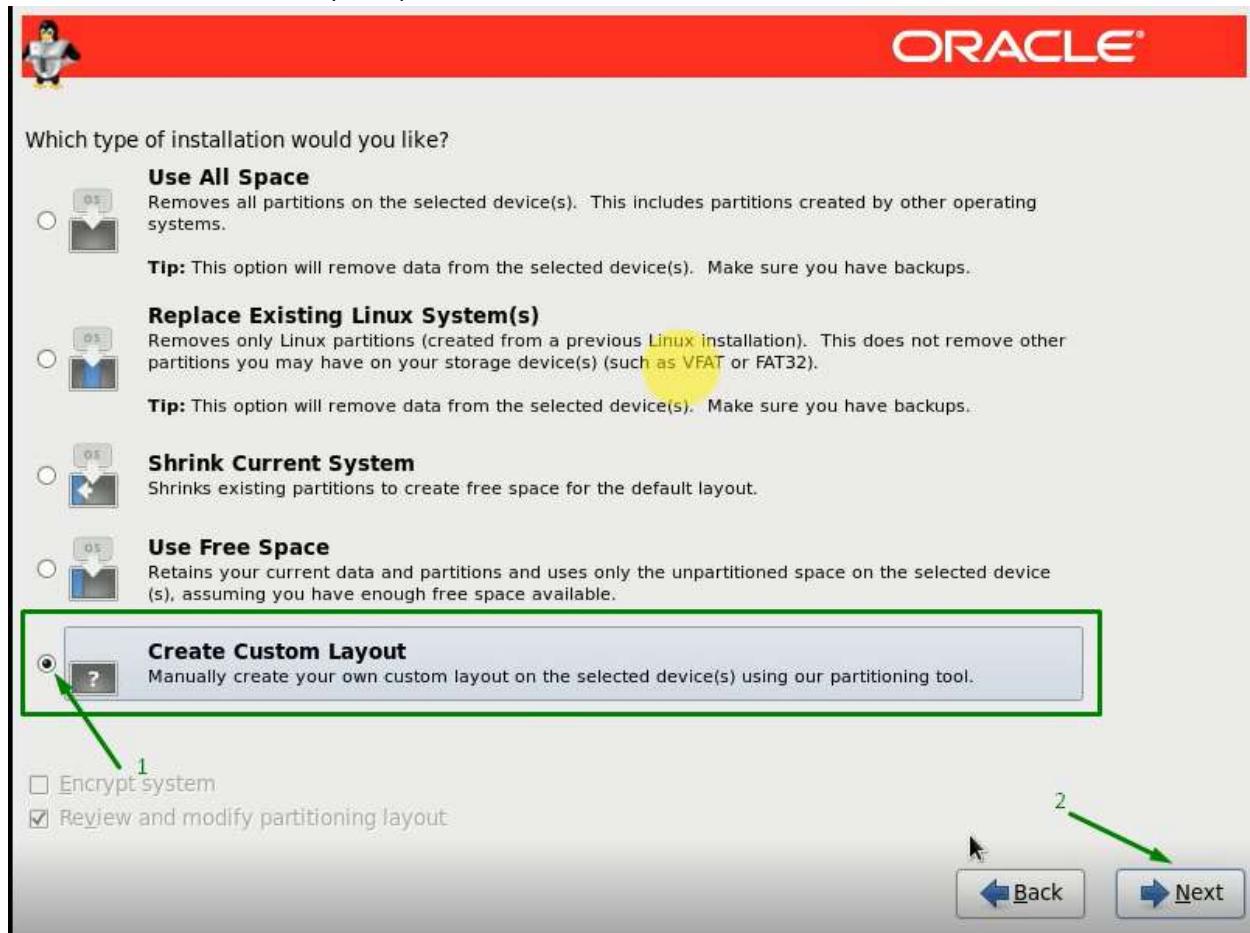
1.29. Select proper city then Click on Next button.



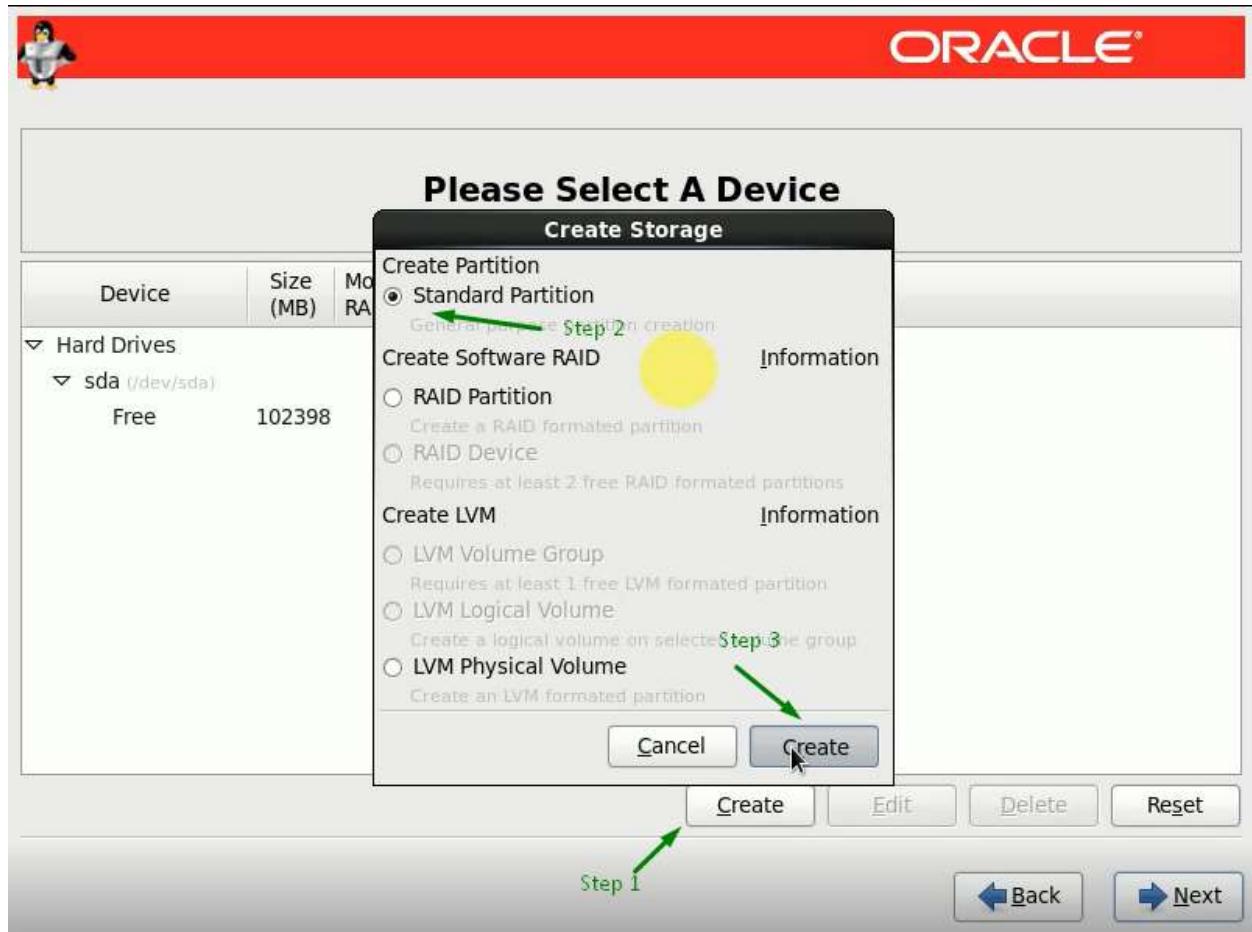
1.30. Put your “root” password the Click on Next button.



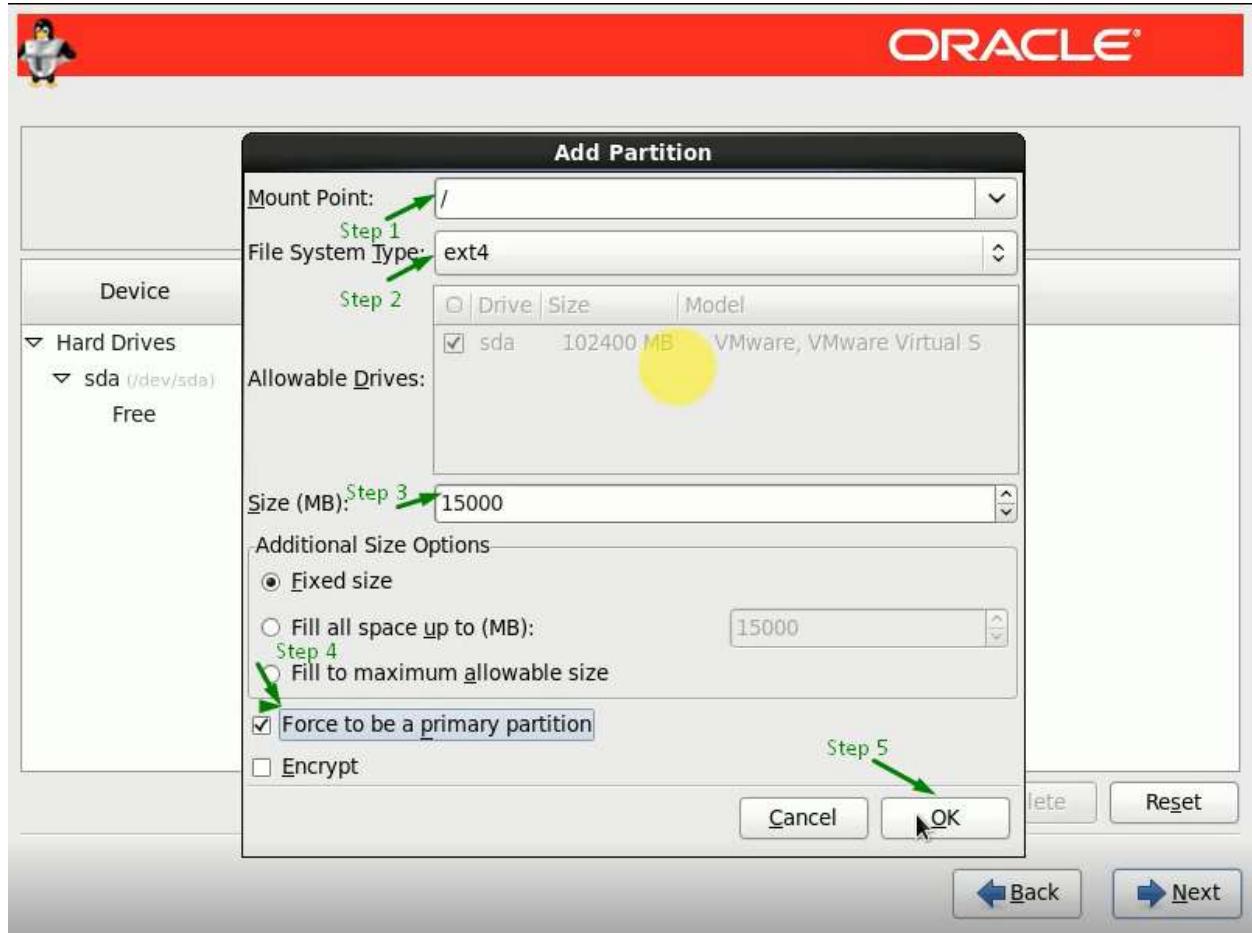
1.31. Select Create Custom Layout option then Click on Next tab.



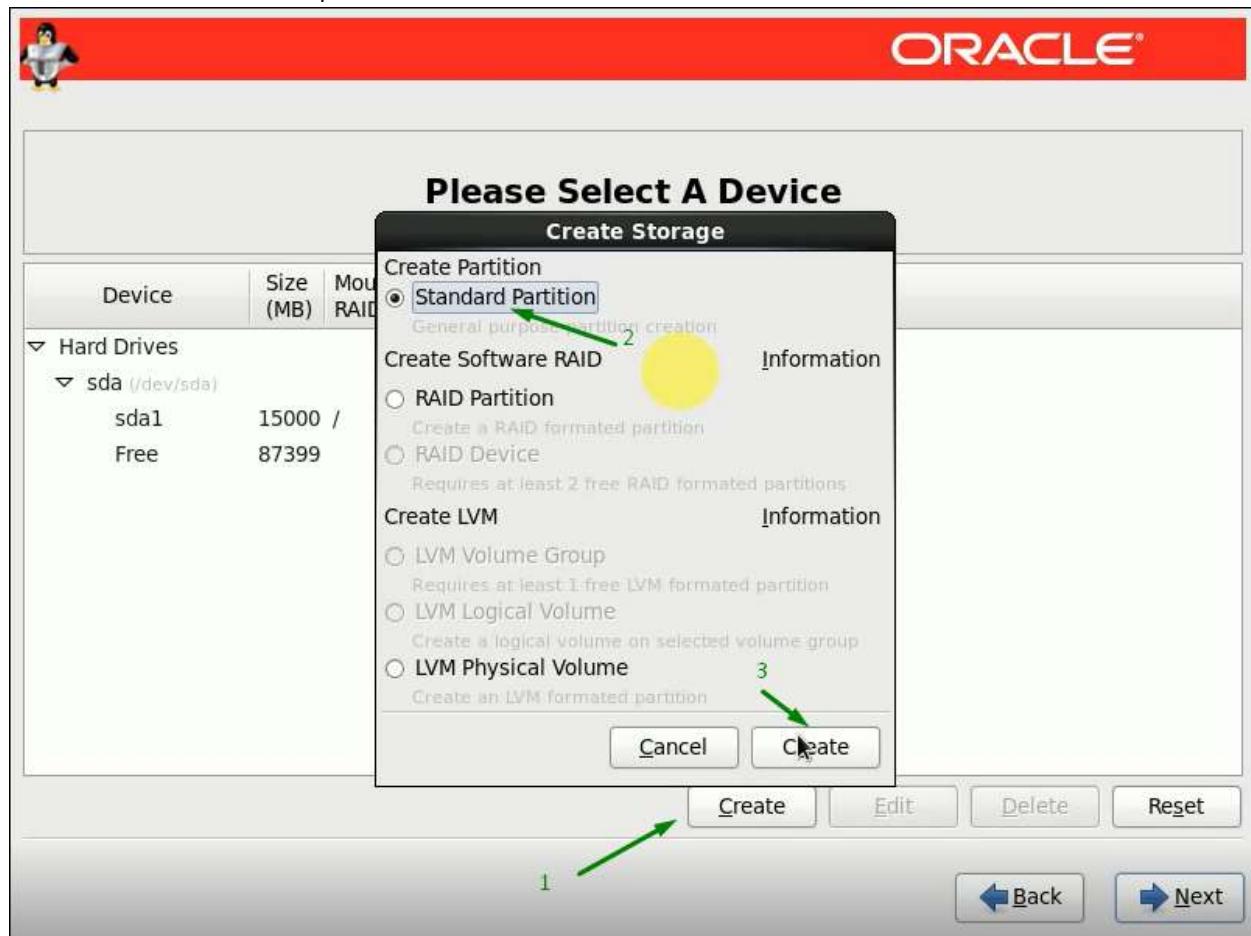
1.32. Proceed to create partition of OS Drive.



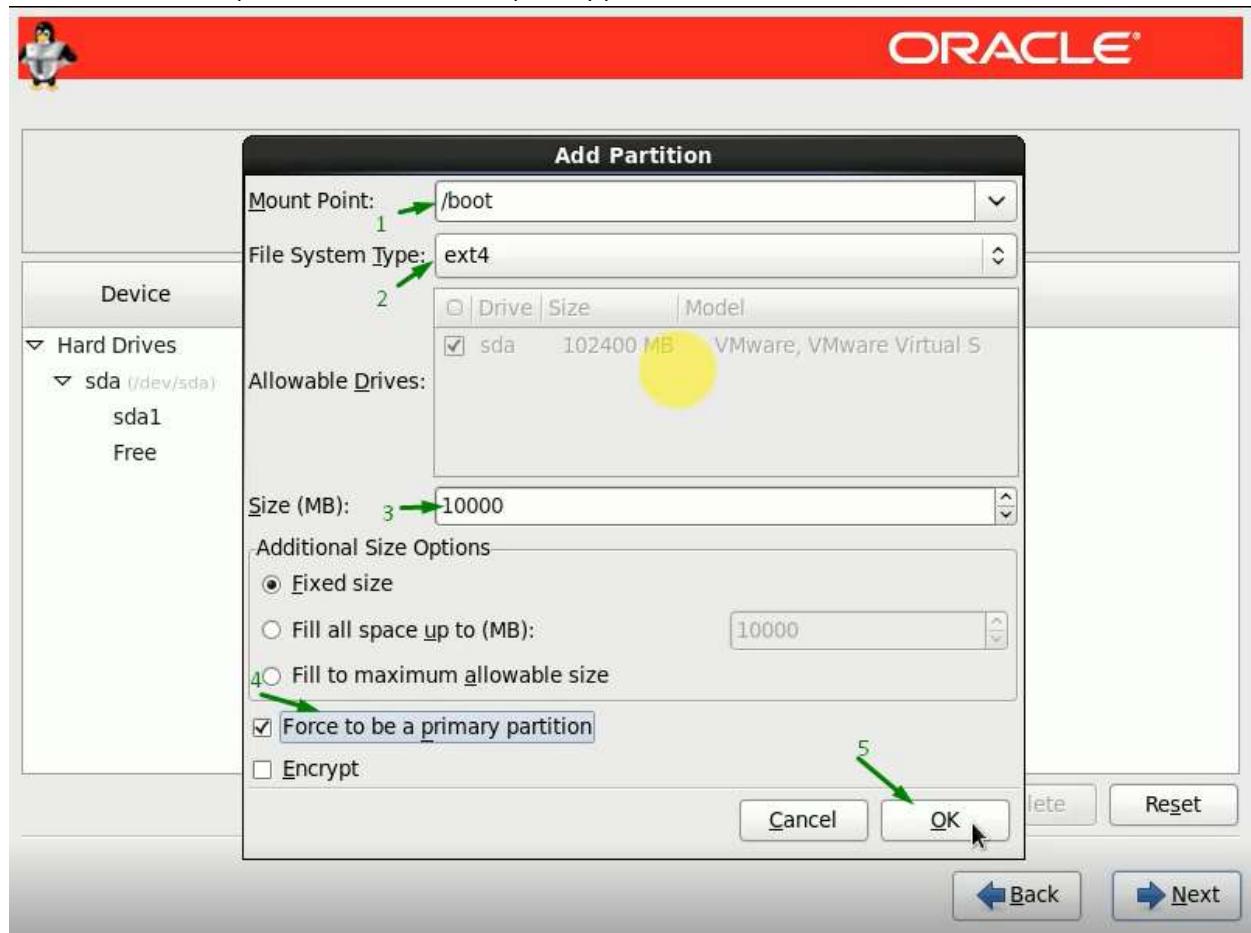
1.33. Create "/" root partition as Force to be a primary partition



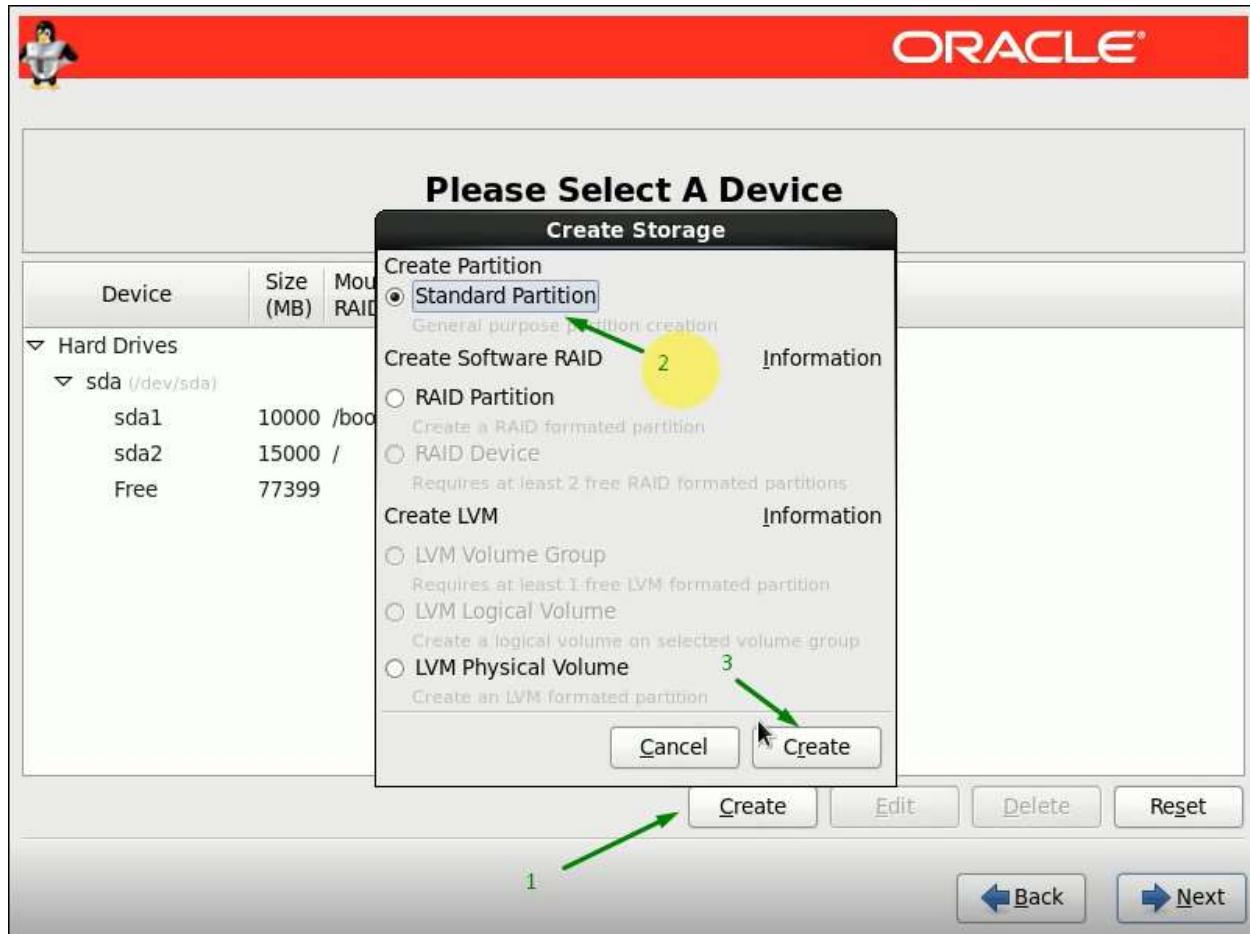
1.34. Proceed to create new partition



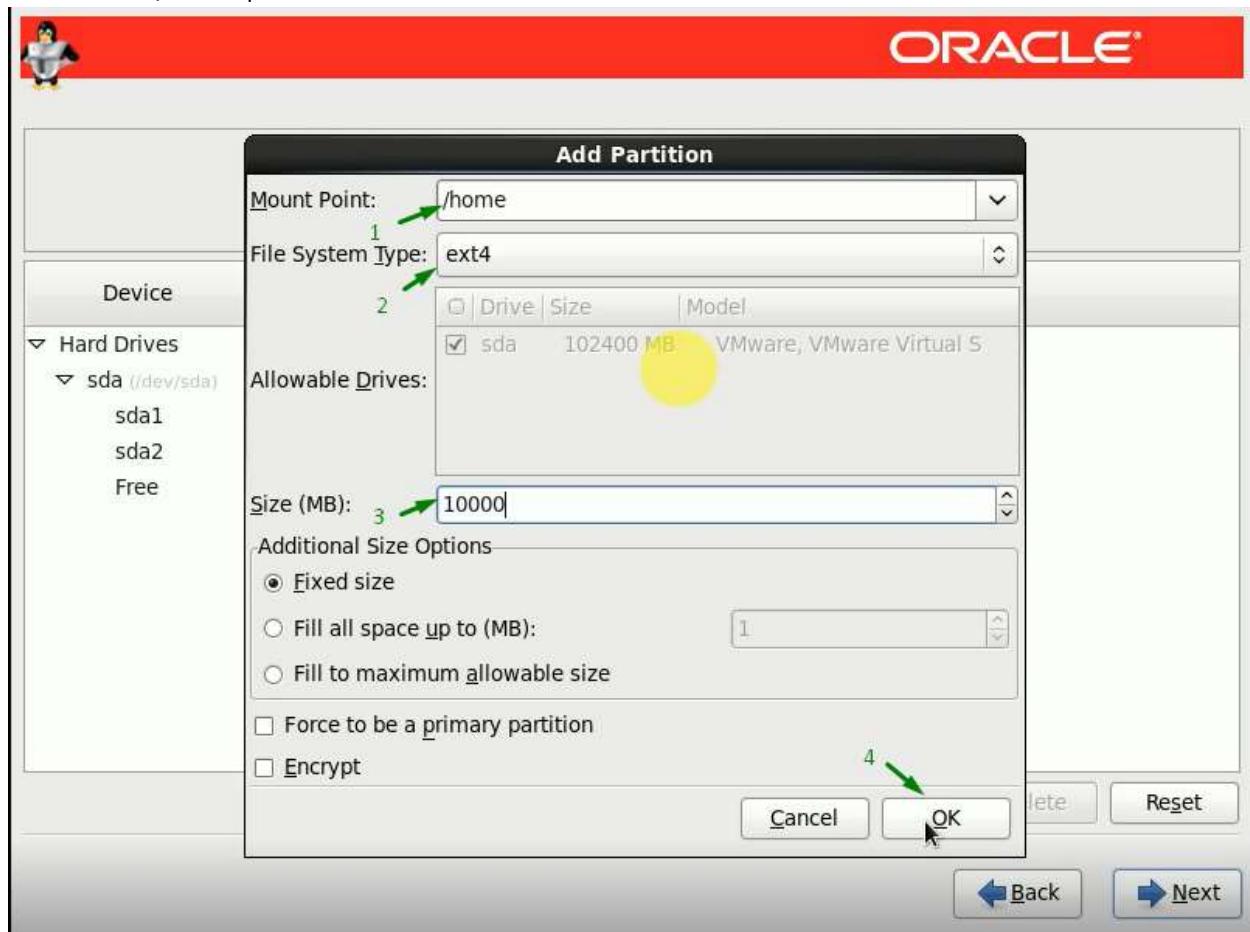
1.35. Create "/boot" partition as Force to be a primary partition



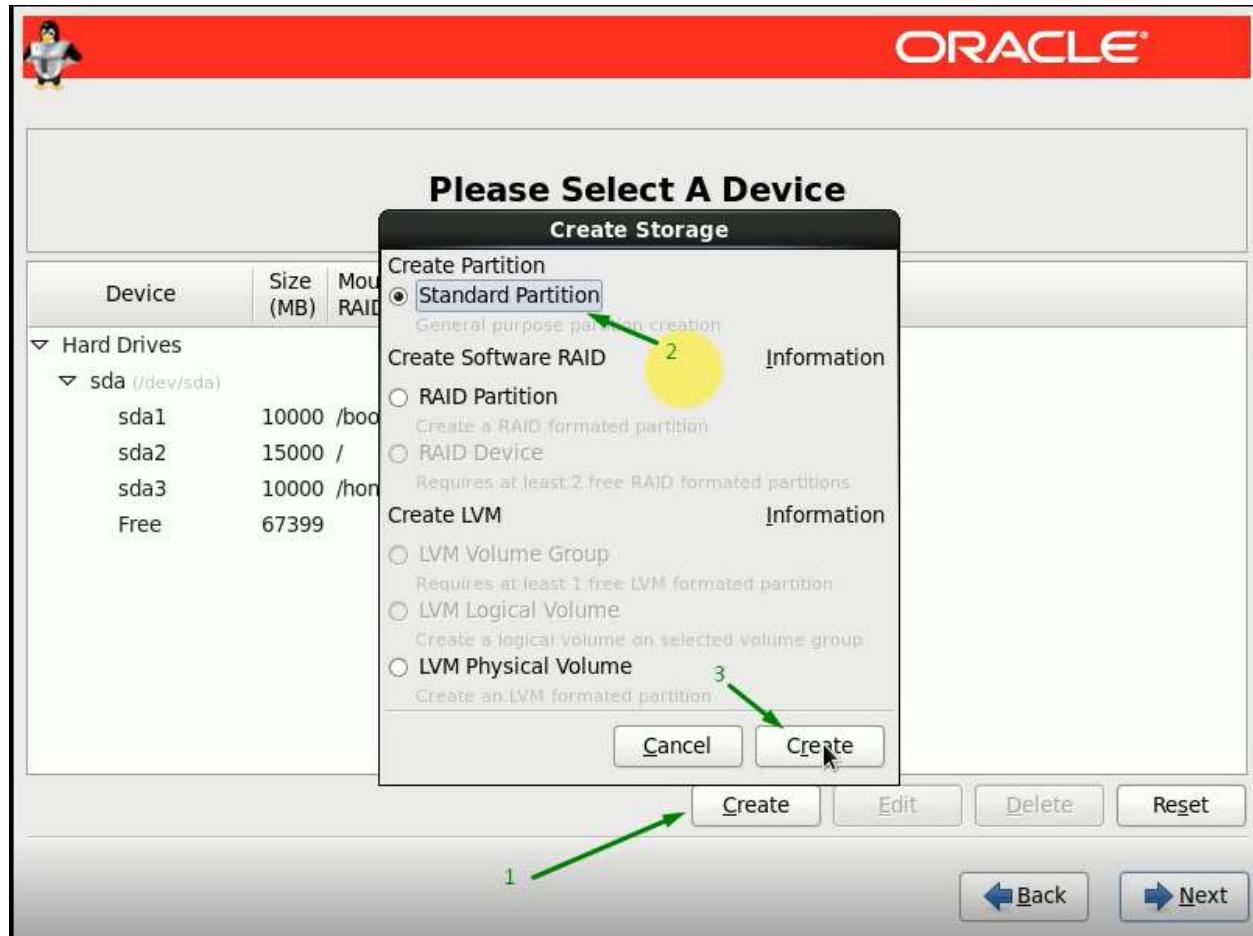
1.36. Proceed to create new partition



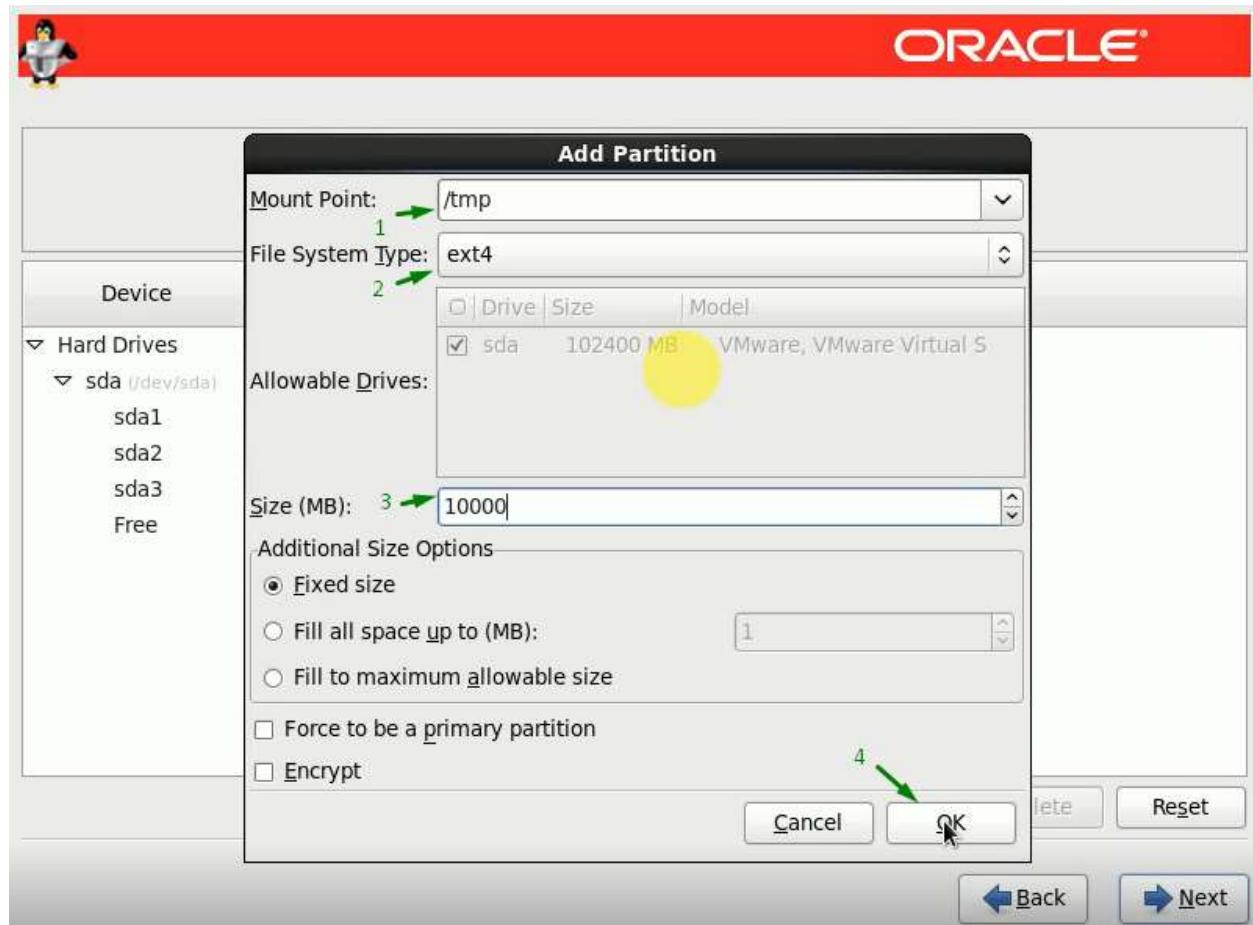
1.37. Create "/home" partition



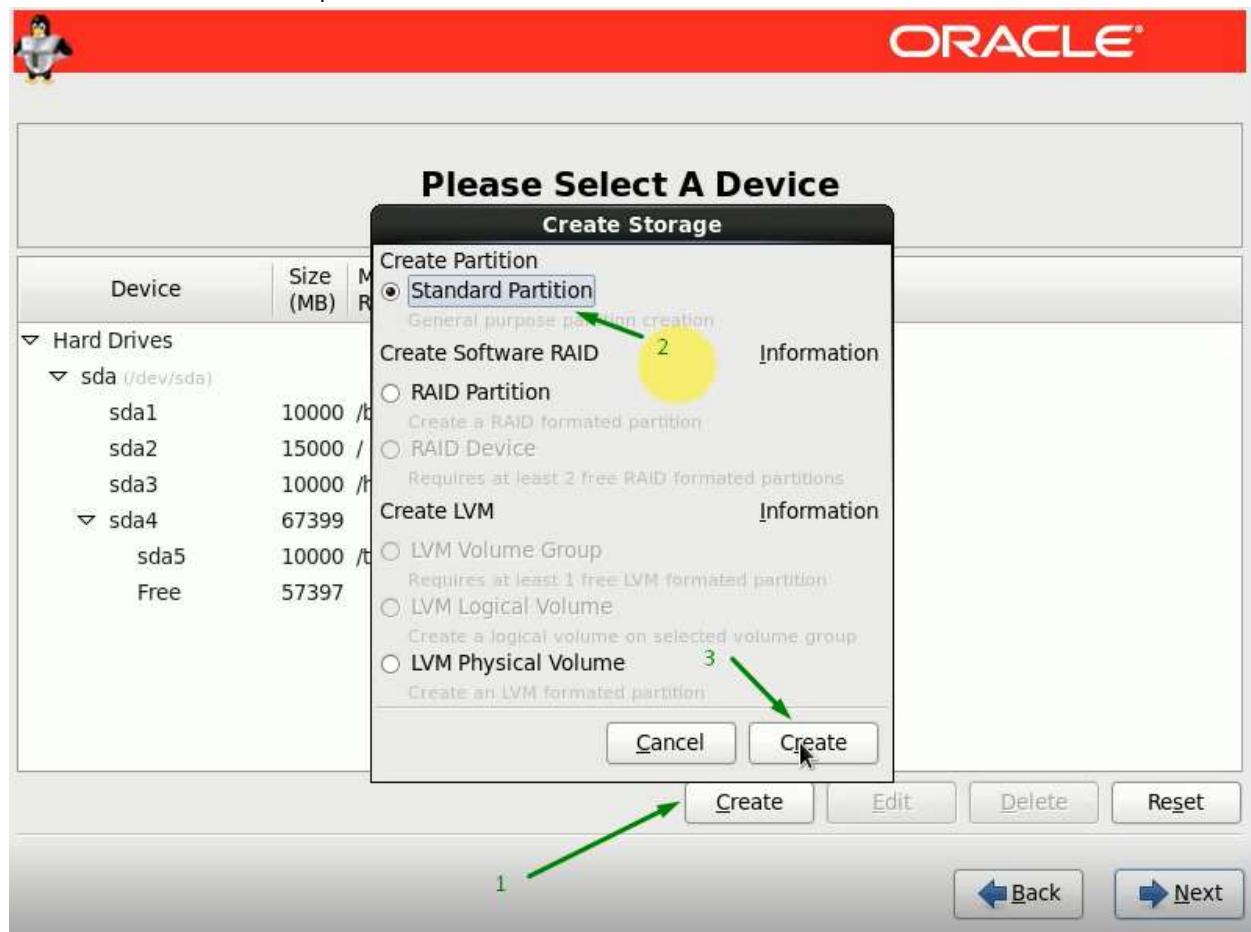
1.38. Proceed to create new partition



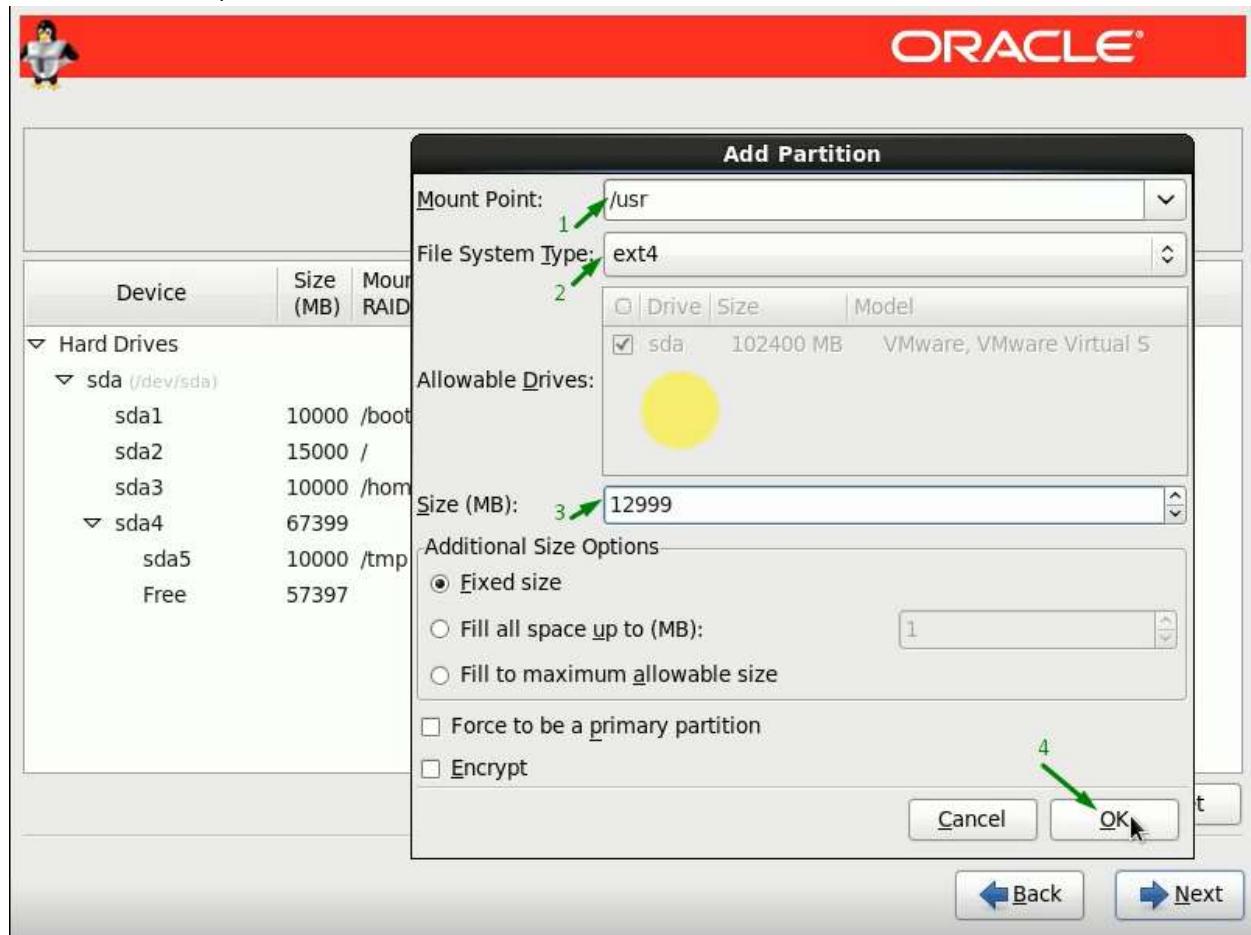
1.39. Create "/tmp" partition



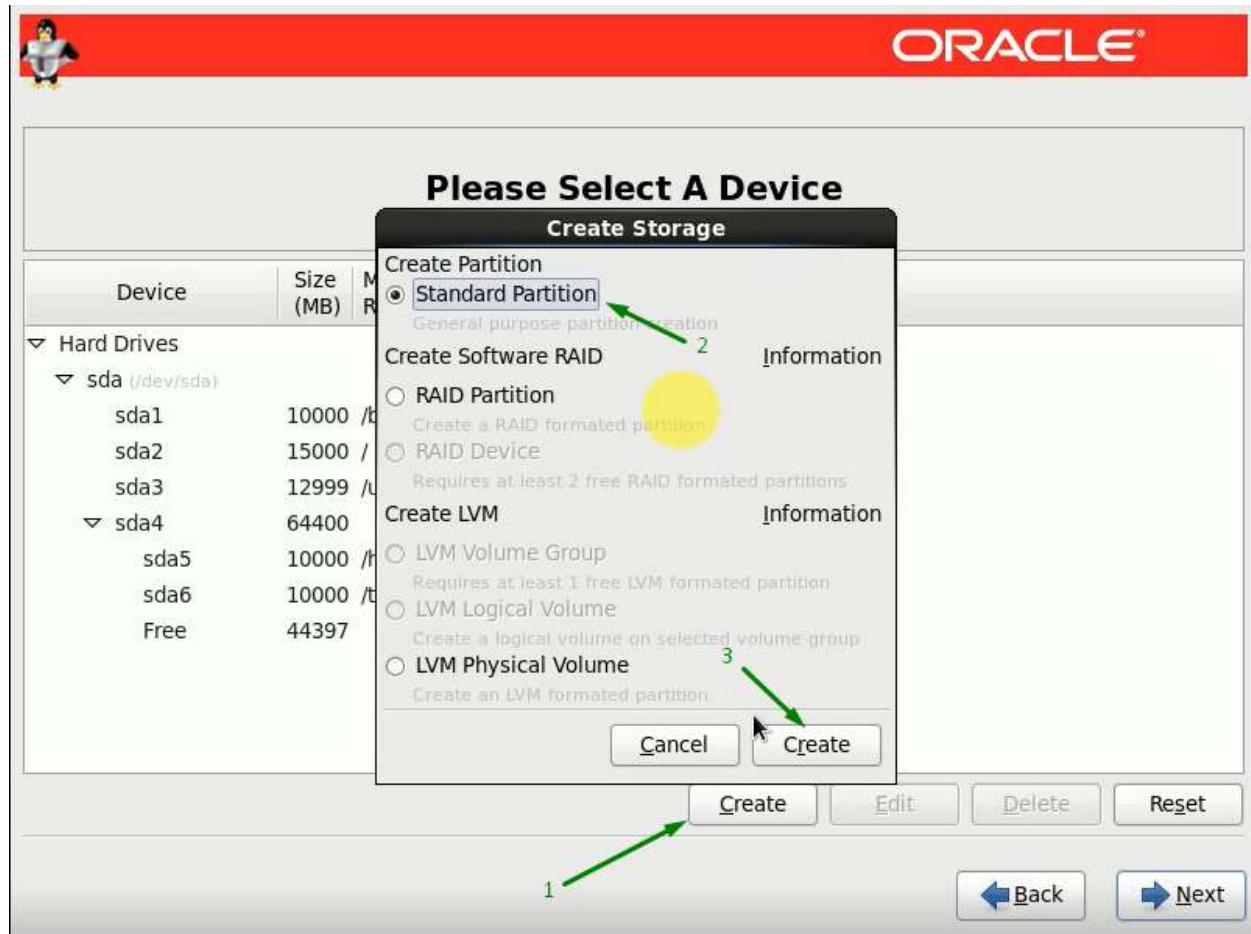
1.40. Proceed to create new partition



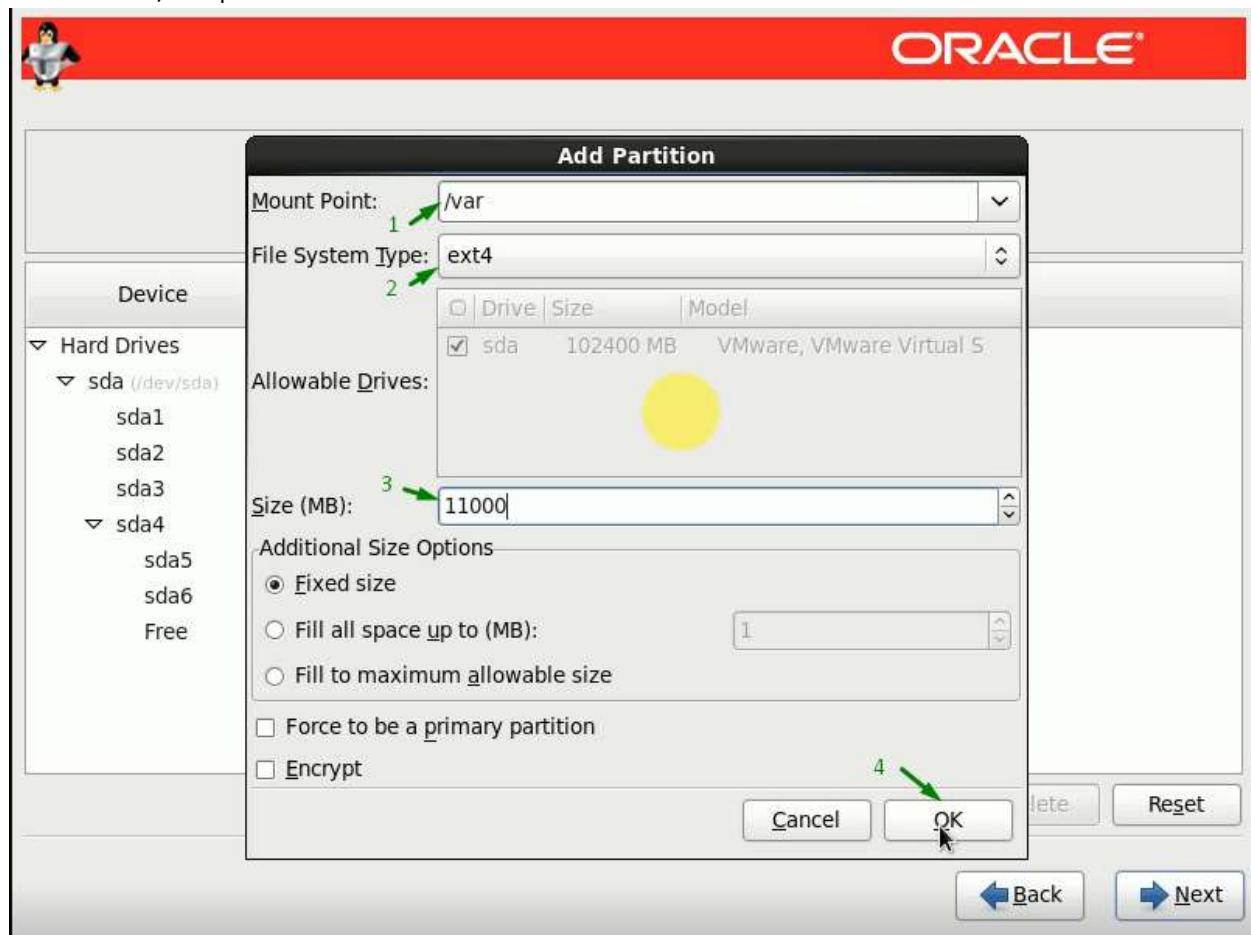
1.41. Create "/usr" partition



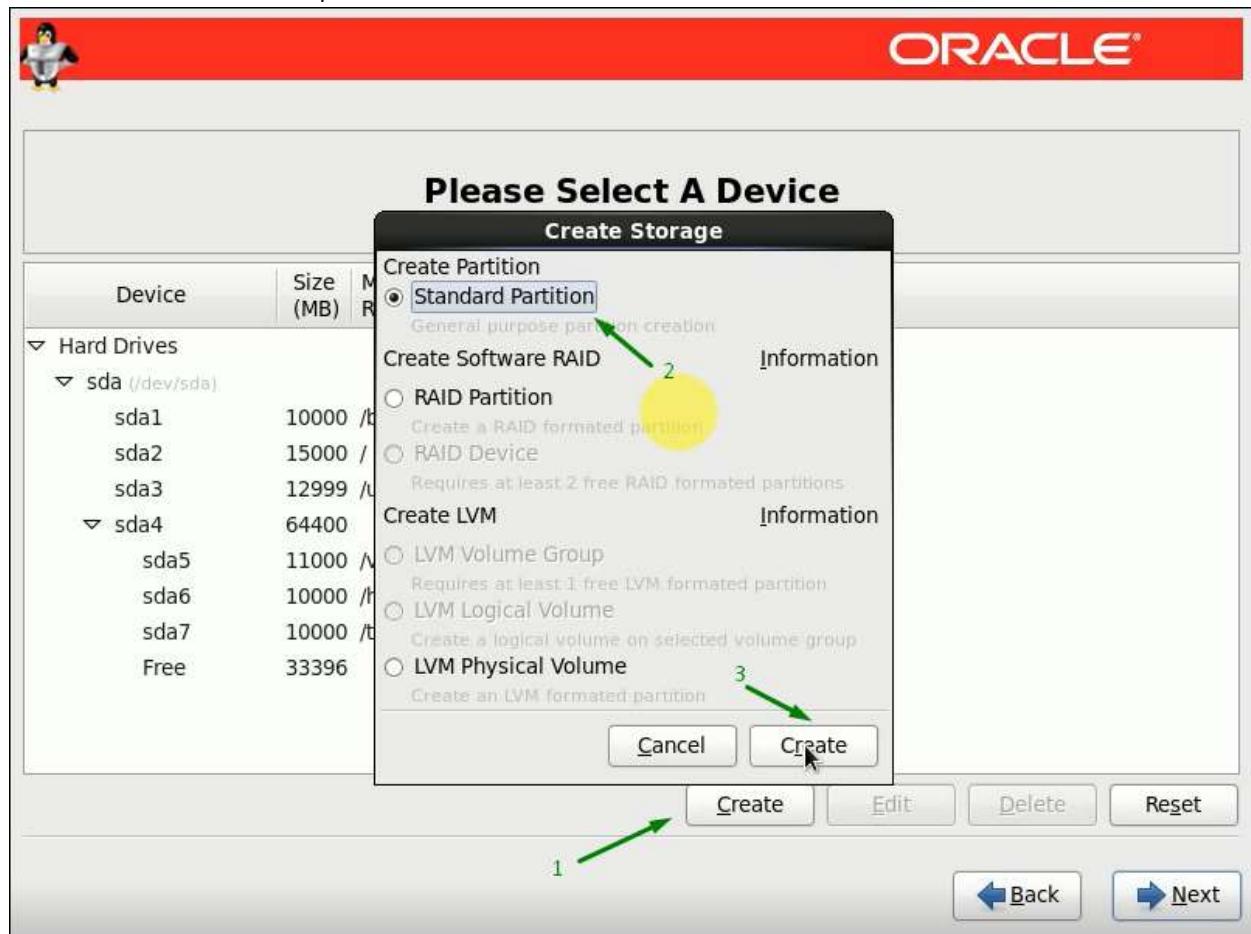
1.42. Proceed to create new partition



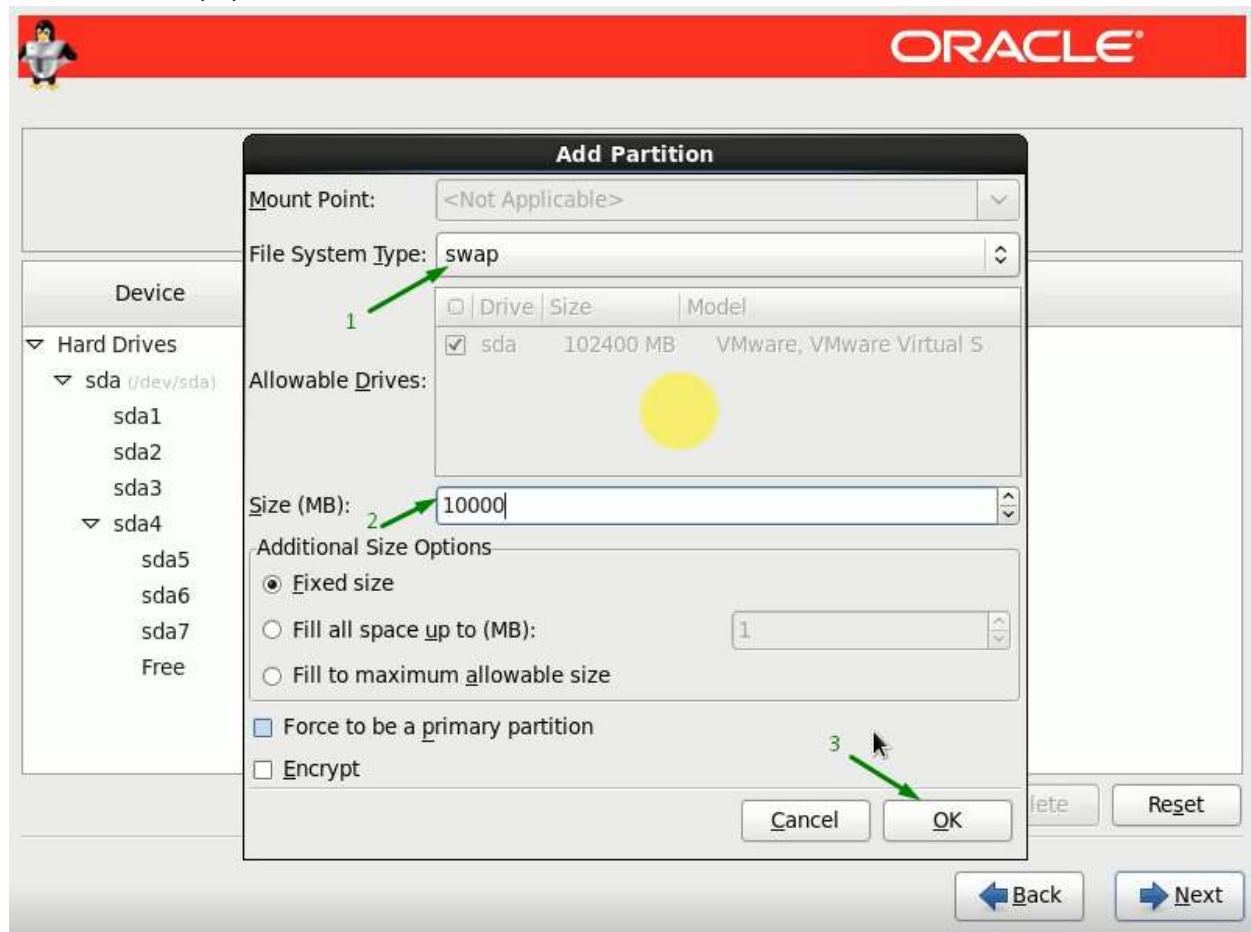
1.43. Create "/var" partition



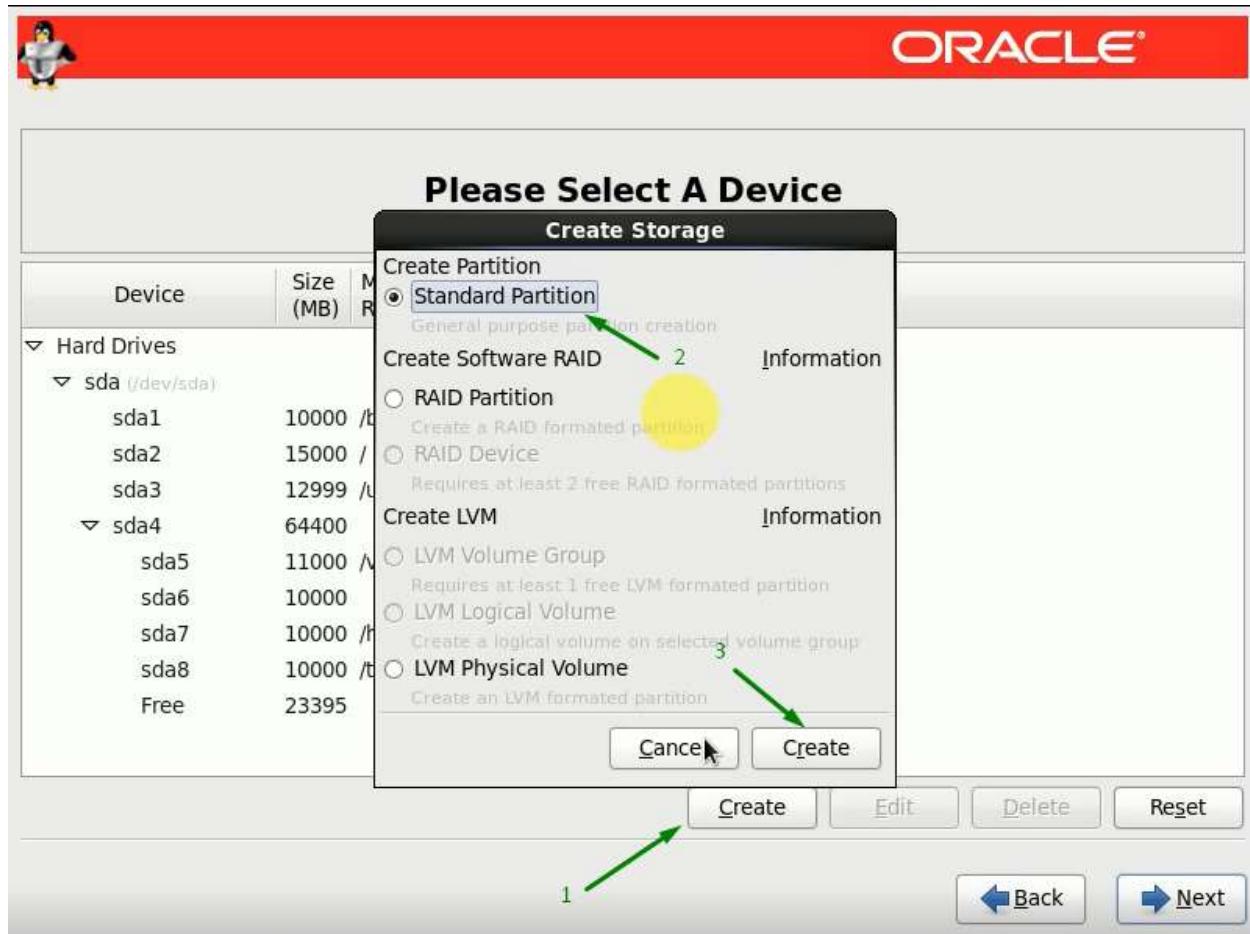
1.44. Proceed to create new partition



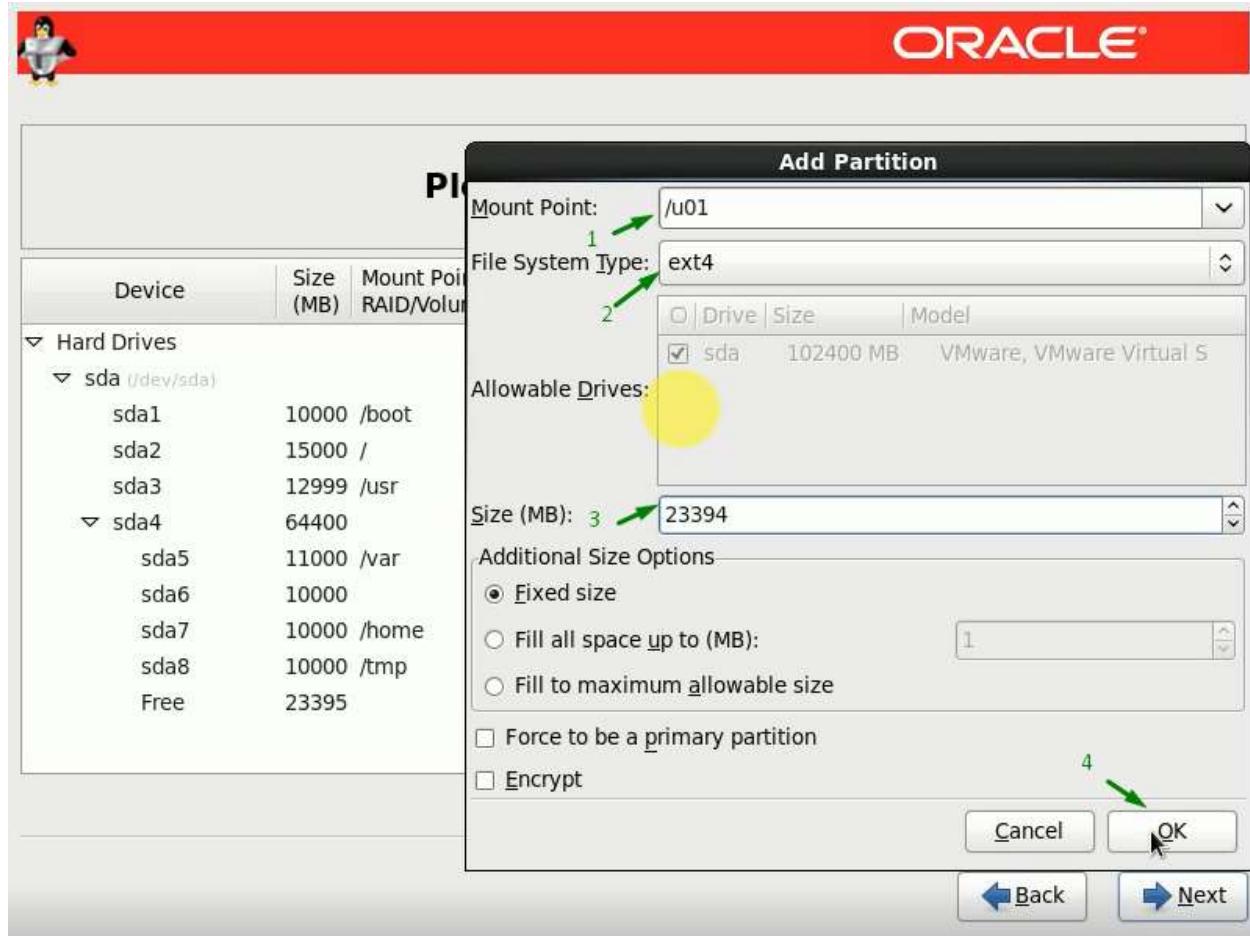
1.45. Create "swap" partition



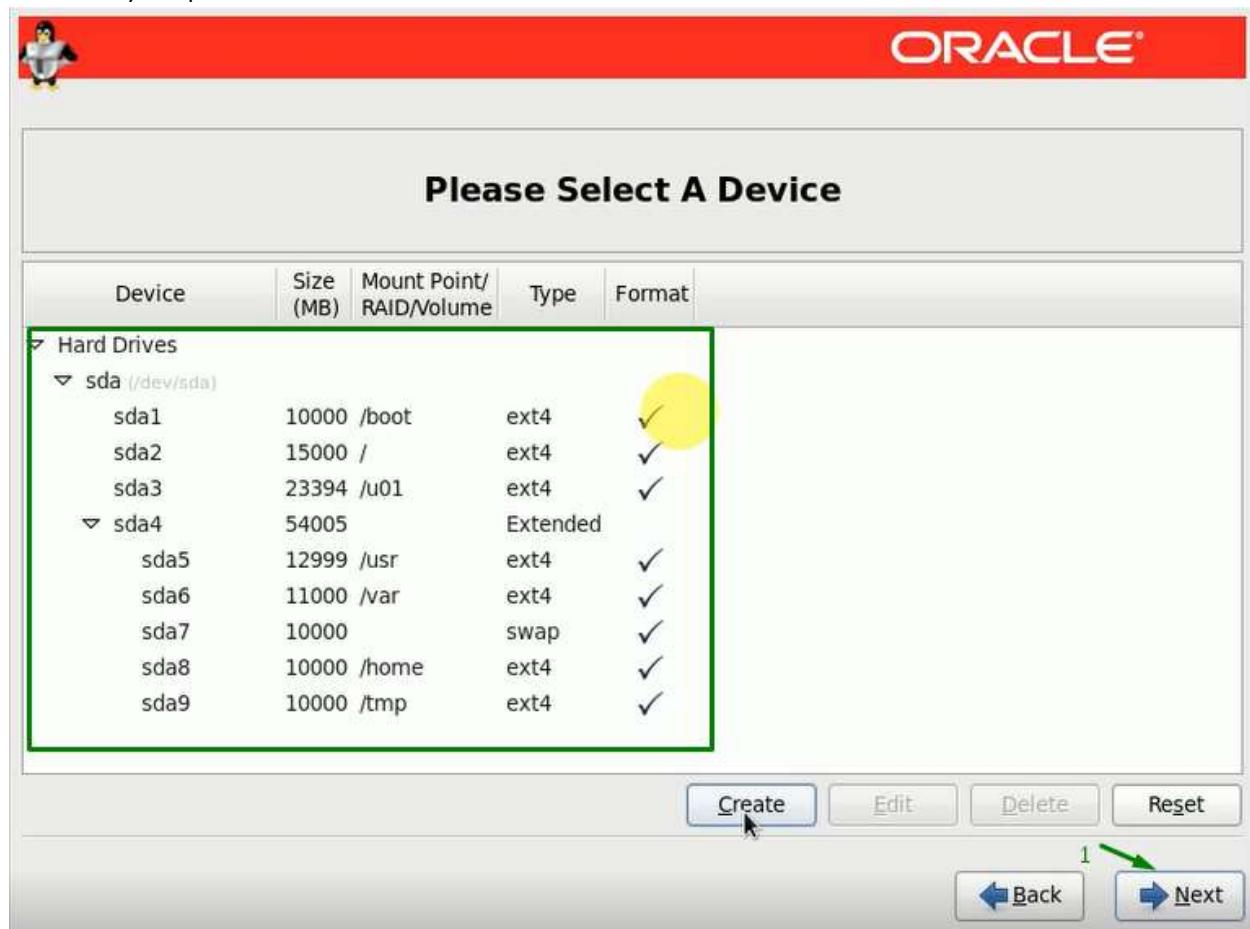
1.46. Proceed to create new partition



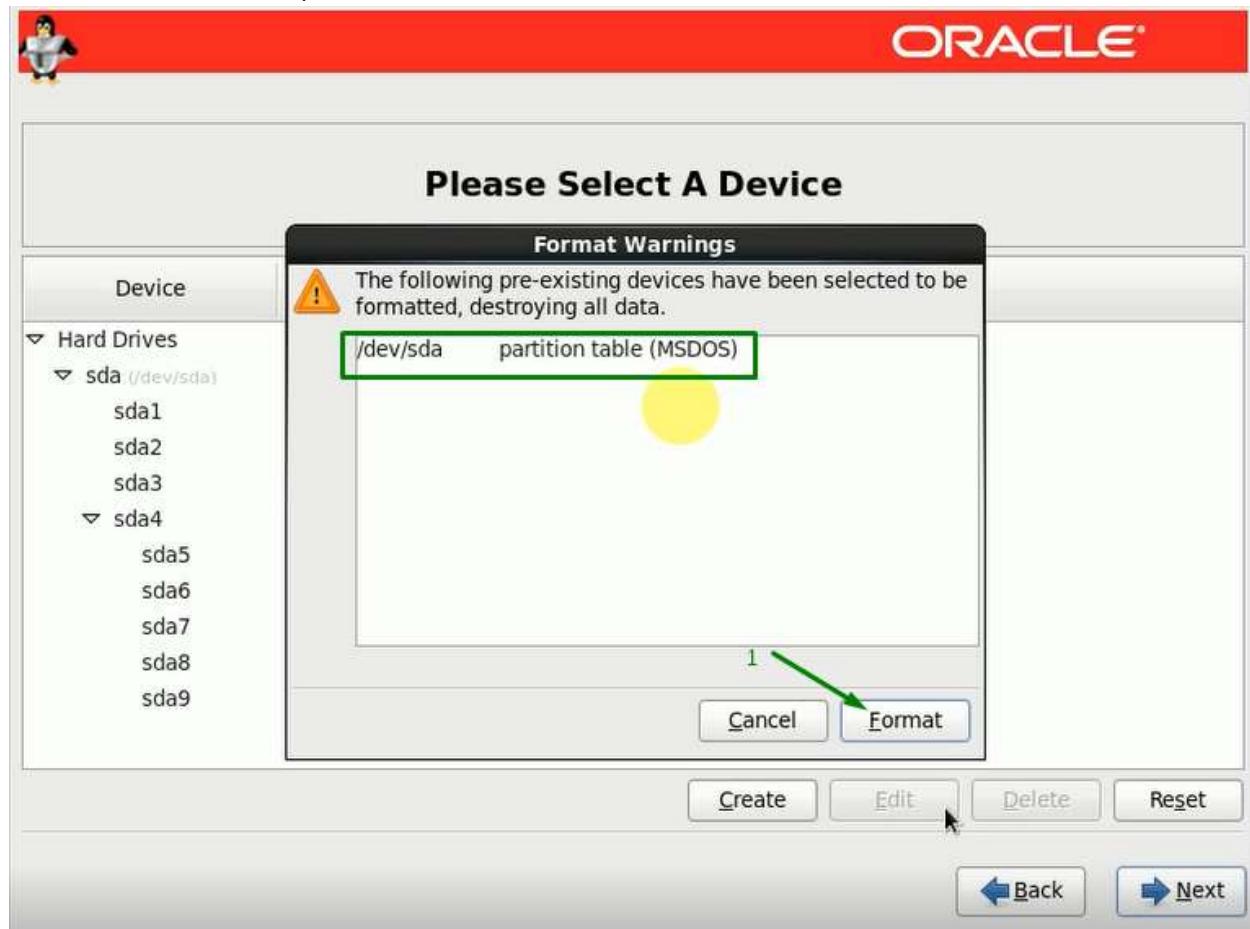
1.47. Create "swap" partition



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



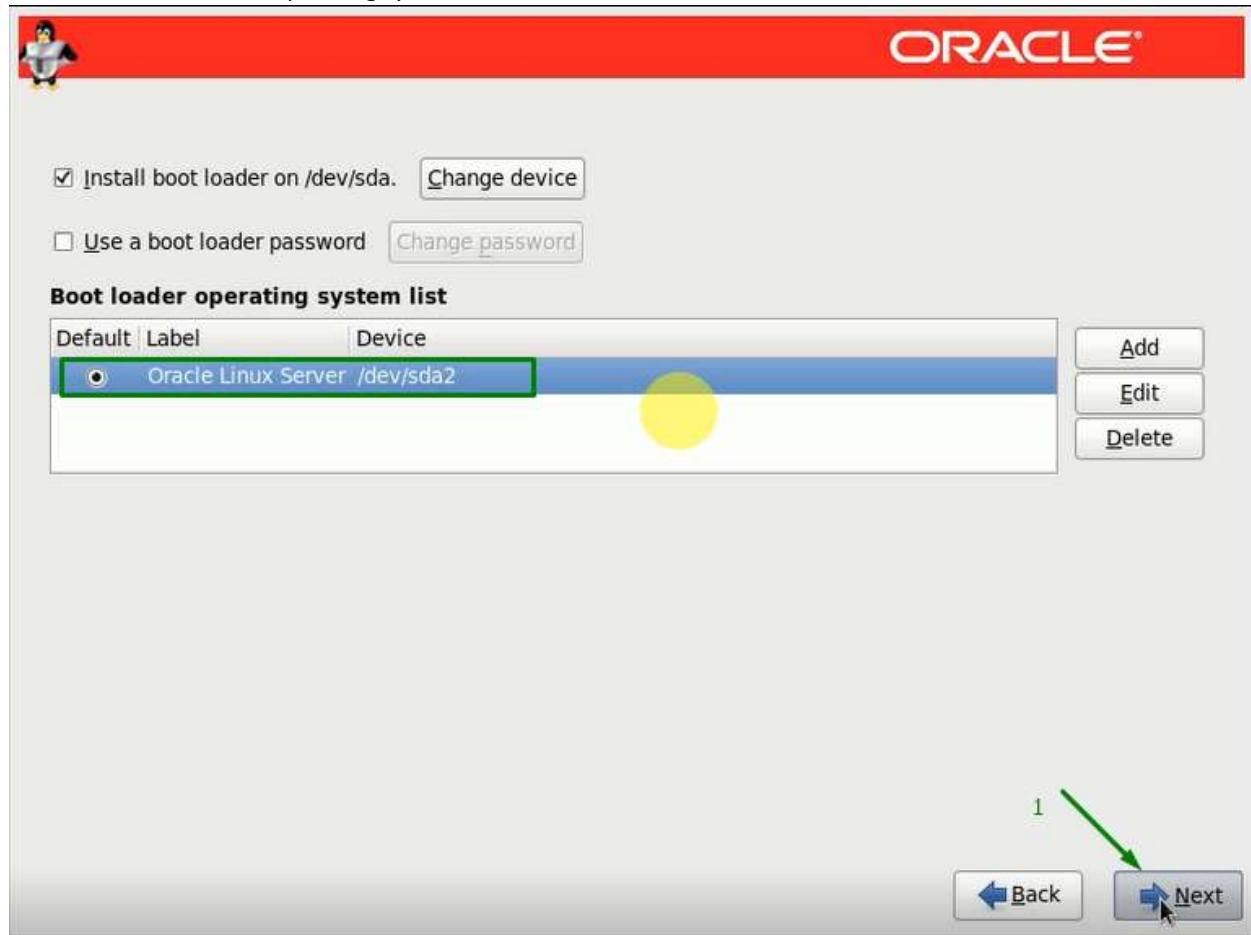
1.49. Proceed to erase our partitions, click on Format button.



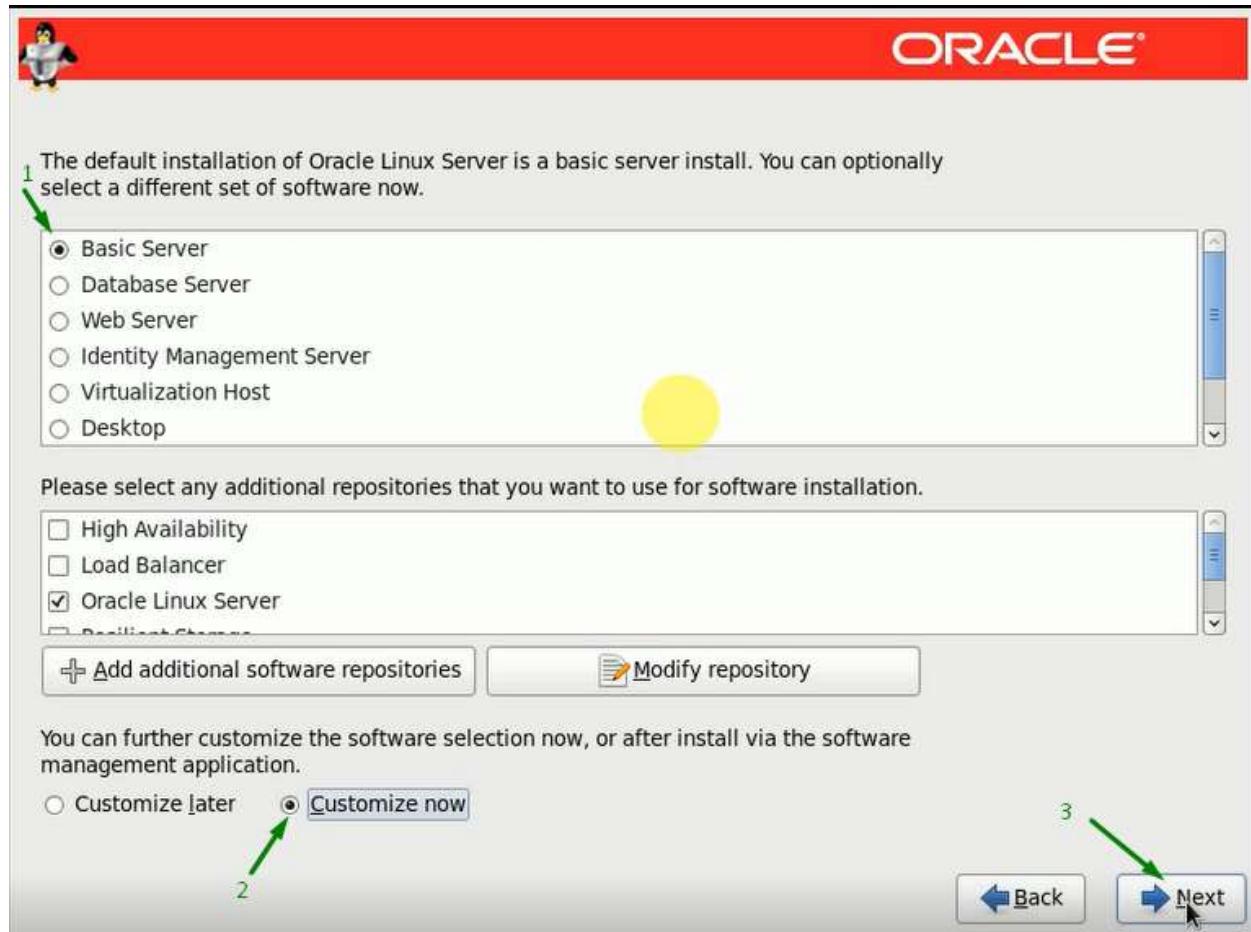
1.50. Click on Write changes to disk button.



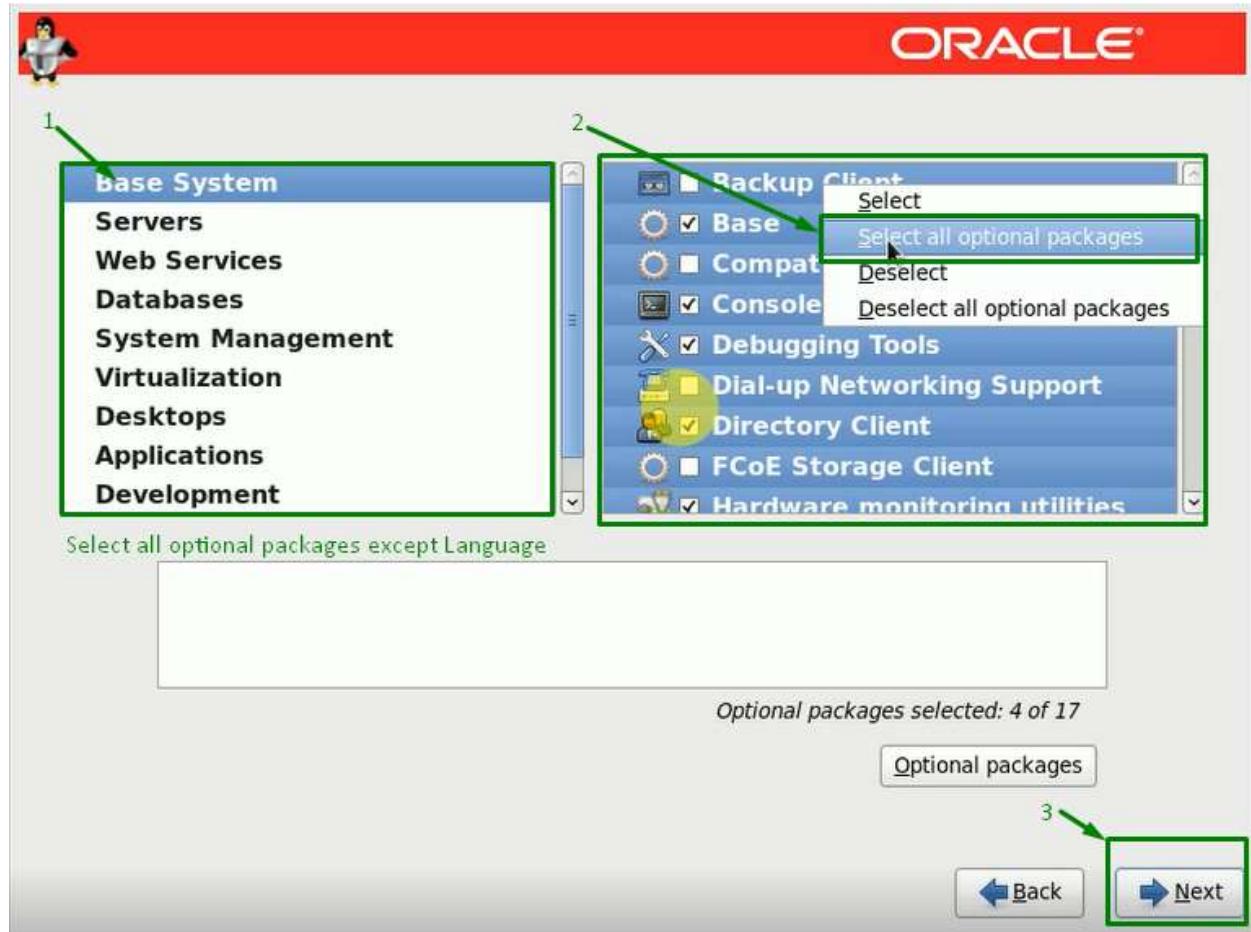
1.51. Select Boot loader operating system then Click on Next button.



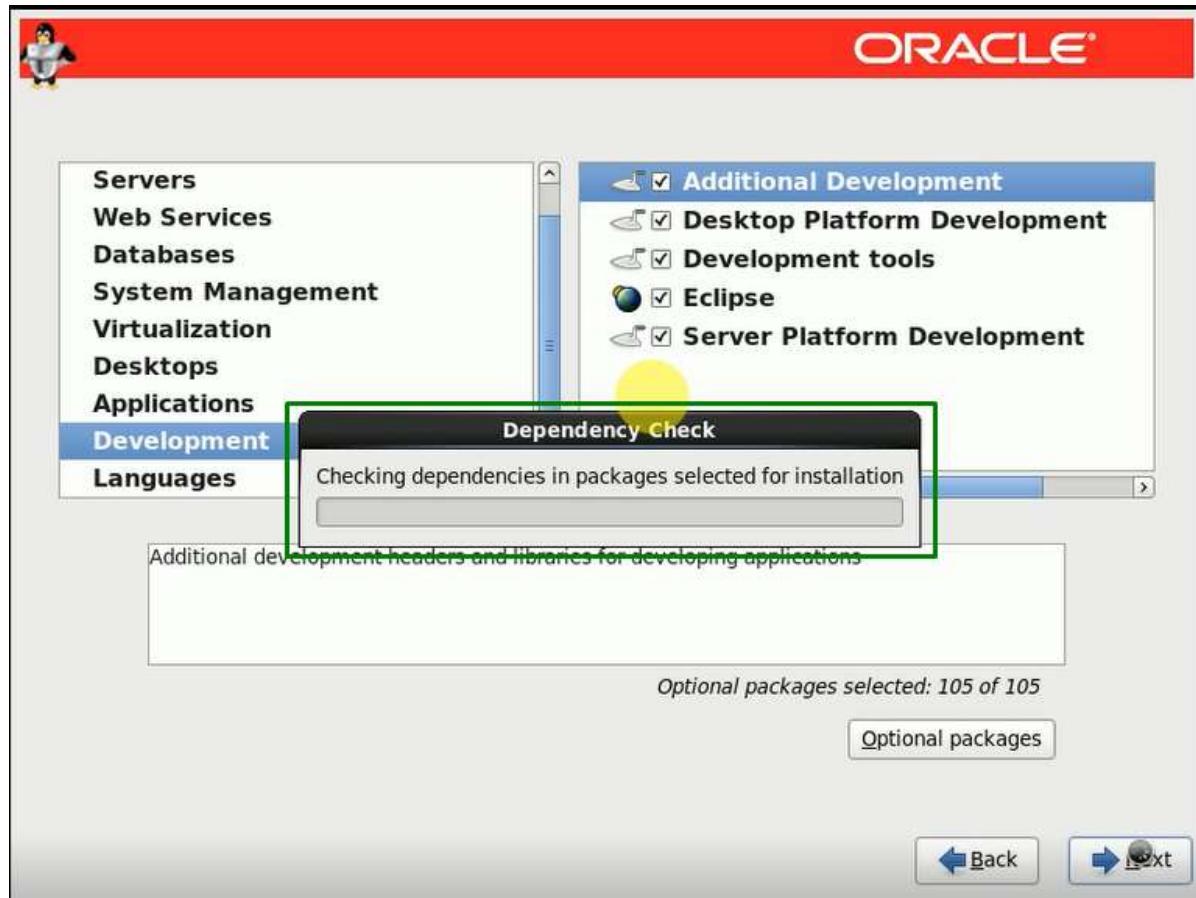
1.52. Choose Customize now option then Click on Next button.



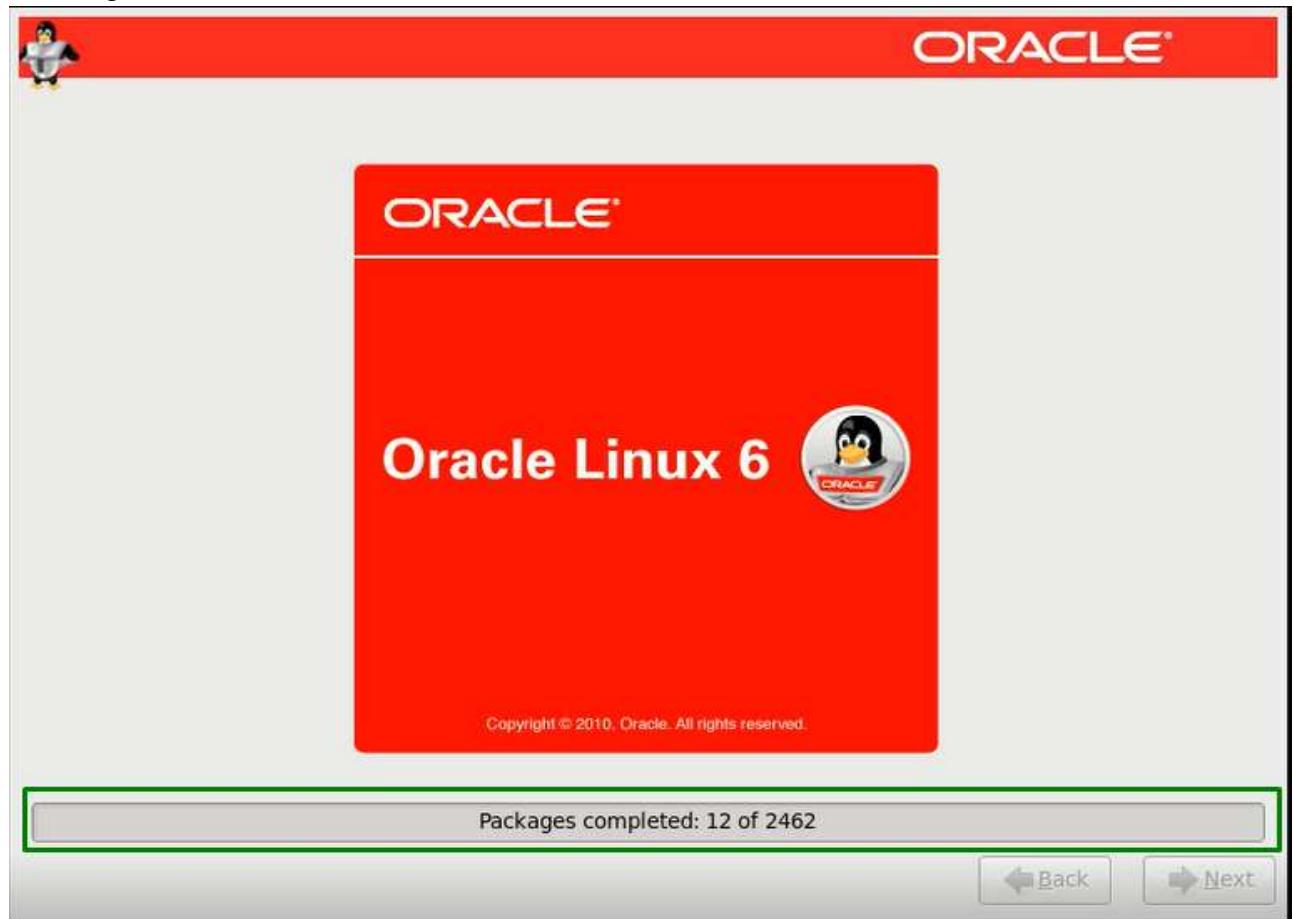
1.53. Choose all optional packages for relevant options except languages option then Click on Next button.



1.54. Progress looks like.



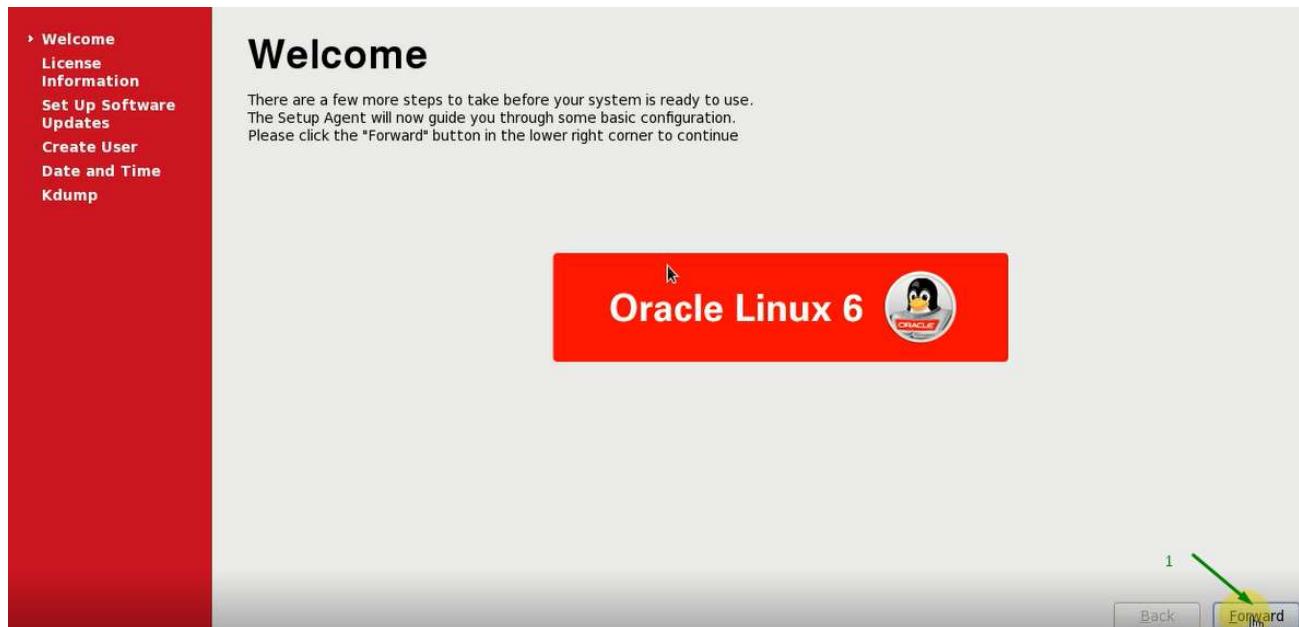
1.55. Progress looks like.



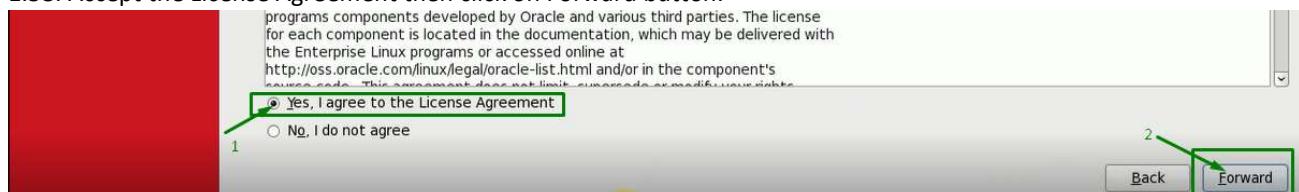
1.56. Click on Reboot button.



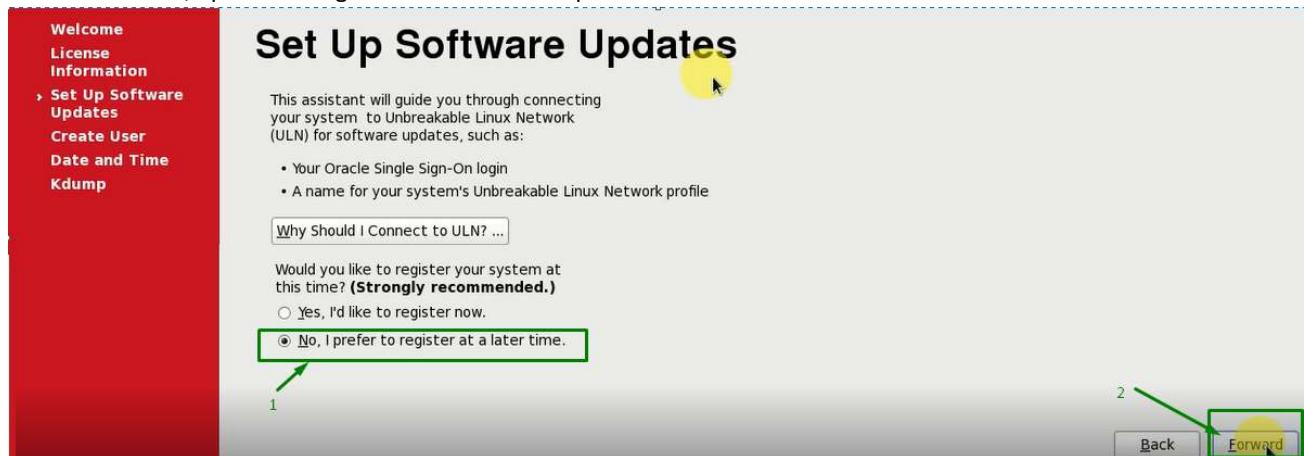
1.57. Click on Forward button.



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



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



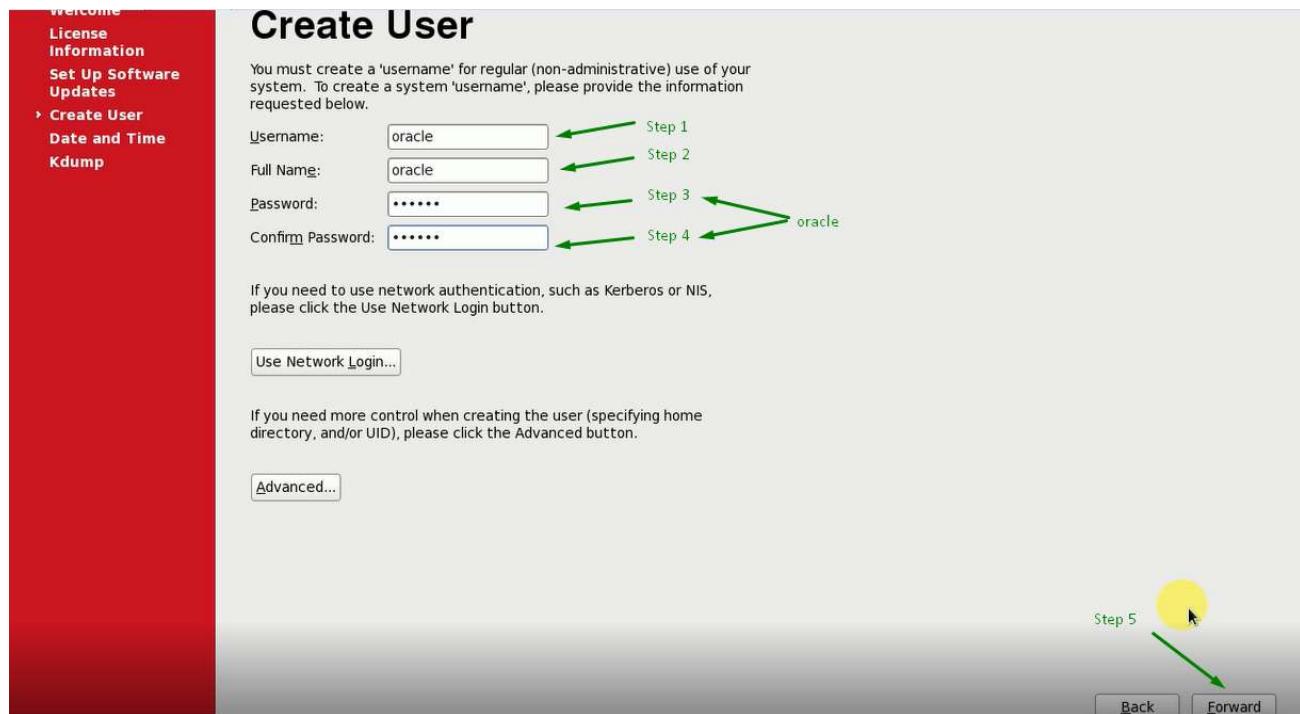
1.60. Click on No thanks, I'll connect later button.



1.61. Click on Forward button.



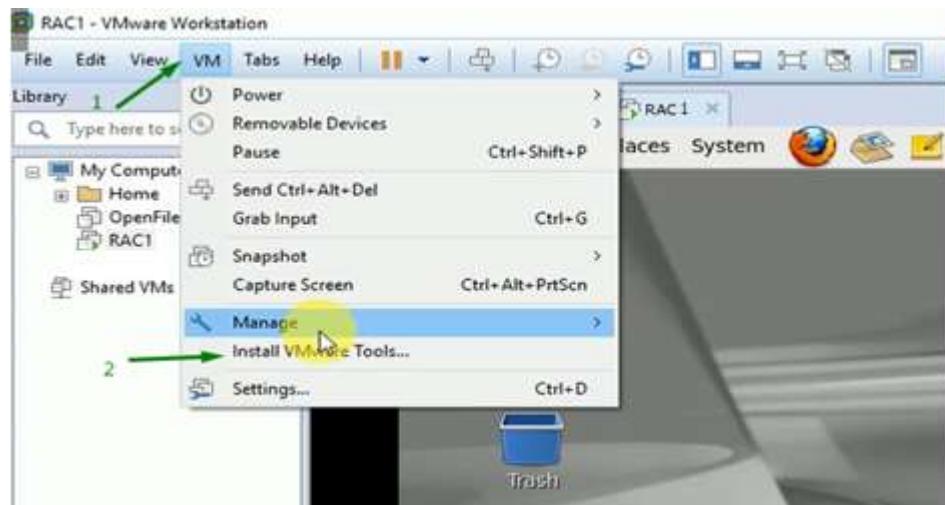
1.62. Create a user named as "oracle" then Click on Forward button.



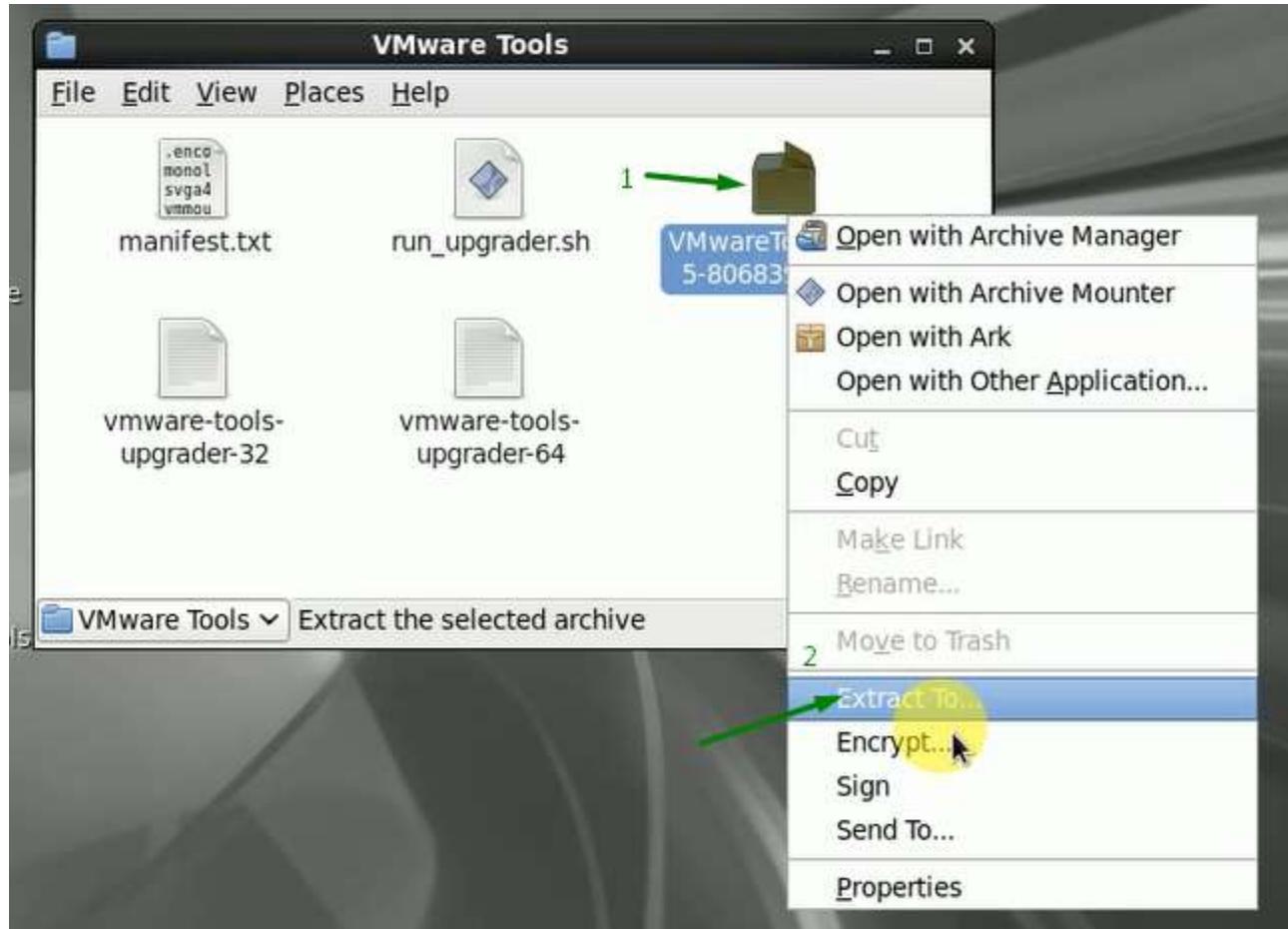
1.63. Login as "root" user with previously password then click on Log In button.



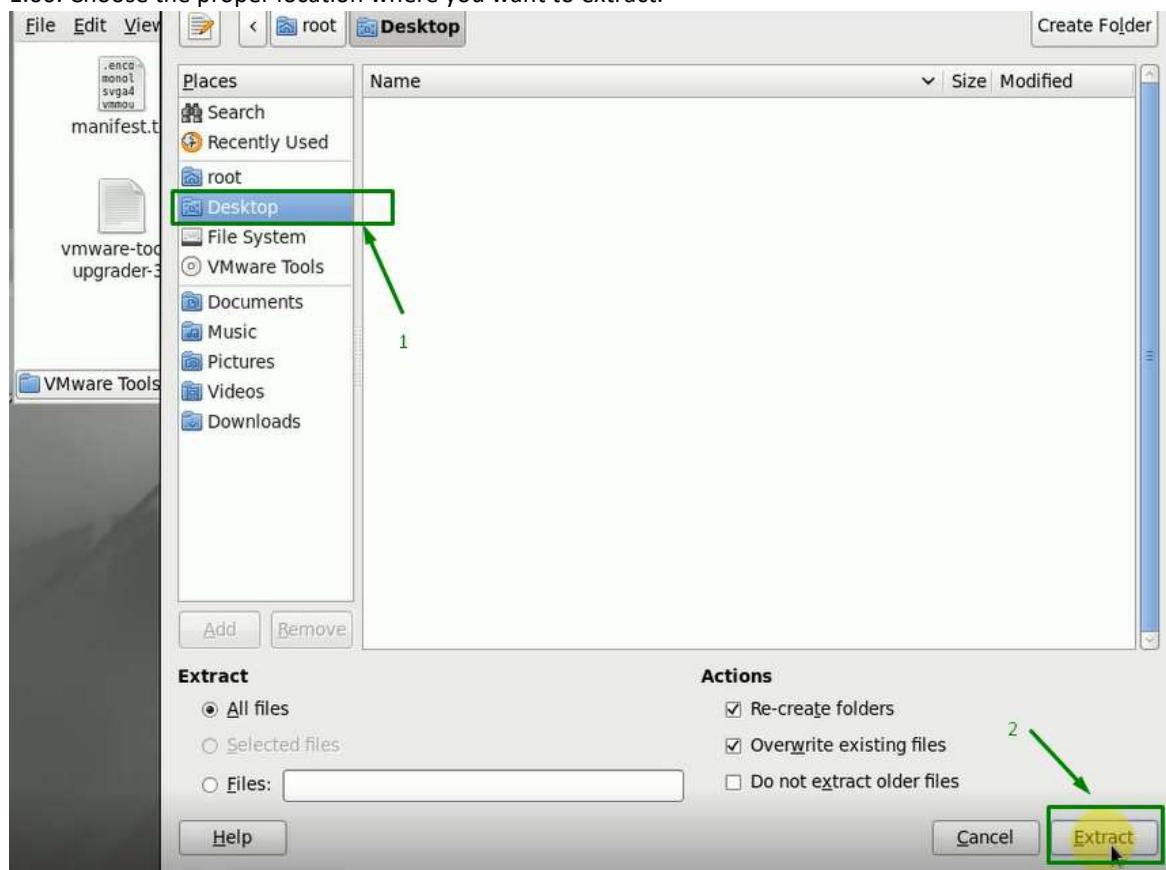
1.64. Go to VM menu then click on "Install VMware Tools".



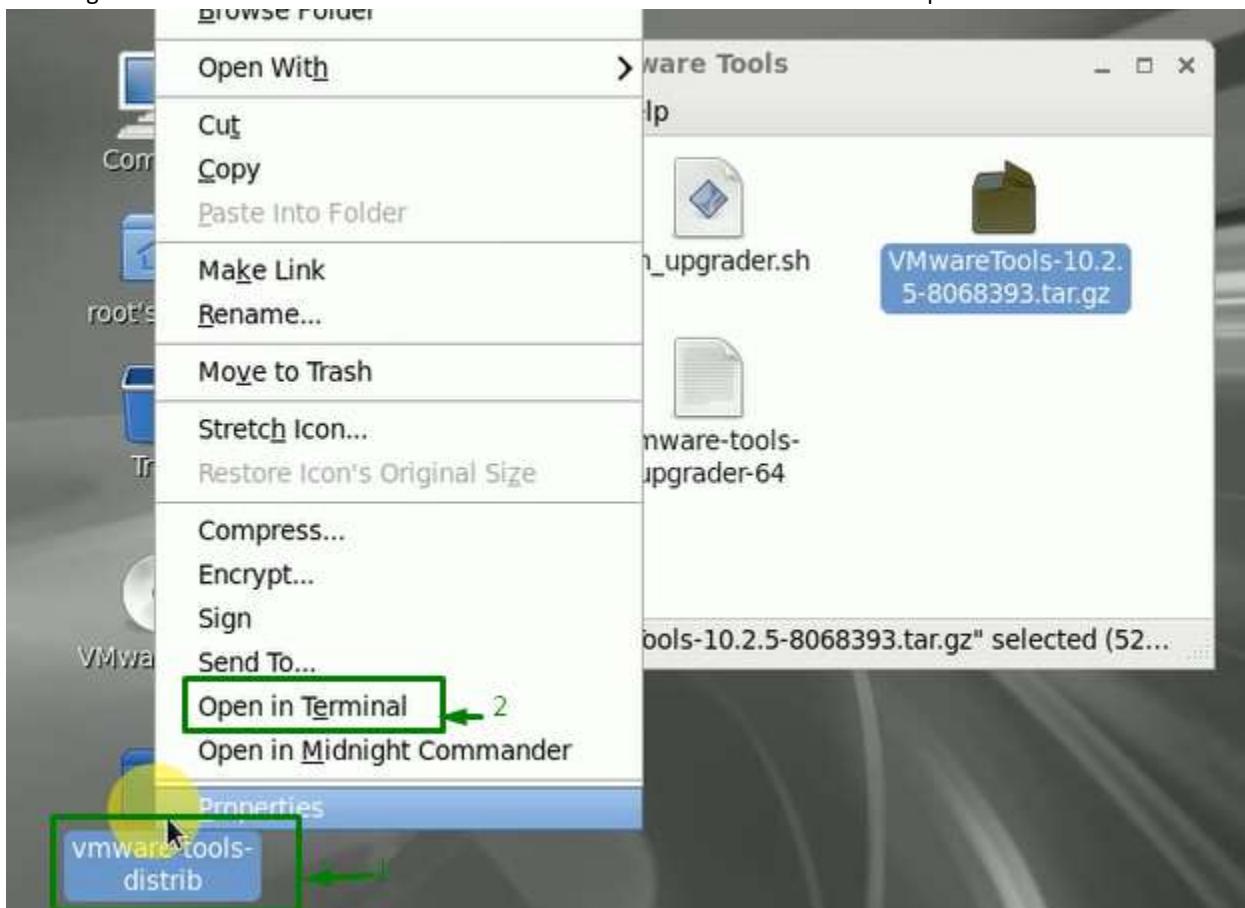
1.65. After step “1.64” there is a terminal with “VMwareTools-10.2.5-8068393.tar.gz” directory appeared then right click on directory and click on “Extract To”.



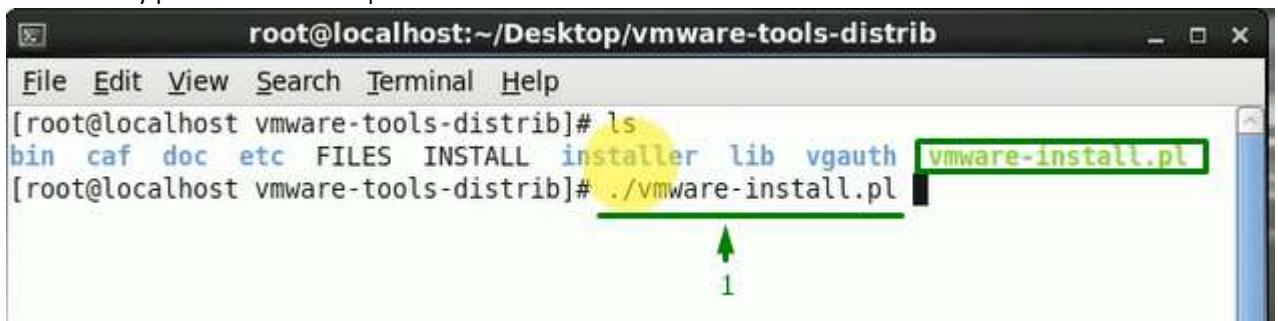
1.66. Choose the proper location where you want to extract.



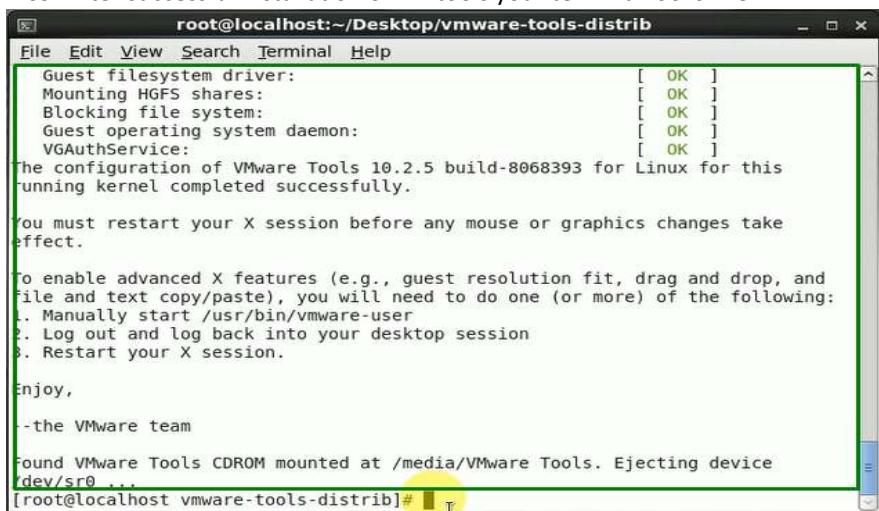
1.67. Right Click on extracted folder named as "vmwaretools-distrib" then click on "Open in Terminal"



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



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



1.70. 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 ]
VGAuthService: [ OK ]
The configuration of VMware Tools 10.2.5 build-8068393 for Linux for this
running kernel completed successfully.

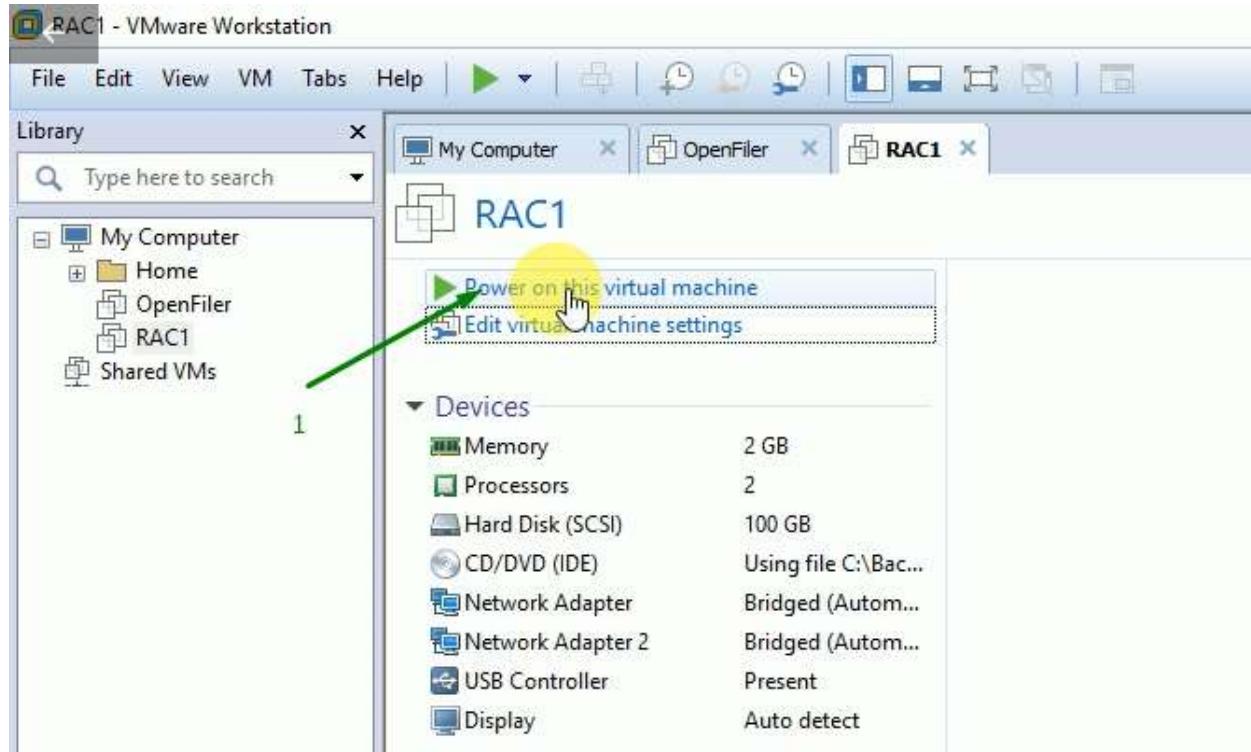
You must restart your X session before any mouse or graphics changes take
effect.

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:
1. Manually start /usr/bin/vmware-user
2. Log out and log back into your desktop session
3. Restart your X session.

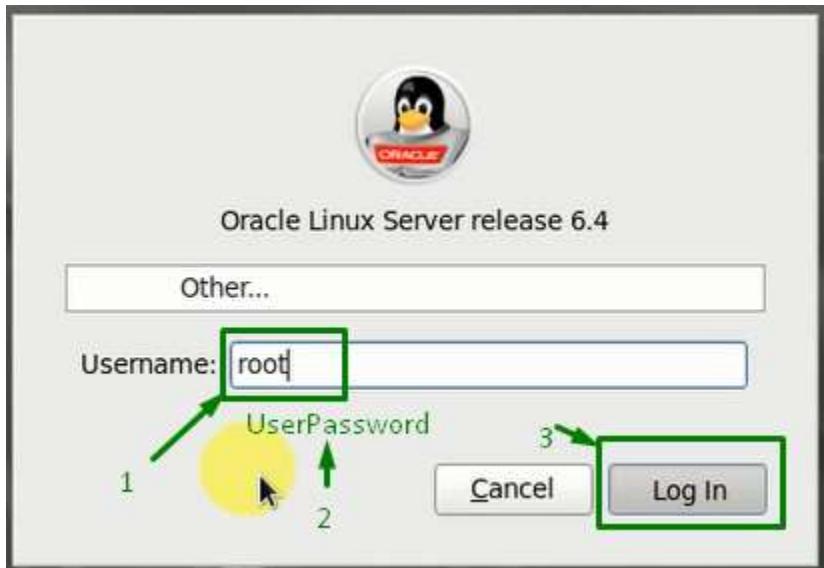
Enjoy,
--the VMware team

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

1.71. Power on your machine.



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



1.73. Your machine drives looks like

```
[root@localhost Desktop]# cd
[root@localhost ~]# hostname
localhost.localdomain
[root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda2        15G  701M   14G  5% /
tmpfs           1004M 100K 1004M  1% /dev/shm
/dev/sda1       9.7G 196M  9.0G  3% /boot
/dev/sda8       9.7G 151M  9.0G  2% /home
/dev/sda9       9.7G 160M  9.0G  2% /tmp
/dev/sda3       23G 172M   22G  1% /u01
/dev/sda5       13G  7.8G  4.2G  66% /usr
/dev/sda6       11G 408M  9.7G  4% /var
:host:/         82G  53G   30G  65% /mnt/hgfs
/dev/sr0        3.5G  3.5G     0 100% /media/OL6.4_x86_64_Disc_1_20130225
[root@localhost ~]#
```

1.74. The "/etc/hosts" file must contain the following information.

```
[root@localhost ~]# vi /etc/hosts
/*
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 ..... localhost localhost.localdomain localhost6 localhost6.localdomain6

# Public
192.168.129.105 rac1.mydomain ..... rac1
192.168.129.106 rac2.mydomain ..... rac2

# Private
192.168.1.102 rac1-priv.mydomain ..... rac1-priv
192.168.1.103 rac2-priv.mydomain ..... rac2-priv

# Virtual
192.168.129.107 rac1-vip.mydomain ..... rac1-vip
192.168.129.108 rac2-vip.mydomain ..... rac2-vip

# Openfiler (SAN/NAS Storage)
192.168.129.104 openfiler.mydomain ..... openfiler

# SCAN
192.168.129.109 rac-scan.mydomain ..... rac-scan
192.168.129.110 rac-scan.mydomain ..... rac-scan
*/
```

1.75. Disable secure Linux by editing the "/etc/selinux/config" file, making sure the SELINUX flag is set as follows.

```
[root@localhost ~]# vim /etc/selinux/config
/*
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#       enforcing -- SELinux security policy is enforced.
#       permissive -- SELinux prints warnings instead of enforcing.
#       disabled -- No SELinux policy is loaded.
#SELINUX=enforcing
SELINUX=disabled
# SELINUXTYPE= can take one of these two values:
#       targeted -- Targeted processes are protected,
#       mls -- Multi Level Security protection.
SELINUXTYPE=targeted
*/
```

1.76. The "/etc/sysconfig/network-scripts/ifcfg-eth0" file must contain the following information.

```
[root@localhost ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth0
]*/
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=static
IPADDR=192.168.129.105
NETMASK=255.255.255.0
GATEWAY=192.168.129.6
DNS1=192.168.129.16
DNS2=192.168.129.2
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
*/
```

1.77. The "/etc/sysconfig/network-scripts/ifcfg-eth1" file must contain the following information.

```
[root@localhost ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth1
]*/
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=static
IPADDR=192.168.1.102
NETMASK=255.255.255.0
GATEWAY=192.168.129.6
DNS1=192.168.129.16
DNS2=192.168.129.2
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
*/
```

1.78. Restart the network services

```
[root@localhost ~]# service network restart

Shutting down interface eth0: Device state: 3 (disconnected) [ OK ]
Shutting down interface eth1: Device state: 3 (disconnected) [ OK ]
Shutting down loopback interface: [ OK ]
Bringing up loopback interface: [ OK ]
Bringing up interface eth0: Active connection state: activated
Active connection path: /org/freedesktop/NetworkManager/ActiveConnection/2 [ OK ]
Bringing up interface eth1: Active connection state: activated
Active connection path: /org/freedesktop/NetworkManager/ActiveConnection/3 [ OK ]
[root@localhost ~]#
```

1.79. Disabling the firewall.

```
[root@localhost ~]# chkconfig --list iptables
/*
iptables 0:off 1:off 2:on 3:on 4:on 5:on 6:off
*/
[root@localhost ~]# service iptables stop
/*
iptables: Setting chains to policy ACCEPT: nat mangle filter[...OK...]
iptables: Flushing firewall rules: [...OK...]
iptables: Unloading modules: [...OK...]
*/
[root@localhost ~]# chkconfig iptables off
[root@localhost ~]# iptables -F
[root@localhost ~]# service iptables save
/*
iptables: Saving firewall rules to /etc/sysconfig/iptables:[...OK...]
*/
[root@localhost ~]# /etc/init.d/iptables stop
/*
iptables: Setting chains to policy ACCEPT: filter [...OK...]
iptables: Flushing firewall rules: [...OK...]
iptables: Unloading modules: [...OK...]
*/
[root@localhost ~]# chkconfig --list iptables
/*
iptables 0:off 1:off 2:off 3:off 4:off 5:off 6:off
*/
```

1.80. ntpd disable services and reboot the machine

```
[root@localhost ~]# service ntpd stop
/*
Shutting down ntpd: [...] [FAILED]
*/
[root@localhost ~]# service ntpd status
/*
ntpd is stopped
*/
[root@localhost ~]# chkconfig ntpd off
[root@localhost ~]# mv /etc/ntp.conf /etc/ntp.conf.backup
[root@localhost ~]# rm /etc/ntp.conf
[root@localhost ~]# rm /var/run/ntp.pid
[root@localhost ~]# init 6
```

1.81. Perform either the Automatic Setup or the Manual Setup to complete the basic prerequisites.

```
[root@rac1 ~]# cd /media/OL6.4\x86_64\Disc\1\20130225/Server/Packages/
[root@rac1 Packages]# yum install oracle-rdbms-server-11gR2-preinstall
[root@rac1 Packages]# yum update
```

1.82. Manual setup the relevant RPMS

```
[root@rac1 Packages]# rpm -iUvh binutils-2*x86_64*
[root@rac1 Packages]# rpm -iUvh glibc-2*x86_64* nss-softokn-freebl-3*x86_64*
[root@rac1 Packages]# rpm -iUvh glibc-2*i686* nss-softokn-freebl-3*i686*
[root@rac1 Packages]# rpm -iUvh compat-libstdc++-33*x86_64*
[root@rac1 Packages]# rpm -iUvh glibc-common-2*x86_64*
[root@rac1 Packages]# rpm -iUvh glibc-devel-2*x86_64*
[root@rac1 Packages]# rpm -iUvh glibc-devel-2*i686*
[root@rac1 Packages]# rpm -iUvh glibc-headers-2*x86_64*
[root@rac1 Packages]# rpm -iUvh elfutils-libelf-0*x86_64*
[root@rac1 Packages]# rpm -iUvh elfutils-libelf-devel-0*x86_64*
[root@rac1 Packages]# rpm -iUvh gcc-4*x86_64*
[root@rac1 Packages]# rpm -iUvh gcc-c++-4*x86_64*
[root@rac1 Packages]# rpm -iUvh ksh-*x86_64*
[root@rac1 Packages]# rpm -iUvh libaio-0*x86_64*
[root@rac1 Packages]# rpm -iUvh libaio-devel-0*x86_64*
[root@rac1 Packages]# rpm -iUvh libaio-0*i686*
[root@rac1 Packages]# rpm -iUvh libaio-devel-0*i686*
[root@rac1 Packages]# rpm -iUvh libgcc-4*x86_64*
[root@rac1 Packages]# rpm -iUvh libgcc-4*i686*
[root@rac1 Packages]# rpm -iUvh libstdc++-4*x86_64*
[root@rac1 Packages]# rpm -iUvh libstdc++-4*i686*
[root@rac1 Packages]# rpm -iUvh libstdc++-devel-4*x86_64*
[root@rac1 Packages]# rpm -iUvh make-3.81*x86_64*
[root@rac1 Packages]# rpm -iUvh numactl-devel-2*x86_64*
[root@rac1 Packages]# rpm -iUvh sysstat-9*x86_64*
[root@rac1 Packages]# rpm -iUvh compat-libstdc++-33*i686*
[root@rac1 Packages]# rpm -iUvh compat-libcap*
[root@rac1 Packages]# rpm -iUvh libaio-devel-0.*
[root@rac1 Packages]# rpm -iUvh ksh-2*
[root@rac1 Packages]# rpm -iUvh libstdc++-4.*.i686*
[root@rac1 Packages]# rpm -iUvh elfutils-libelf-0*i686* elfutils-libelf-devel-0*i686*
[root@rac1 Packages]# rpm -iUvh libtool-ltdl*i686*
[root@rac1 Packages]# rpm -iUvh ncurses*i686*
[root@rac1 Packages]# rpm -iUvh readline*i686*
[root@rac1 Packages]# rpm -iUvh unixODBC*
[root@rac1 Packages]# rpm -Uvh oracleasm*.rpm
rpm -q binutils compat-libstdc++-33 elfutils-libelf elfutils-libelf-devel elfutils-libelf-devel-static \
rpm -q gcc gcc-c++ glibc glibc-common glibc-devel glibc-headers kernel-headers ksh libaio libaio-devel \
rpm -q libgcc libgomp libstdc++ libstdc++-devel make numactl-devel sysstat unixODBC unixODBC-devel
```

1.83. Pre-Installation Steps for ASM

```
[root@rac1 ~]# cd /etc/yum.repos.d
[root@rac1 yum.repos.d]# uname -a
/*
Linux rac1.mydomain 2.6.39-400.313.1.el6uek.x86_64 #1
SMP Thu Aug 8 15:49:52 PDT 2019 x86_64 x86_64 x86_64 GNU/Linux
*/
[root@rac1 yum.repos.d]# cat /etc/os-release
/*
NAME="Oracle Linux Server"
VERSION="6.10".
ID="ol".
VERSION_ID="6.10".
PRETTY_NAME="Oracle Linux Server 6.10"
ANSI_COLOR="0;31".
CPE_NAME="cpe:/o:oracle:linux:6:10:server"
HOME_URL="https://linux.oracle.com/" |
BUG_REPORT_URL="https://bugzilla.oracle.com/".

ORACLE_BUGZILLA_PRODUCT="Oracle Linux 6".
ORACLE_BUGZILLA_PRODUCT_VERSION=6.10.
ORACLE_SUPPORT_PRODUCT="Oracle Linux".
ORACLE_SUPPORT_PRODUCT_VERSION=6.10
*/
```

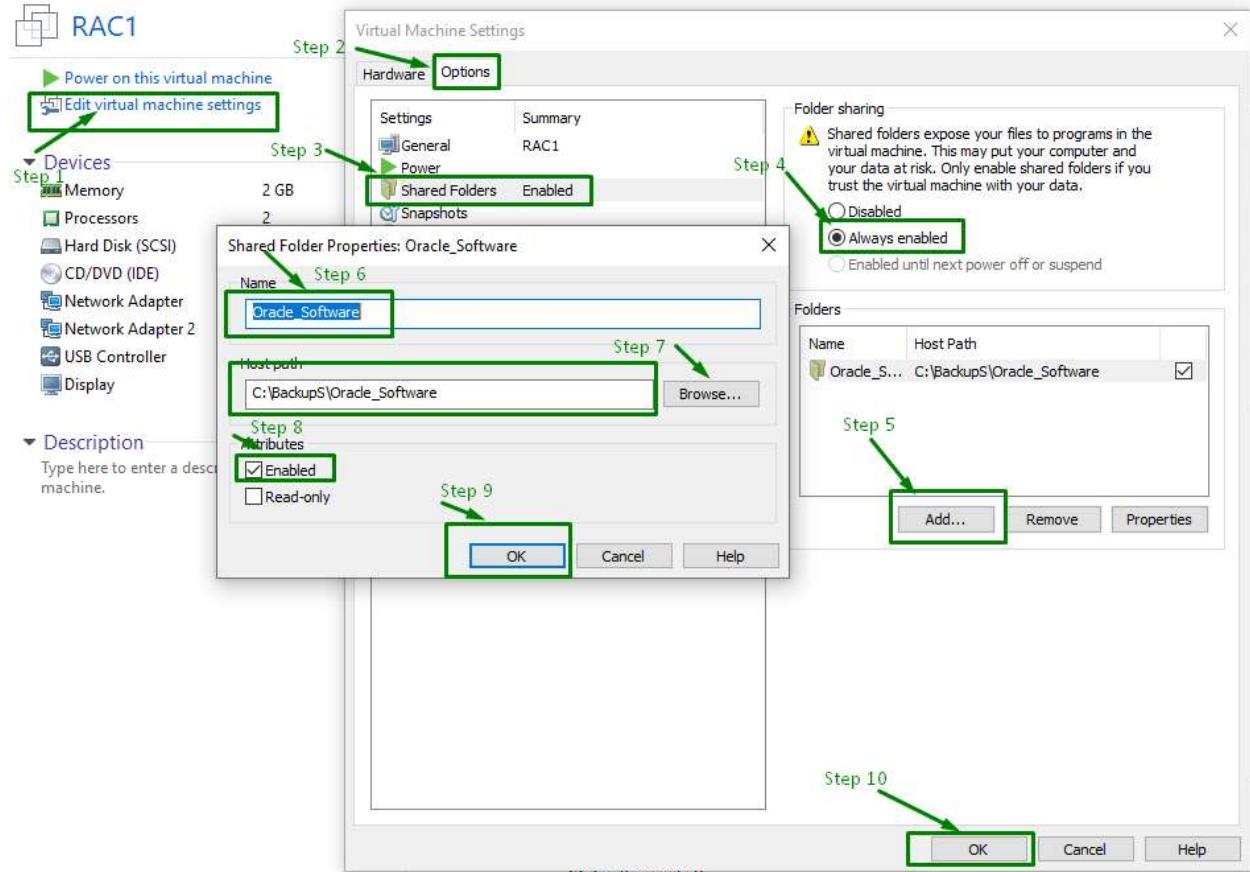
1.84. Creating an repo

```
[root@rac1 yum.repos.d]# wget https://public-yum.oracle.com/public-yum-ol6.repo
/*
--2019-09-02 13:50:54-- https://public-yum.oracle.com/public-yum-ol6.repo
Resolving public-yum.oracle.com... 104.84.157.171
Connecting to public-yum.oracle.com|104.84.157.171|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 12045 (12K) [text/plain]
Saving to: "public-yum-ol6.repo.2"

100% [=====] 12,045      --.-K/s   in 0s

2019-09-02 13:50:55 (95.3 MB/s) -- "public-yum-ol6.repo" saved [12045/12045]
*/
[root@rac1 yum.repos.d]# ls
/*
oracle-linux-ol6.repo.disabled  public-yum-ol6.repo  public-yum-ol6.repo.2
packagekit-media.repo           public-yum-ol6.repo.1  uek-ol6.repo.disabled
*/
[root@rac1/rac2 yum.repos.d]# yum install kmod-oracleasm
[root@rac1/rac2 yum.repos.d]# yum install oracleasm-support
/*
Loaded plugins: aliases, changelog, kabi, presto, refresh-packagekit, security,
tmpprepo, ulninfo, verify, versionlock
Loading support for kernel ABI
Setting up Install Process
Package oracleasm-support-2.1.11-2.el6.x86_64 already installed and latest version
Nothing to do
*/
```

1.85. Creating a Shared folder to install relevant rpms by ASM



1.86. To install relevant rpms by ASM

```
[root@rac1 ~]# cd /mnt/hgfs/Oracle_Software/OracleASM_Package/
[root@rac1 OracleASM_Package]# ls
/*
elfutils-libelf-devel-static-0.164-2.el6.x86_64.rpm
oracleasmlib-2.0.4-1.el6.x86_64.rpm
*/
[root@rac1 OracleASM_Package]# rpm -iUvh oracleasmlib-2.0.4-1.el6.x86_64.rpm
/*
Preparing.....#####
[100%]
...package oracleasmlib-2.0.4-1.el6.x86_64 is already installed
*/
[root@rac1 OracleASM_Package]# rpm -iUvh elfutils-libelf-devel-static-0.164-2.el6.x86_64.rpm
/*
Preparing.....#####
[100%]
...1:elfutils-libelf-devel-s##### [100%]
*/
[root@rac1 ~]# rpm -qa | grep -i oracleasm
/*
kmod-oracleasm-2.0.8-16.1.el6_10.x86_64
oracleasmlib-2.0.4-1.el6.x86_64
oracleasm-support-2.1.11-2.el6.x86_64
*/
```

1.87. Add the kernel parameters file "/etc/sysctl.conf" and add oracle recommended kernel parameters

```
[root@rac1 ~]# vim /etc/sysctl.conf
/*
net.ipv4.ip_forward=0
net.ipv4.conf.default.accept_source_route=0
kernel.sysrq=0
kernel.core_uses_pid=1
net.ipv4.tcp_syncookies=1
net.bridge.bridge-nf-call-ip6tables=0
net.bridge.bridge-nf-call-iptables=0
net.bridge.bridge-nf-call-arptables=0
kernel.msgmnb=65536
kernel.msgmax=65536
fs.file-max=6815744
kernel.sem=250 32000 100 128
kernel.shmmni=65536
kernel.shmall=1073741824
kernel.shmmax=4398046511104
kernel.panic_on_oops=1
net.core.rmem_default=262144
net.core.rmem_max=4194304
net.core.wmem_default=262144
net.core.wmem_max=1048576
net.ipv4.conf.all.rp_filter=2
net.ipv4.conf.default.rp_filter=2
fs.aio-max-nr=1048576
net.ipv4.ip_local_port_range=9000 65500
*/
[root@rac1 ~]# /sbin/sysctl -p
```

1.88. Edit "/etc/security/limits.conf" file to limit user processes

```
[root@rac1 ~]# vim /etc/security/limits.conf
/*
oracle    soft   nofile  65536
oracle    hard   nofile  65536
oracle    soft   nproc   16384
oracle    hard   nproc   16384
oracle    soft   stack   10240
oracle    hard   stack   32768
oracle    hard   memlock 134217728
oracle    soft   memlock 134217728

grid     soft   nproc   16384
grid     hard   nproc   16384
grid     soft   nofile  65536
grid     hard   nofile  65536
grid     soft   stack   10240
grid     soft   memlock 134217728
grid     hard   memlock 134217728
*/
```

1.89. Add the following line to the "/etc/pam.d/login" file, if it does not already exist.

```
[root@rac1 ~]# vim /etc/pam.d/login
/*
 #%PAM-1.0
auth [user_unknown=ignore success=ok ignore=ignore default=bad] pam_securetty.so
auth       include      system-auth
account    required    pam_nologin.so
account    include      system-auth
password   include      system-auth
# pam_selinux.so.close should be the first session rule
session   required    pam_selinux.so.close
session   required    pam_loginuid.so
session   optional    pam_console.so
# pam_selinux.so.open should only be followed by sessions to be executed in the user context
session   required    pam_selinux.so.open
session   required    pam_namespace.so
session   optional    pam_keyinit.so.force.revoke
session   include      system-auth
-session  optional    pam_ck_connector.so
session   required    pam_limits.so
*/
```

1.90. Create the new groups and users.

```
[root@rac1 ~]# cat /etc/group | grep -i oinstall
/*
oinstall:x:54321:
*/
[root@rac1 ~]# cat /etc/group | grep -i dba
/*
dba:x:54322:oracle
*/
[root@rac1 !]# cat /etc/group | grep -i asm
[root@rac1 ~]# /usr/sbin/groupadd -g 503 oper
[root@rac1 ~]# /usr/sbin/groupadd -g 504 asmadmin
[root@rac1 ~]# /usr/sbin/groupadd -g 506 asmdba
[root@rac1 ~]# /usr/sbin/groupadd -g 507 asmoper
[root@rac1 ~]# /usr/sbin/useradd -g oinstall -G asmadmin,asmdba,asmoper,grid
[root@rac1 ~]# /usr/sbin/usermod -g oinstall -G dba,oper,asmdba,oracle
```

1.91. Verify the groups and users.

```
[root@rac1 ~]# cat /etc/group | grep -i asm
/*
asmadmin:x:504:grid
asmdba:x:506:grid,oracle
asmoper:x:507:grid
*/
[root@rac1 ~]# cat /etc/group | grep -i oracle
/*
dba:x:54322:oracle
oper:x:503:oracle
asmdba:x:506:grid,oracle
*/
[root@rac1 ~]# cat /etc/group | grep -i grid
/*
asmadmin:x:504:grid
asmdba:x:506:grid,oracle
asmoper:x:507:grid
*/
```

1.92. Set the password for users.

```
[root@rac1 ~]# passwd oracle
/*
Changing password for user oracle.          oracle
New password: ←
BAD PASSWORD: it is based on a dictionary word
BAD PASSWORD: is too simple
Retype new password: ←
passwd: all authentication tokens updated successfully.
*/
[root@rac1 ~]# passwd grid
/*
Changing password for user grid.           grid
New password: ←
BAD PASSWORD: it is too short
BAD PASSWORD: is too simple
Retype new password: ←
passwd: all authentication tokens updated successfully.
*/
```

1.93. Create number of directory required to install grid and oracle

```
--1.Create.the.Oracle.Inventory.Director:  
[root@rac1.~]# mkdir -p /u01/app/oraInventory  
[root@rac1.~]# chown -R grid:oinstall /u01/app/oraInventory  
[root@rac1.~]# chmod -R 775 /u01/app/oraInventory  
  
--2.Creating.the.Oracle.Grid.Infrastructure.Home.Directory:  
[root@rac1.~]# mkdir -p /u01/11.2.0.3.0/grid  
[root@rac1.~]# chown -R grid:oinstall /u01/11.2.0.3.0/grid  
[root@rac1.~]# chmod -R 775 /u01/11.2.0.3.0/grid  
  
--3.Creating.the.Oracle.Base.Directory  
[root@rac1.~]# mkdir -p /u01/app/oracle  
[root@rac1.~]# mkdir /u01/app/oracle/cfgtoollogs  
[root@rac1.~]# chown -R oracle:oinstall /u01/app/oracle  
[root@rac1.~]# chmod -R 775 /u01/app/oracle  
[root@rac1.~]# chown -R grid:oinstall /u01/app/oracle/cfgtoollogs  
[root@rac1.~]# chmod -R 775 /u01/app/oracle/cfgtoollogs  
  
--4.Creating.the.Oracle.RDBMS.Home.Directory  
[root@rac1.~]# mkdir -p /u01/app/oracle/product/11.2.0.3.0/db_1  
[root@rac1.~]# chown -R oracle:oinstall /u01/app/oracle/product/11.2.0.3.0/db_1  
[root@rac1.~]# chmod -R 775 /u01/app/oracle/product/11.2.0.3.0/db_1  
[root@rac1.~]# cd /u01/app/oracle  
[root@rac1.oracle]# chown -R oracle:oinstall product/  
[root@rac1.oracle]# chmod -R 775 product/
```

1.94. Make the following changes to the default shell startup file, add the following lines to the /etc/profile file

```
[root@rac1.~]# vim /etc/profile  
/*  
if [ . $USER == "oracle" ]; then  
..... if [ . $SHELL == "/bin/ksh" ]; then  
..... ulimit -p 16384  
..... ulimit -n 65536  
..... else  
..... ulimit -u 16384 -n 65536  
..... fi  
fi  
  
if [ . $USER == "grid" ]; then  
..... if [ . $SHELL == "/bin/ksh" ]; then  
..... ulimit -p 16384  
..... ulimit -n 65536  
..... else  
..... ulimit -u 16384 -n 65536  
..... fi  
fi  
*/
```

1.95. For the C shell (csh or tcsh), add the following lines to the /etc/csh.login file

```
[root@rac1 ~]# vim /etc/csh.login
/*
if ( $USER == "oracle" ) then
..... limit maxproc 16384
..... limit descriptors 65536
endif

if ( $USER == "grid" ) then
..... limit maxproc 16384
..... limit descriptors 65536
endif
*/
```

1.96. Unzip the relevant setup files

```
[root@rac1 ~]# mkdir -p /home/grid/grid_software
[root@rac1 ~]# mkdir -p /home/oracle/oracle_software

--Unzip the files.
[root@rac1 oracle]# cd
[root@rac1 ~]# cd /mnt/hgfs/Oracle_Software/Oracle\ Db\ 11.2.0.3.0\ \ (64-bit\ -\ Linux\ )/
[root@rac1 Oracle_Db_11.2.0.3.0_(64-bit-Linux)]# ls
/*
p10404530_112030_Linux-x86-64_1of7.zip p10404530_112030_Linux-x86-64_3of7-Clusterware.zip
p10404530_112030_Linux-x86-64_2of7.zip software_patch
*/
# unzip p10404530_112030_Linux-x86-64_1of7.zip -d /home/oracle/oracle_software/
# unzip p10404530_112030_Linux-x86-64_2of7.zip -d /home/oracle/oracle_software/
# unzip p10404530_112030_Linux-x86-64_3of7-Clusterware.zip -d /home/grid/grid_software/

--Login as root user and issue the following command at rac1
[root@rac1 Oracle_Db_11.2.0.3.0_(64-bit-Linux)]# cd /home/grid/
[root@rac1 grid]# chown -R grid:oinstall /home/grid_software
[root@rac1 grid]# chmod -R 775 /home/grid/
[root@rac1 grid]# cd /home/oracle/
[root@rac1 oracle]# chown -R oracle:oinstall /home/oracle/
[root@rac1 oracle]# chmod -R 775 /home/oracle/
```

1.97. To Disable the virbr0 Linux services and then reboot the VM machine

```
[root@rac1 ~]# cd /etc/sysconfig/
[root@rac1 sysconfig]# brctl show
/*
bridge.name.....bridge.id.....STP.enabled....interfaces
lxcbr0.....8000.000000000000...no.....
pan0.....8000.000000000000...no.....
virbr0.....8000.525400467a72...yes.....virbr0-nic
*/
[root@rac1 sysconfig]# virsh net-list
/*
Name.....State.....Autostart.....Persistent
-----
default.....active....yes.....yes
*/
[root@rac1 sysconfig]# service libvirtd stop
/*
Stopping libvirtd daemon: .....[ OK ]
*/
[root@rac1 sysconfig]# chkconfig --list | grep libvirtd
/*
libvirtd.....0:off....1:off....2:off....3:on....4:on....5:on....6:off
*/
[root@rac1 sysconfig]# chkconfig libvirtd off
[root@rac1 sysconfig]# ip link set lxcbr0 down
[root@rac1 sysconfig]# brctl delbr lxcbr0
[root@rac1 sysconfig]# brctl show
[root@rac1 sysconfig]# init 6
```

1.98. To Verify the virbr0 Linux services

```
[root@rac1 ~]# brctl show
/*
bridge.name.....bridge.id.....STP.enabled....interfaces
lxcbr0.....8000.000000000000...no.....
pan0.....8000.000000000000...no.....
*/
[root@rac1 ~]# chkconfig --list | grep libvirtd
/*
libvirtd..0:off....1:off....2:off....3:off....4:off....5:off....6:off
*/

```

1.99. Login as the oracle user and add the following lines at the end of the ".bash_profile" file and reset the .bash_profiler setting into Linux kernel.

```
[root@rac1 ~]# su - oracle
[oracle@rac1 ~]$ vim .bash_profile
/*
# .bash_profile

#.Get.the.aliases.and.functions
if [-f ~/.bashrc ]; then
....|....~/.bashrc
fi

#.User.specfic.environment.and.startup.programs
#PATH=$PATH:$HOME/bin
#export PATH

#.Oracle.Settings
TMP=/tmp; export TMP
TMPDIR=$TMP; export TMPDIR

ORACLE_HOSTNAME=rac1.mydomain; export ORACLE_HOSTNAME
ORACLE_UNQNAME=racdb; export ORACLE_UNQNAME
ORACLE_BASE=/u01/app/oracle; export ORACLE_BASE
ORACLE_HOME=$ORACLE_BASE/product/11.2.0.3.0/db_1; export ORACLE_HOME
ORACLE_SID=racdb1; export ORACLE_SID

PATH=/usr/sbin:$PATH; export PATH
PATH=$ORACLE_HOME/bin:$PATH; export PATH

LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib; export LD_LIBRARY_PATH
CLASSPATH=$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib; export CLASSPATH
*/
[oracle@rac1 ~]$ . .bash_profile
```

1.100. Login as the grid user and add the following lines at the end of the ".bash_profile" file and reset the .bash_profiler setting into Linux kernel.

```
[root@rac1 ~]# su - grid
[grid@rac1 ~]$ vim .bash_profile
/*
# .bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
    . ~/.bashrc
fi

# User specific environment and startup programs
#PATH=$PATH:$HOME/bin
#export PATH

# Grid Settings
TMP=/tmp; export TMP
TMPDIR=$TMP; export TMPDIR

ORACLE_SID=+ASM1; export ORACLE_SID
ORACLE_BASE=/u01/app/oracle; export ORACLE_BASE
GRID_HOME=/u01/11.2.0.3.0/grid; export GRID_HOME
ORACLE_HOME=$GRID_HOME; export ORACLE_HOME

PATH=/usr/sbin:$PATH; export PATH
PATH=$ORACLE_HOME/bin:$PATH; export PATH

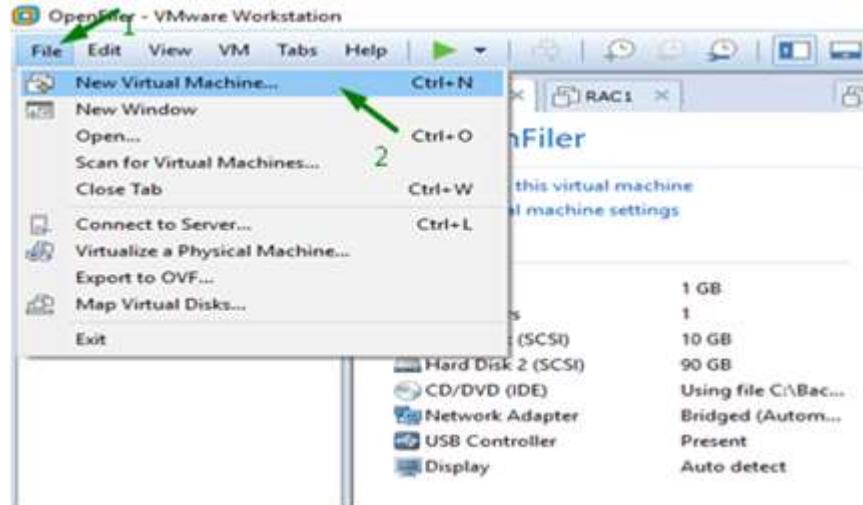
LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib; export LD_LIBRARY_PATH
CLASSPATH=$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib; export CLASSPATH
*/
[grid@rac1 ~]$ . .bash_profile
```

1.101. Edit the "/etc/sysconfig/network" file as

```
[root@rac1 ~]# vim /etc/sysconfig/network
/*
NETWORKING=yes
HOSTNAME=rac1.mydomain
# oracle-rdbms-server-11gR2-preinstall :: Add NOZEROCONF=yes
NOZEROCONF=yes
*/
```

2. OS Installation for RAC2 (VM 3) – For time saving you just crate new VM as Clone of VM 2 named RAC2 or Create a New VM as follows

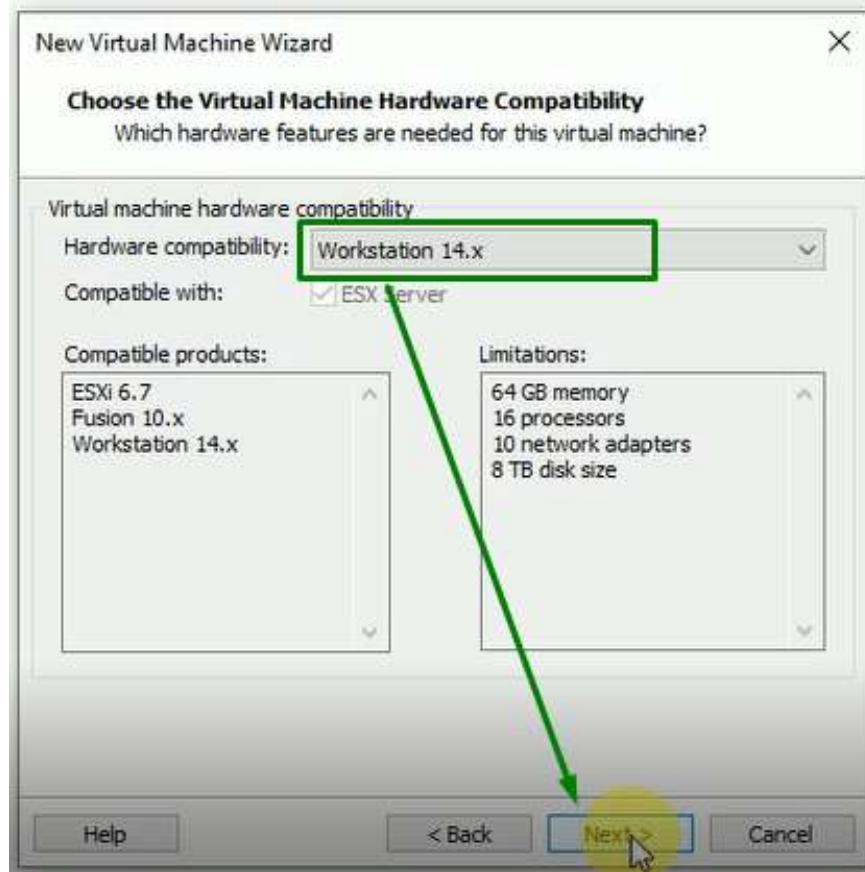
2.1. New Virtual machine setup



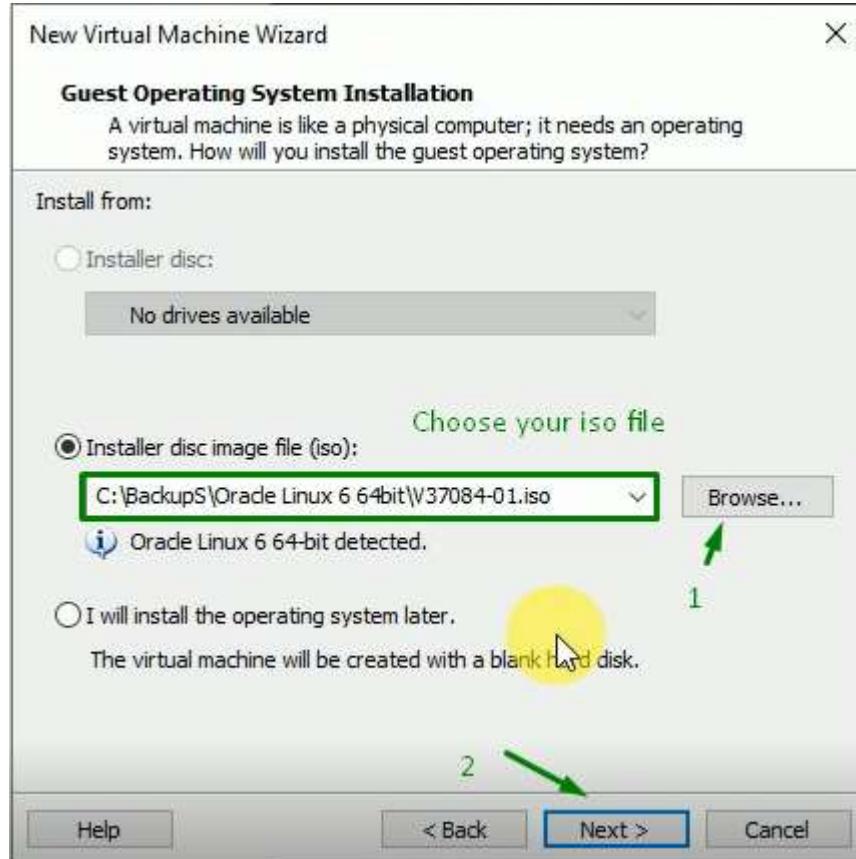
2.2. Choose Custom setting then click on Next button



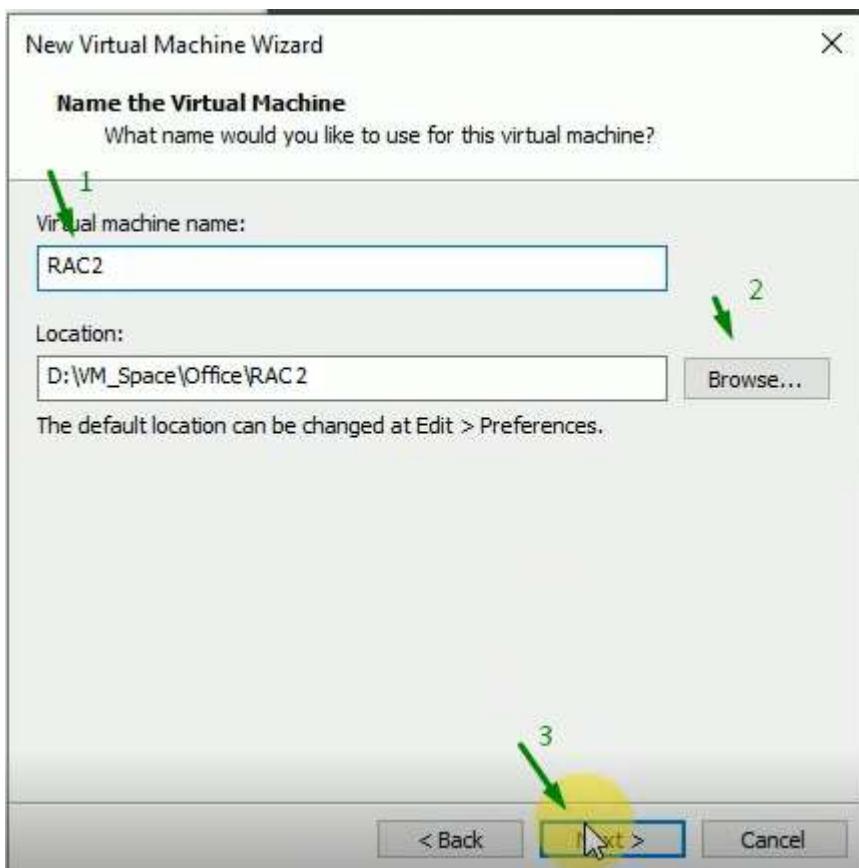
2.3. Choose Hardware default compatibility then click on Next button



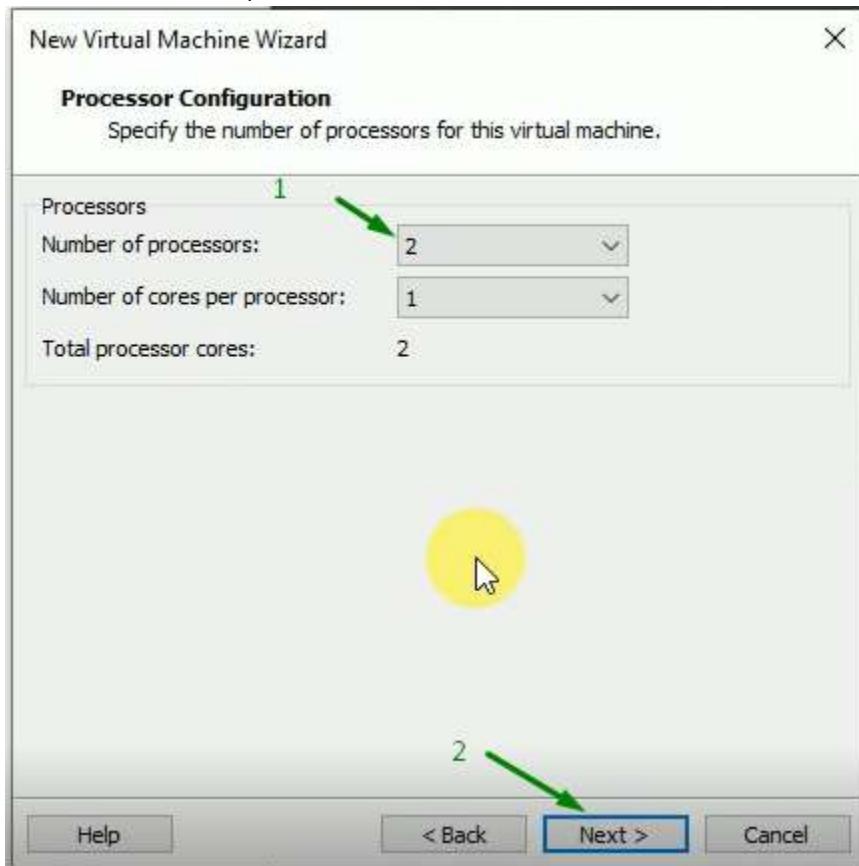
2.4. Choose Oracle Linux Server 6.10 iso file (V37084-01.iso) then click on Next button



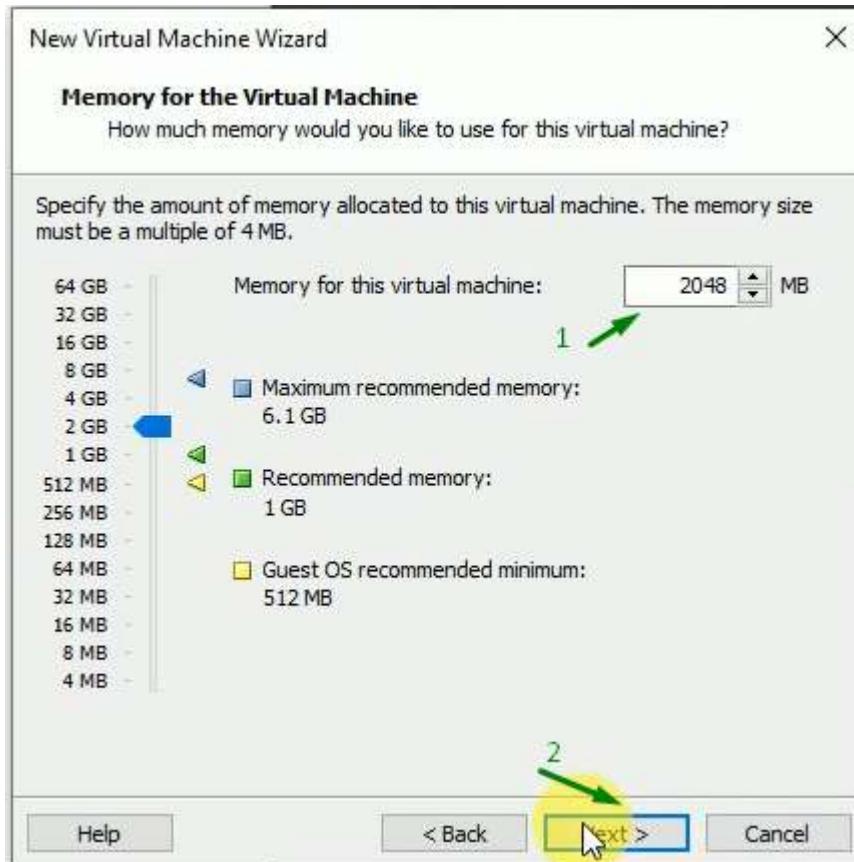
2.5. Put your machine named as RAC2 and provide a location where you want to store/create VM space then click on Next button



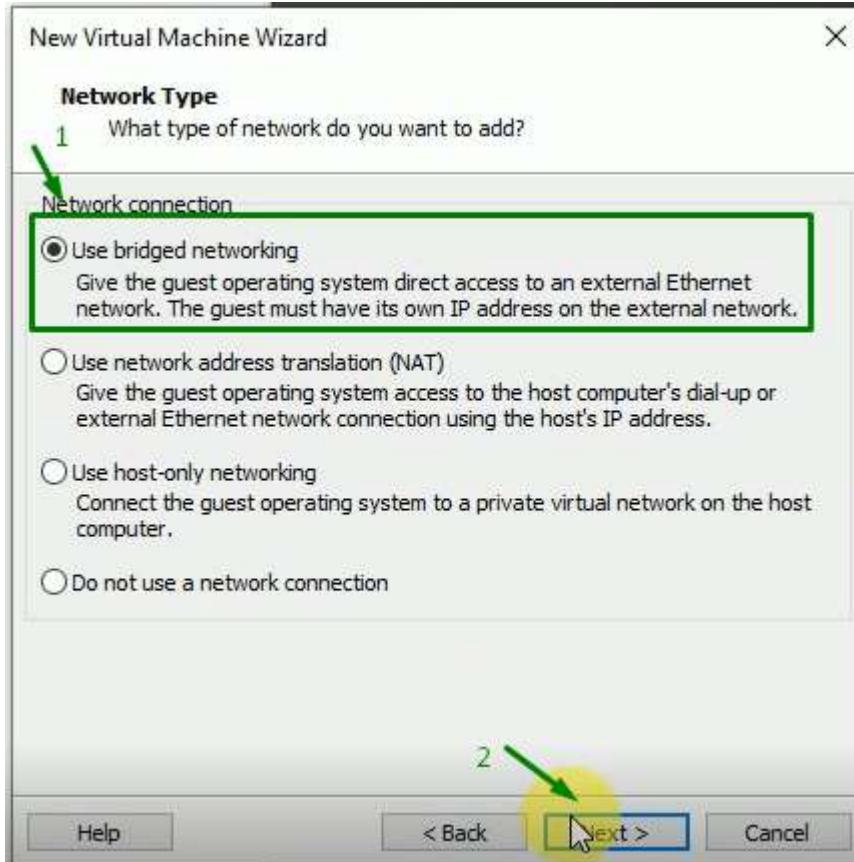
2.6. Select Number of processors then click on Next button



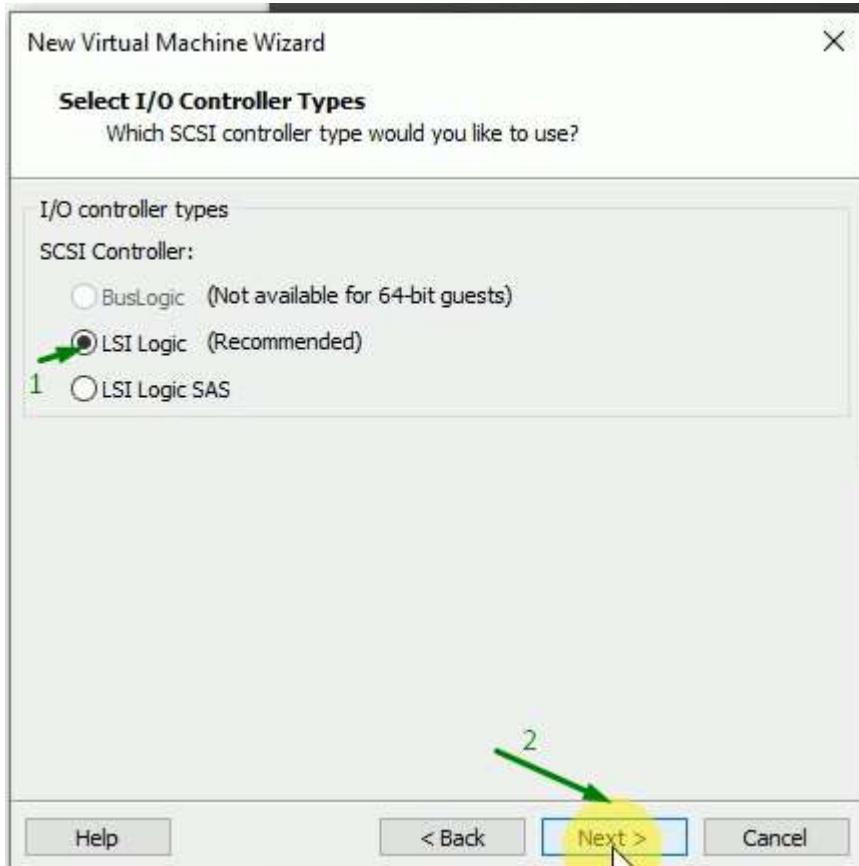
2.7. Put ram as 2GB then click on Next button.



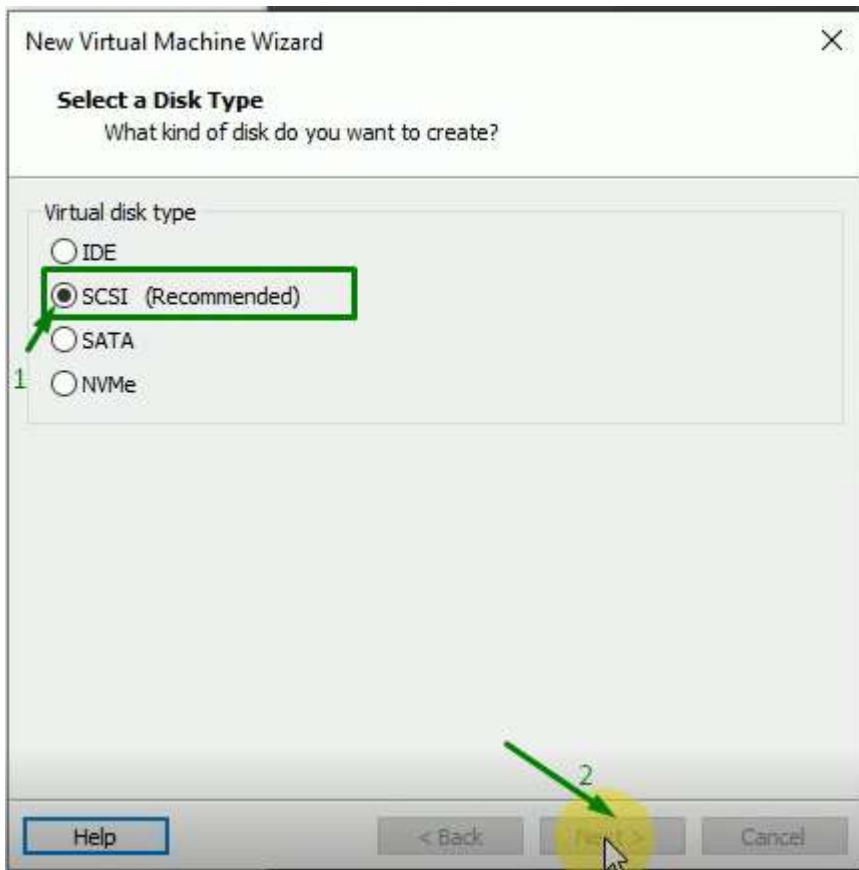
2.8. Select Network connection as bridge then click on Next button.



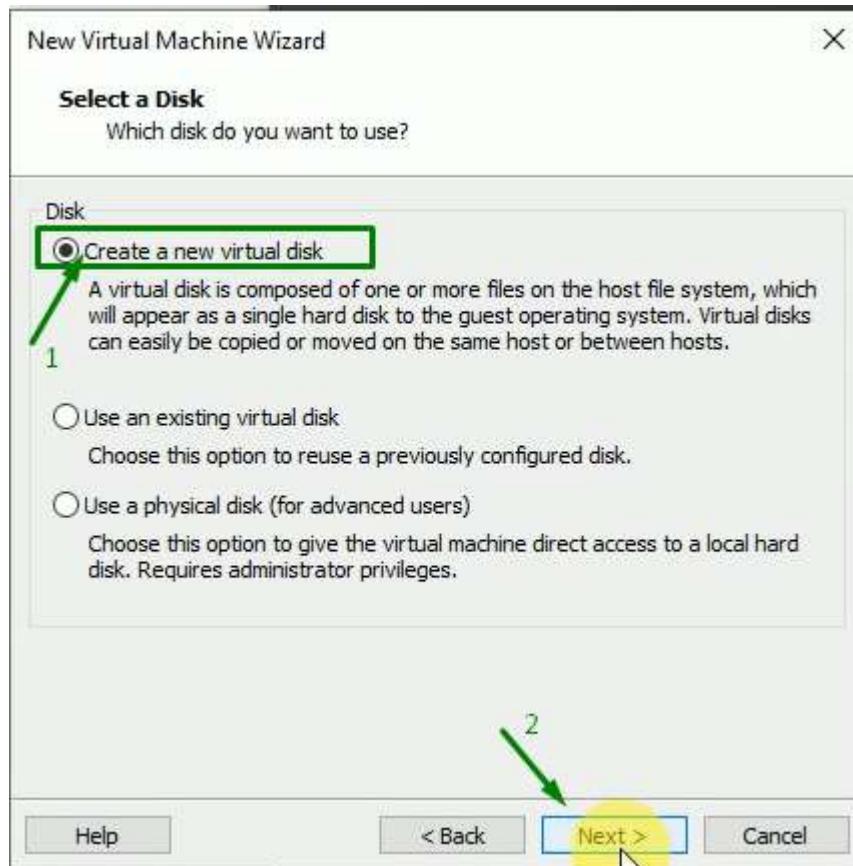
2.9. Select LSI Logic then click on Next button.



2.10. Select SCSI then click on Next button.



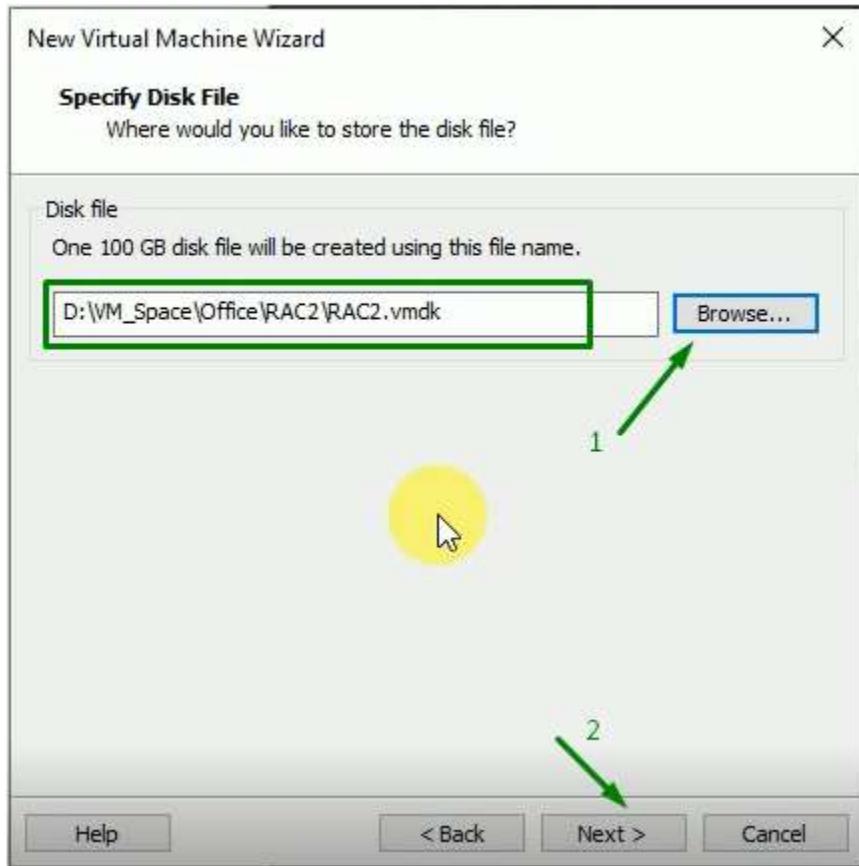
2.11. Select create a new virtual disk then click on Next button.



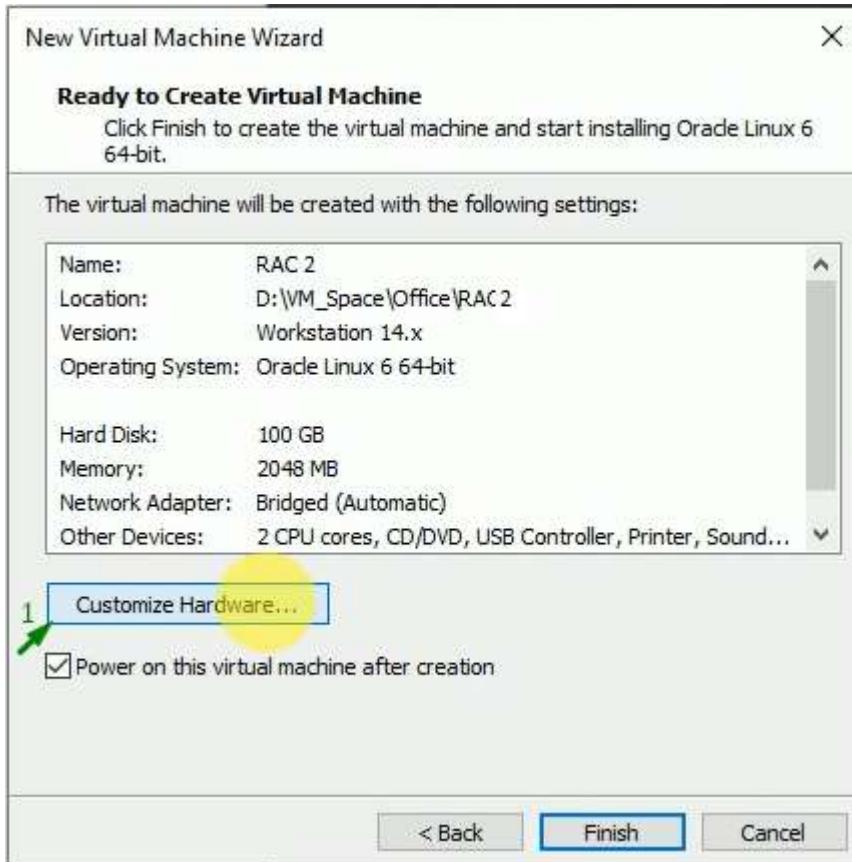
2.12. Put 11GB and select Store virtual disk as a single file then click on Next button.



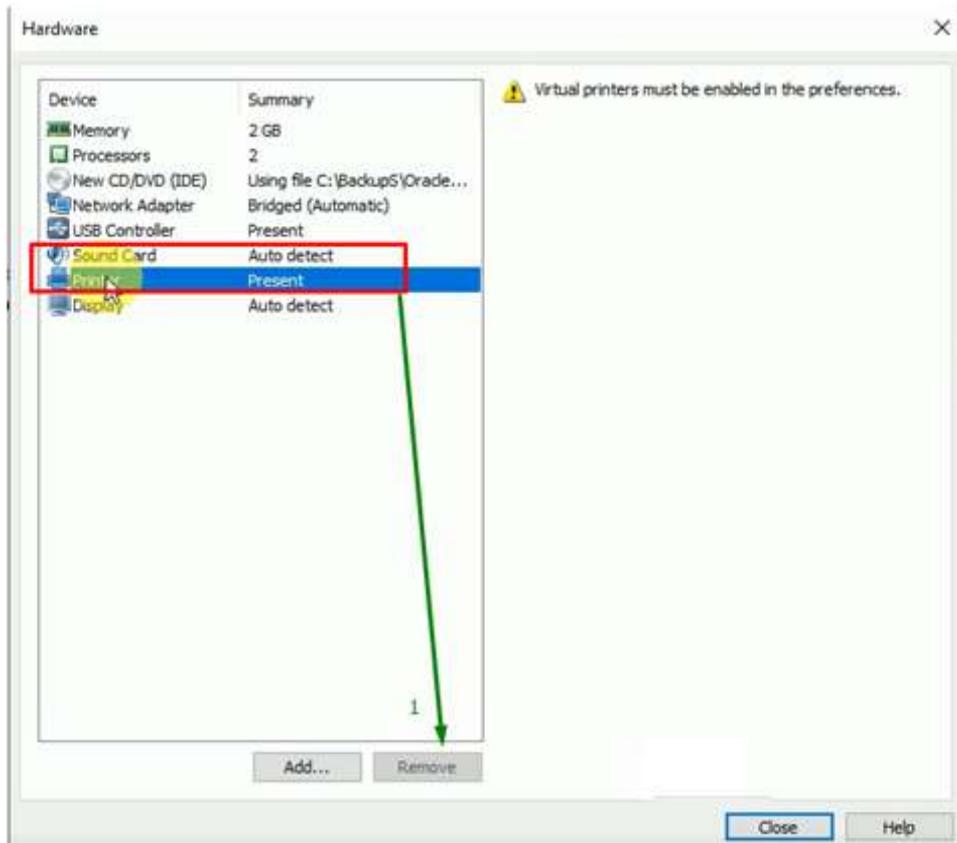
2.13. Select location to Store virtual disk as a single file then click on Next button.



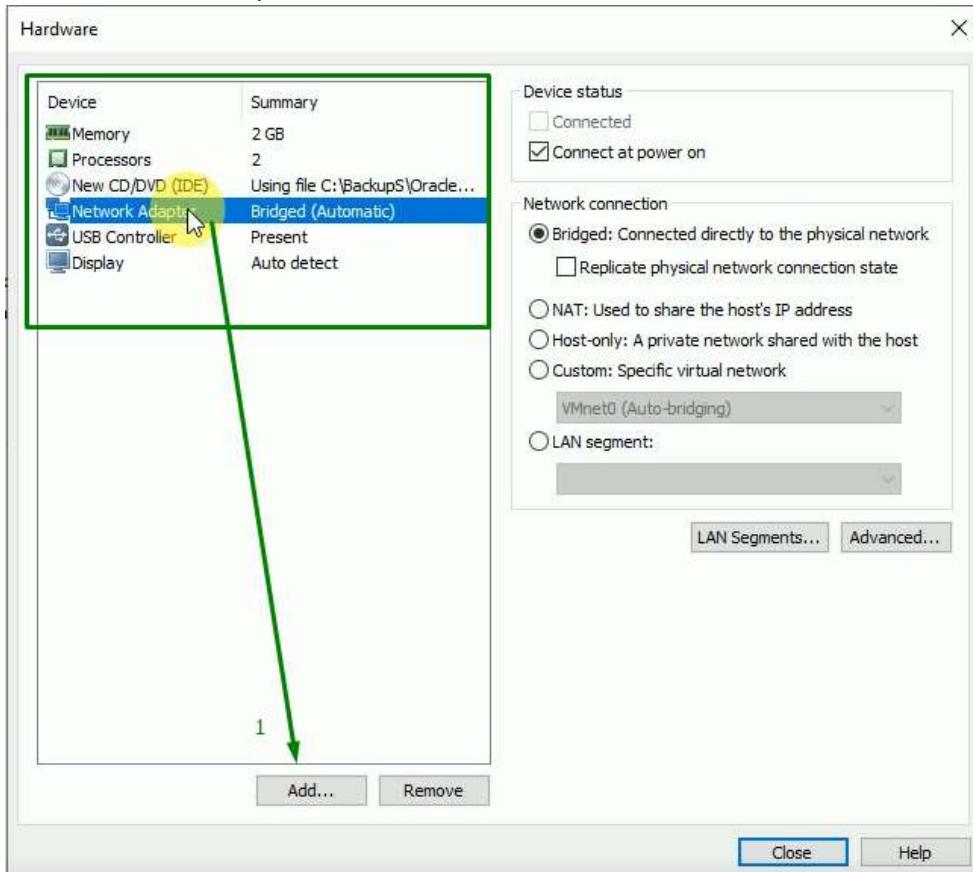
2.14. Click on Customize hardware.



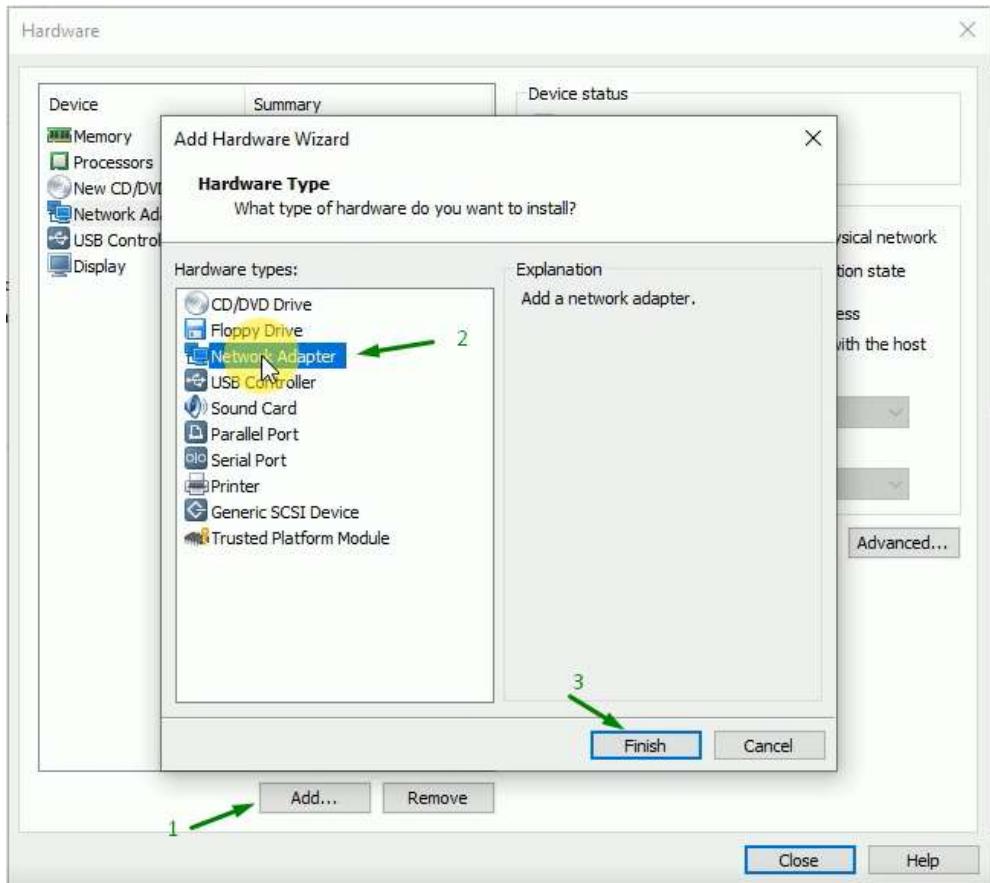
2.15. Remove the unnecessary hardware's.



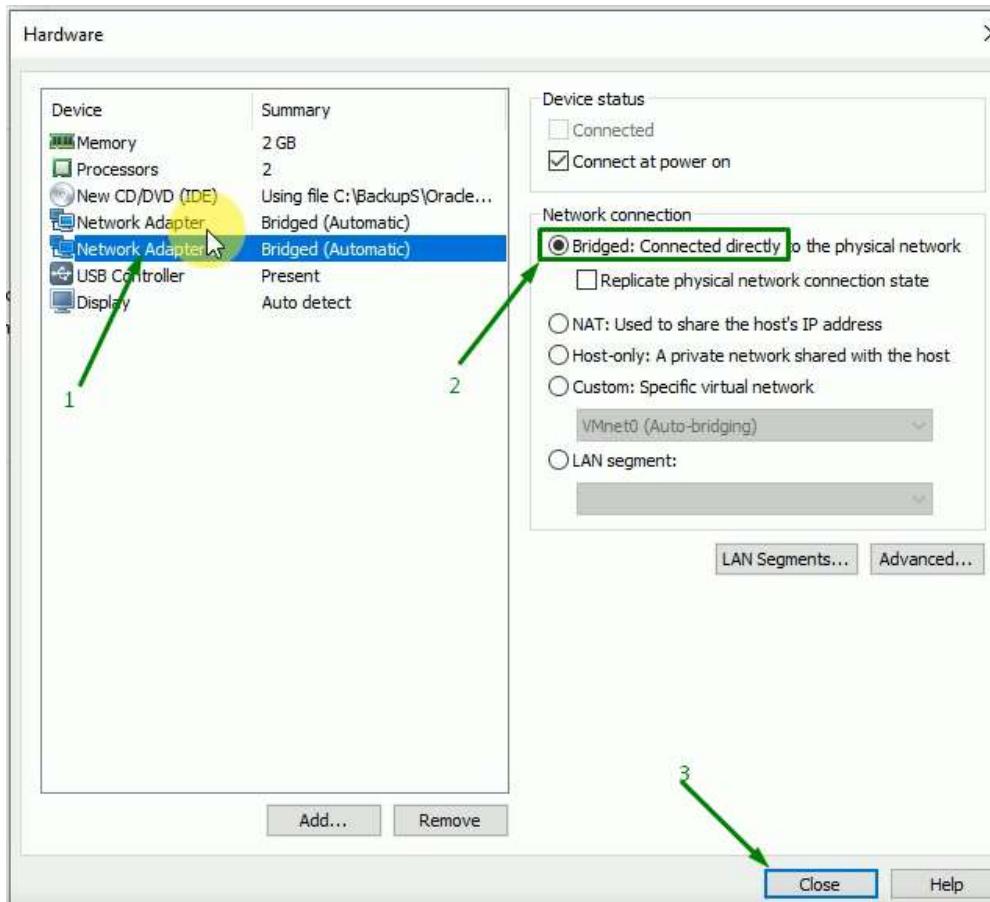
2.16. Add Network Adapter.



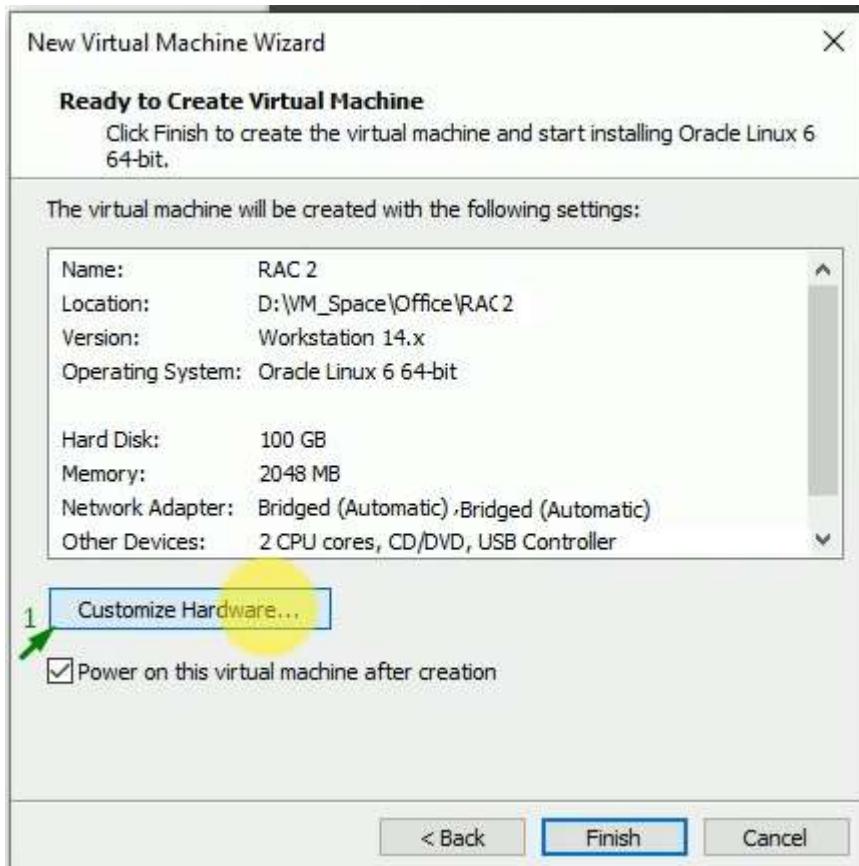
2.17. Click on Add Button then select network Adaptor then click on Finish button.



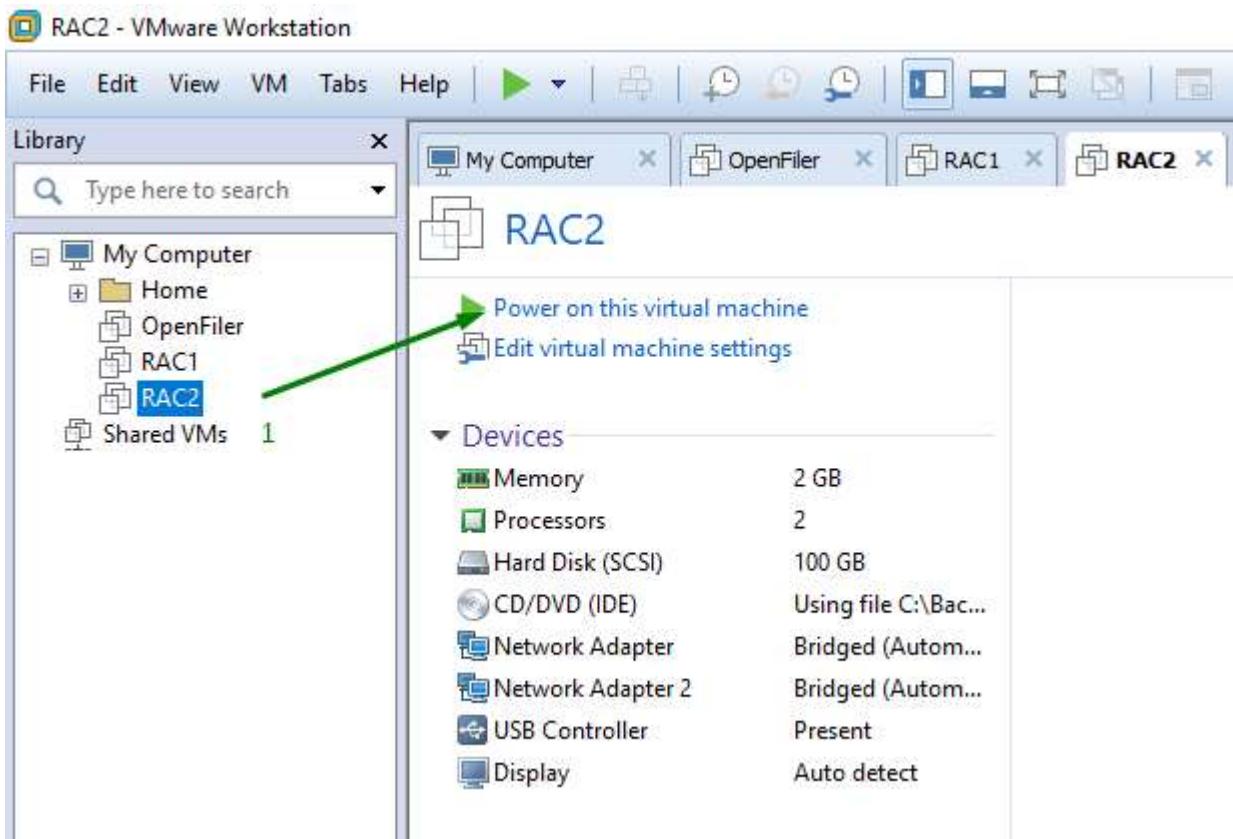
2.18. Select network Adaptor then change the Network connection as Bridge then click on Close button.



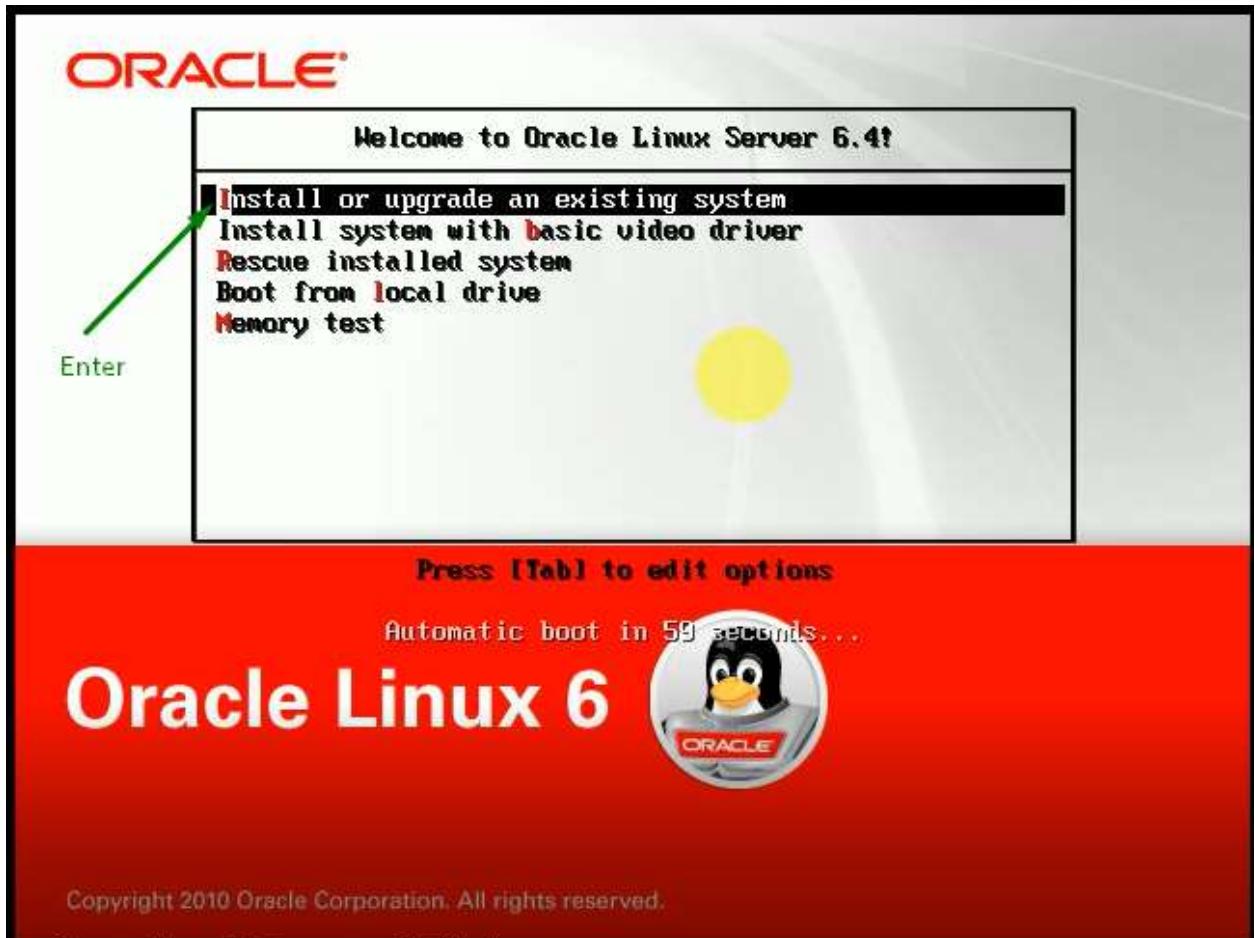
2.19. Click on Finish button.



2.20. Click on Power on button.



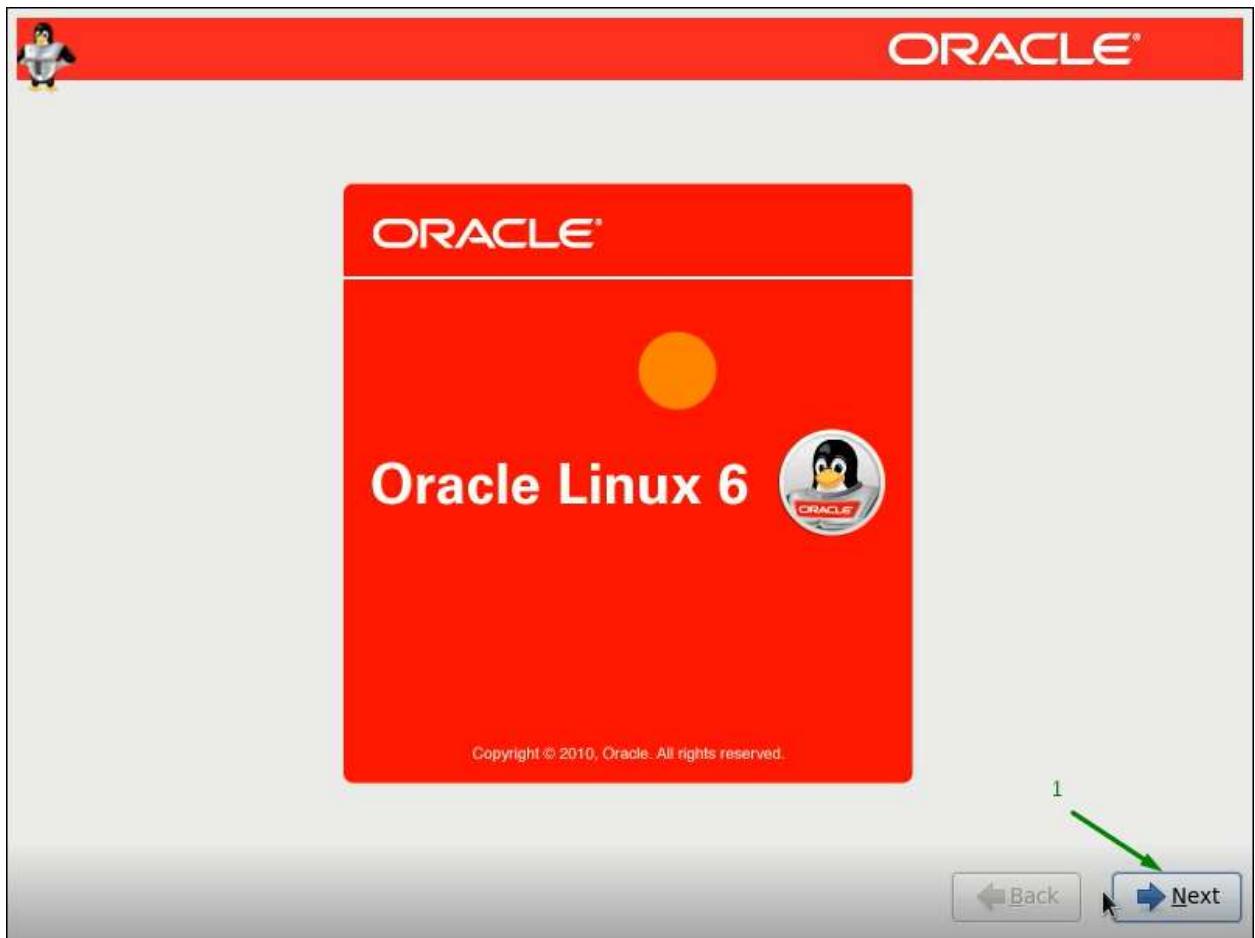
2.21. Install Oracle Linux Server.



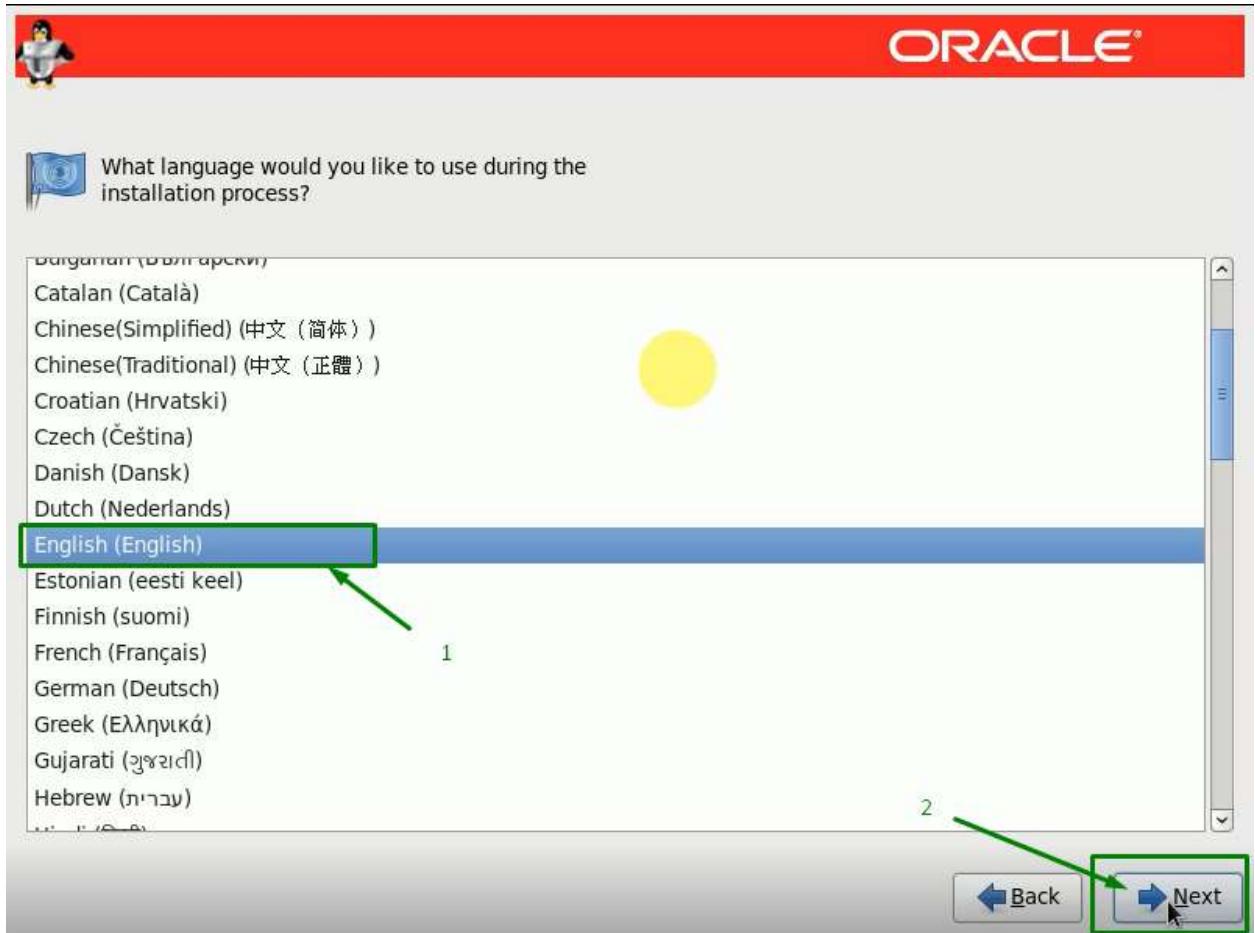
2.22. Click on Skip tab using Keyboard.



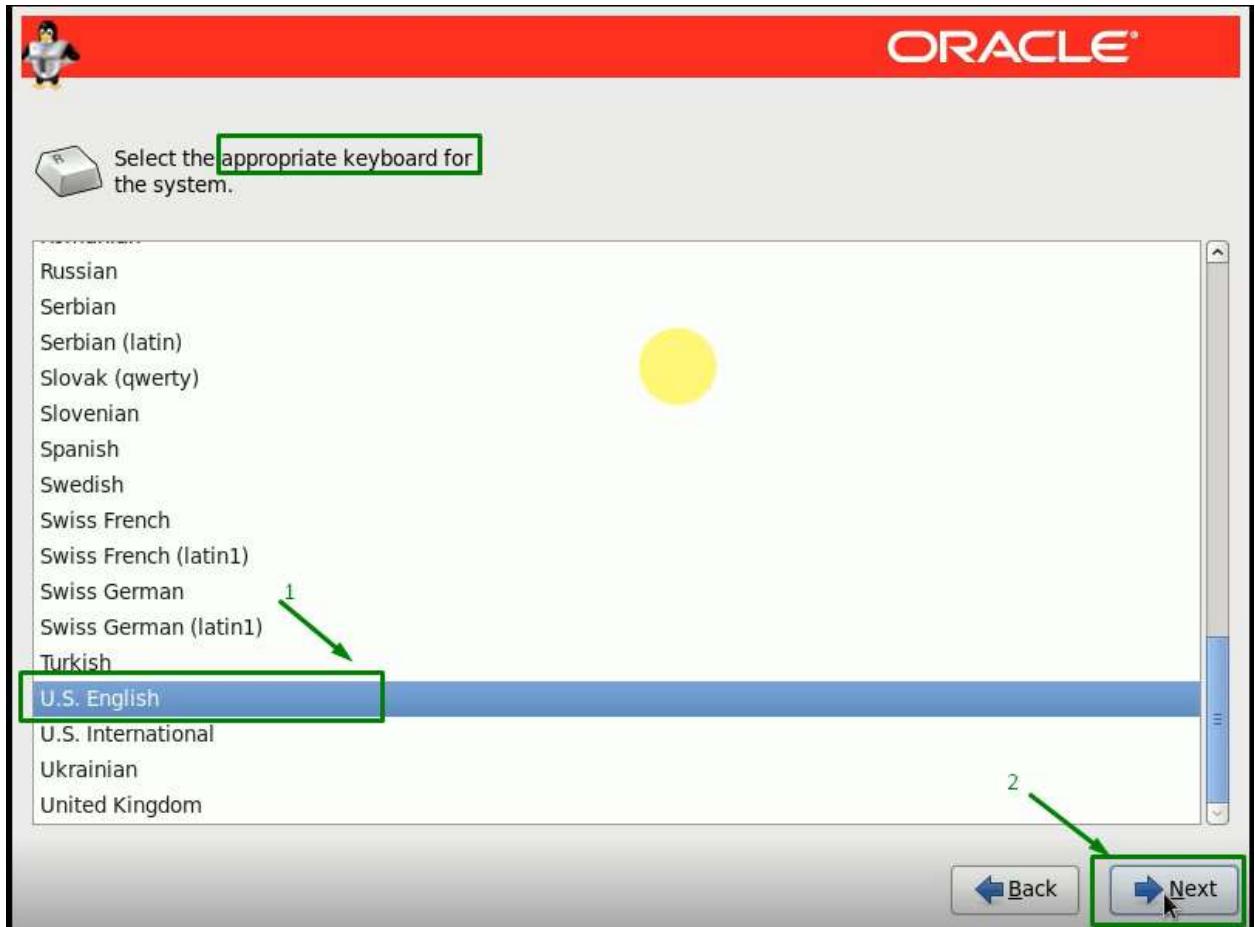
2.23. Click on Next button.



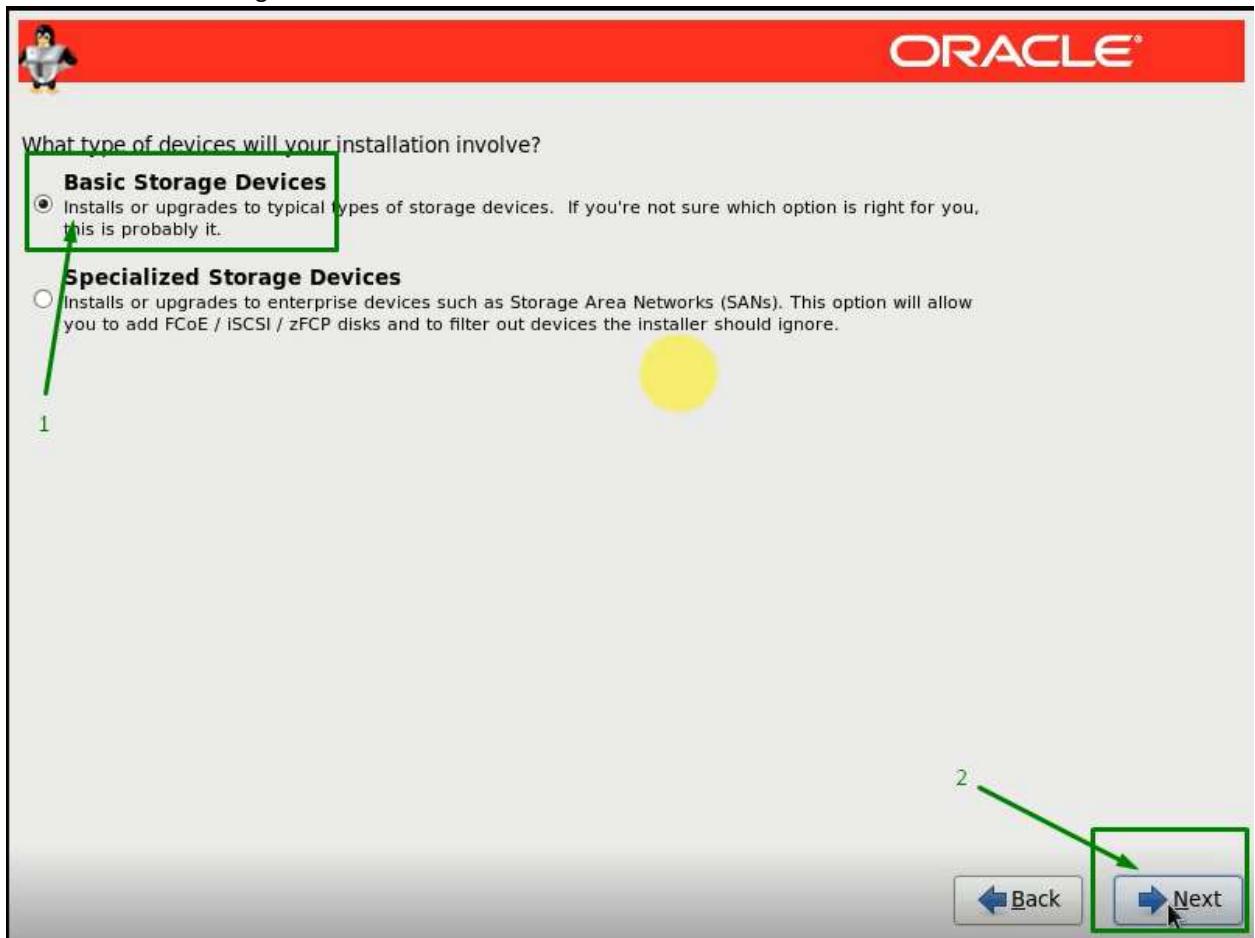
2.24. Choose proper language then Click on Next button.



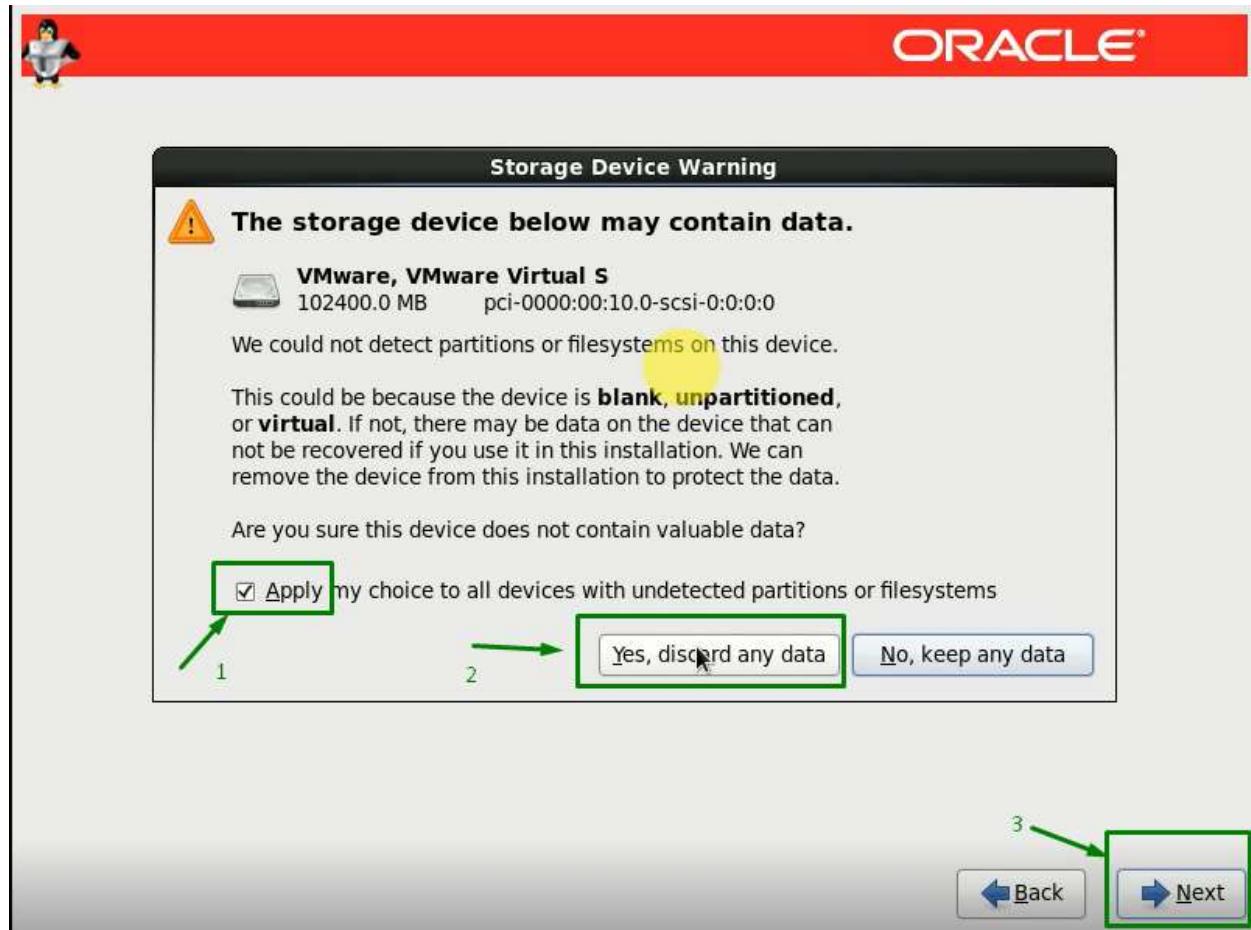
2.25. Choose proper keyboard then Click on Next button.



2.26. Select Basic Storage then Click on Next button.



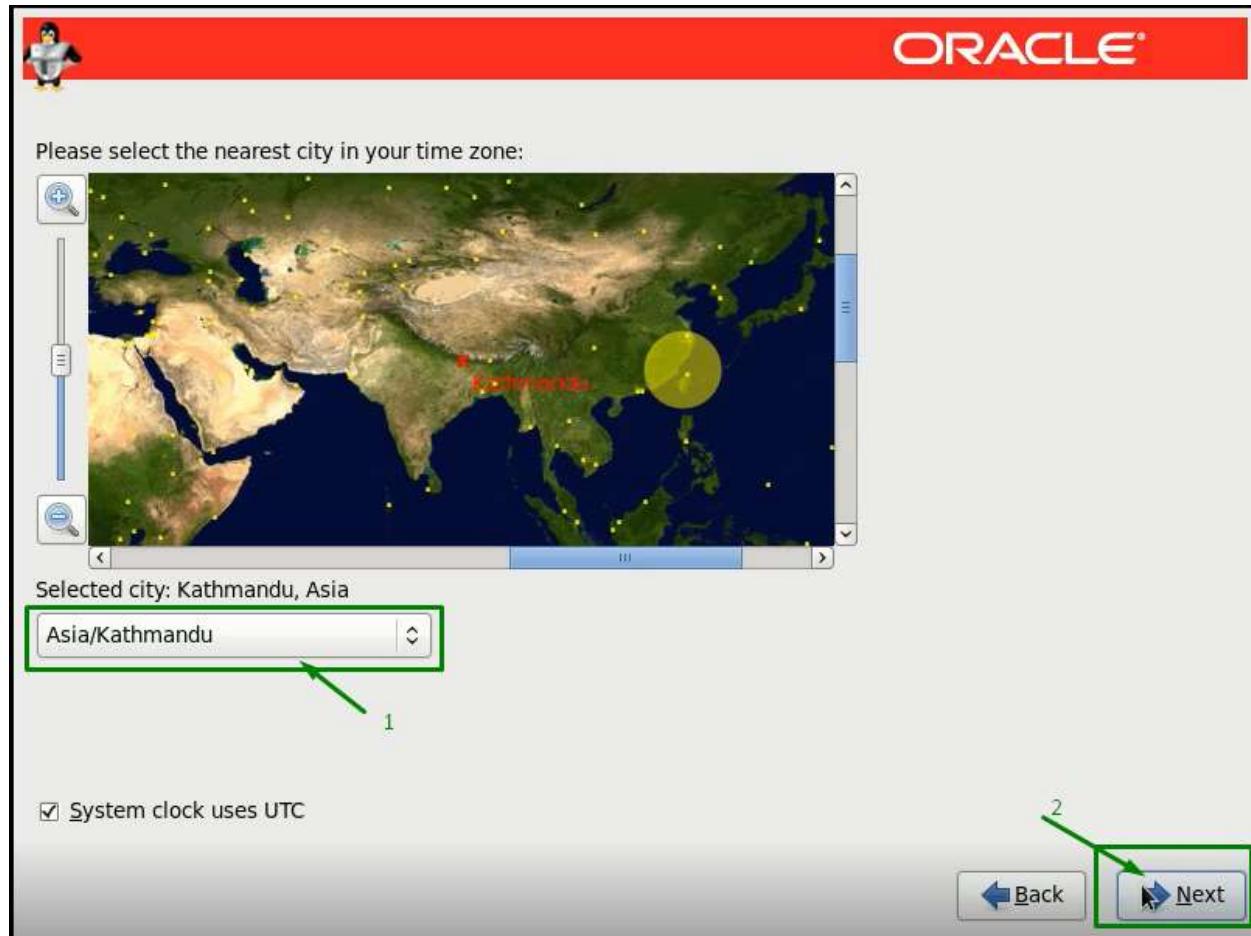
2.27. Select the proper Storage Device Warning then Click on Next button.



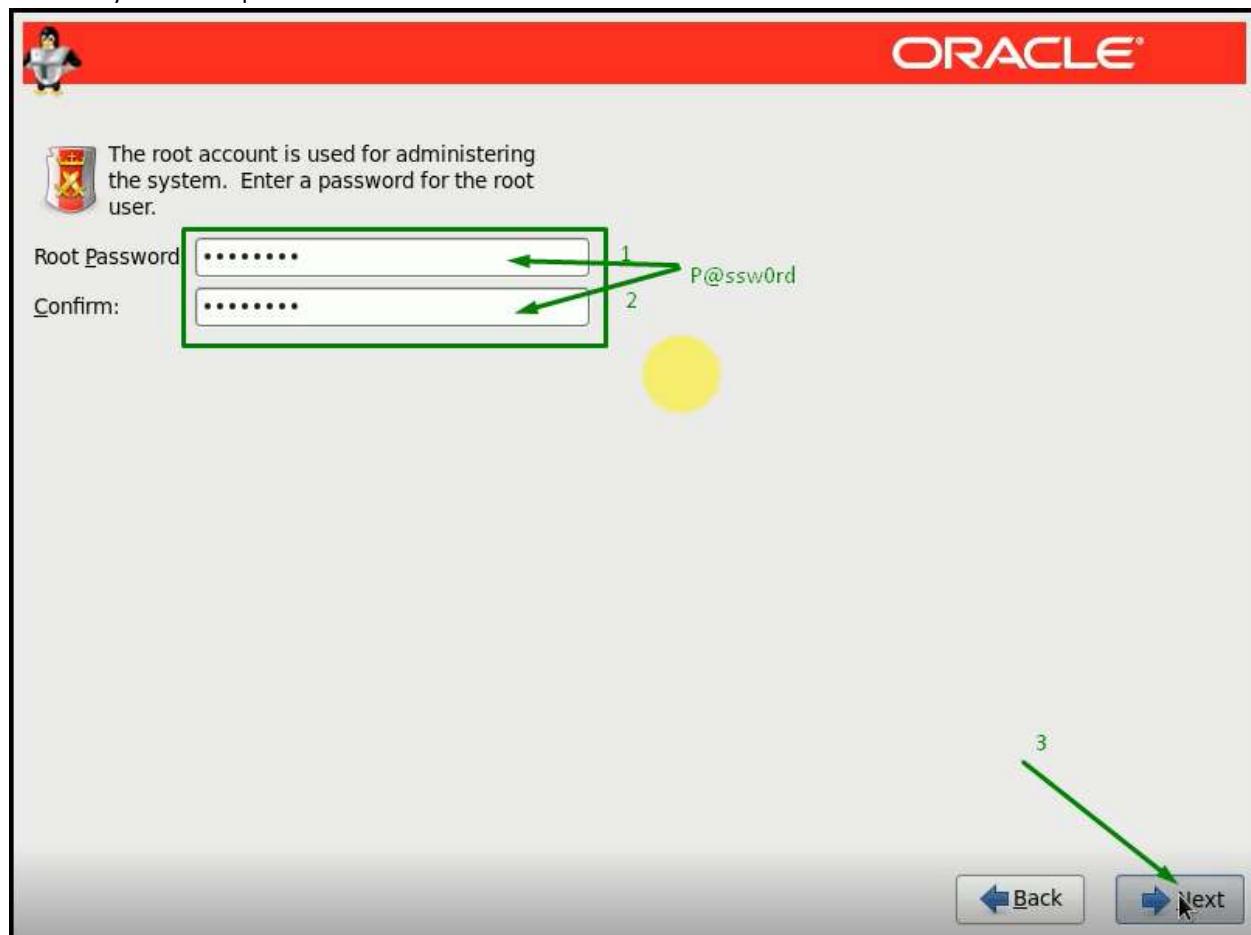
2.28. Click on Next button.



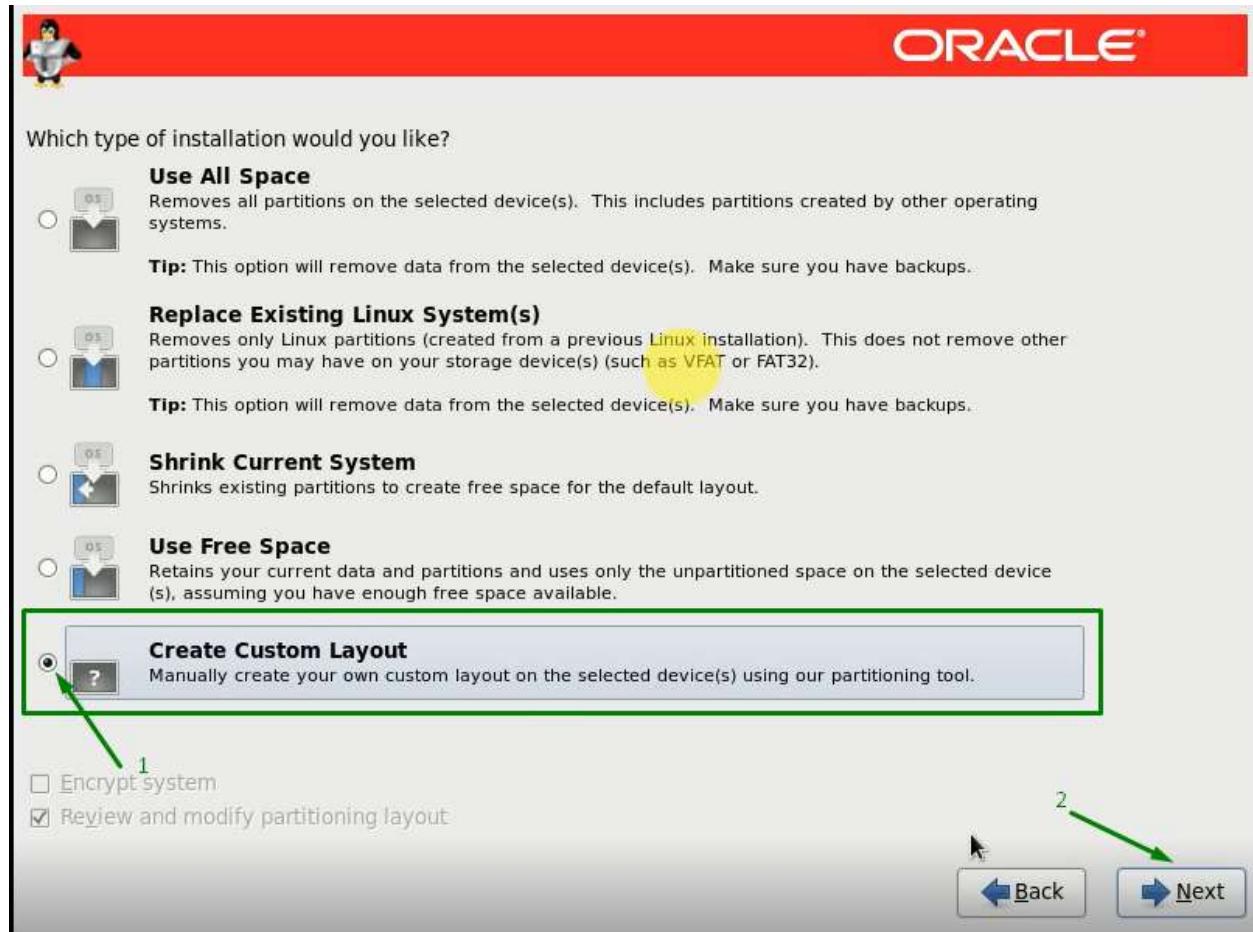
2.29. Select proper city then Click on Next button.



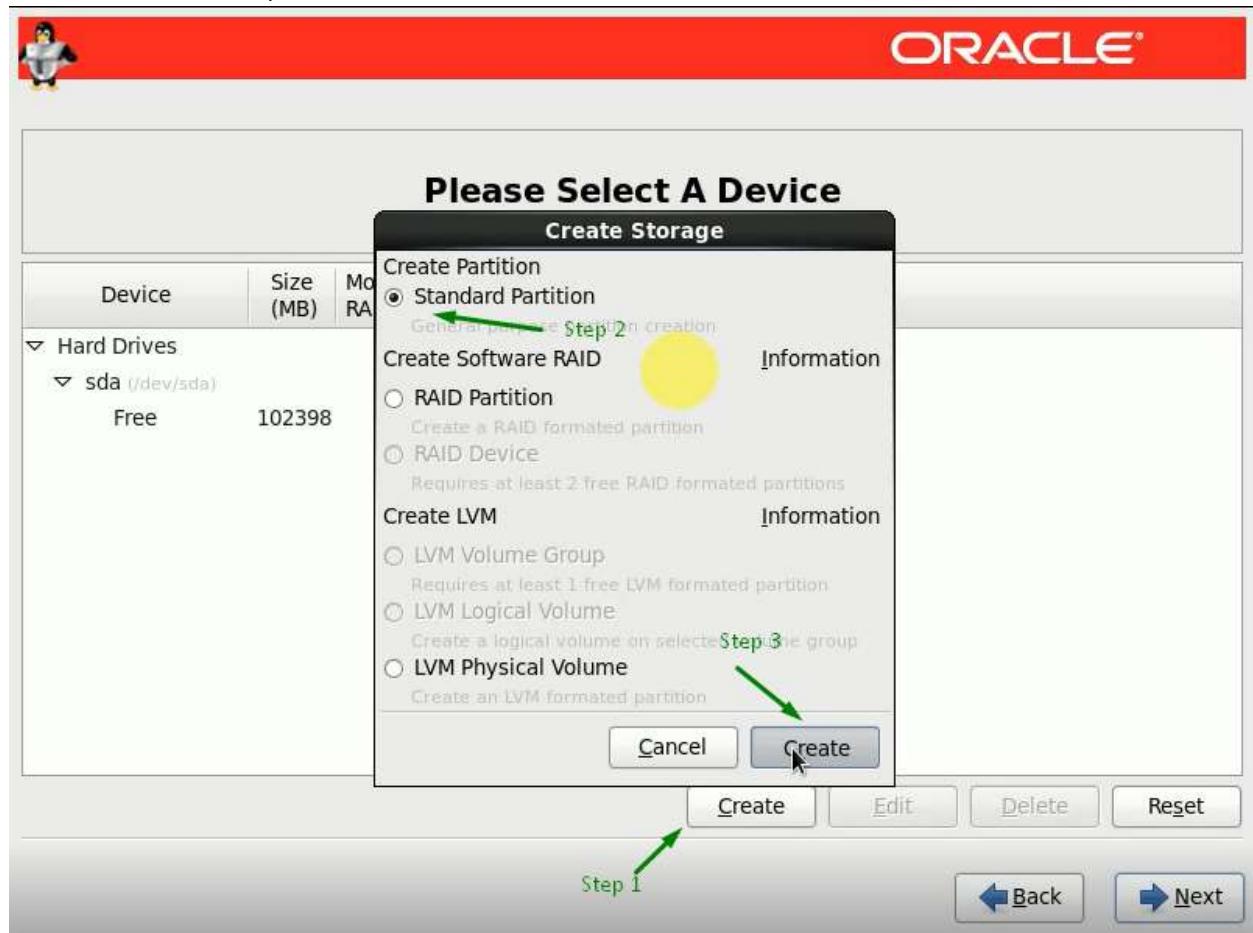
2.30. Put your "root" password the Click on Next button.



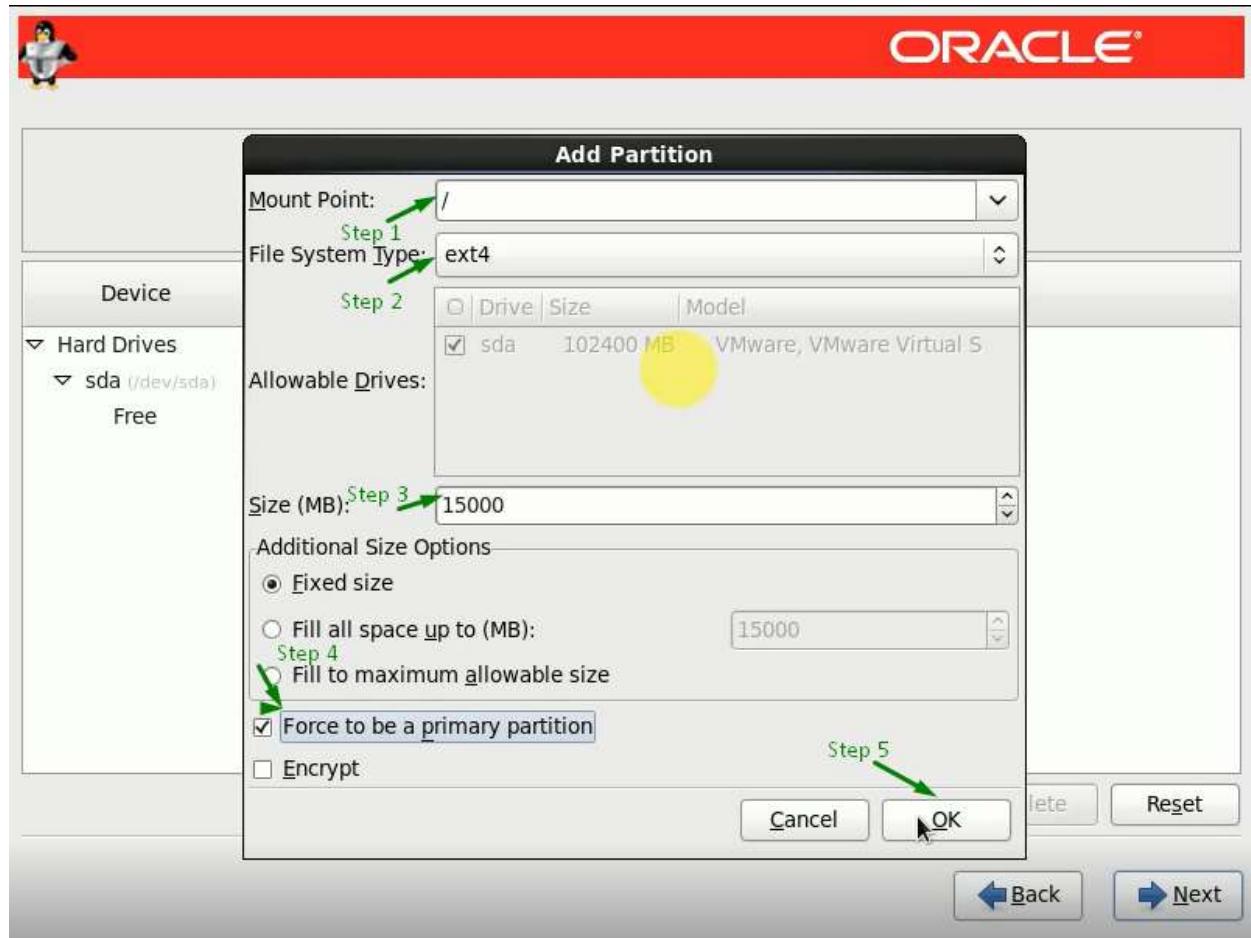
2.31. Select Create Custom Layout option then Click on Next tab.



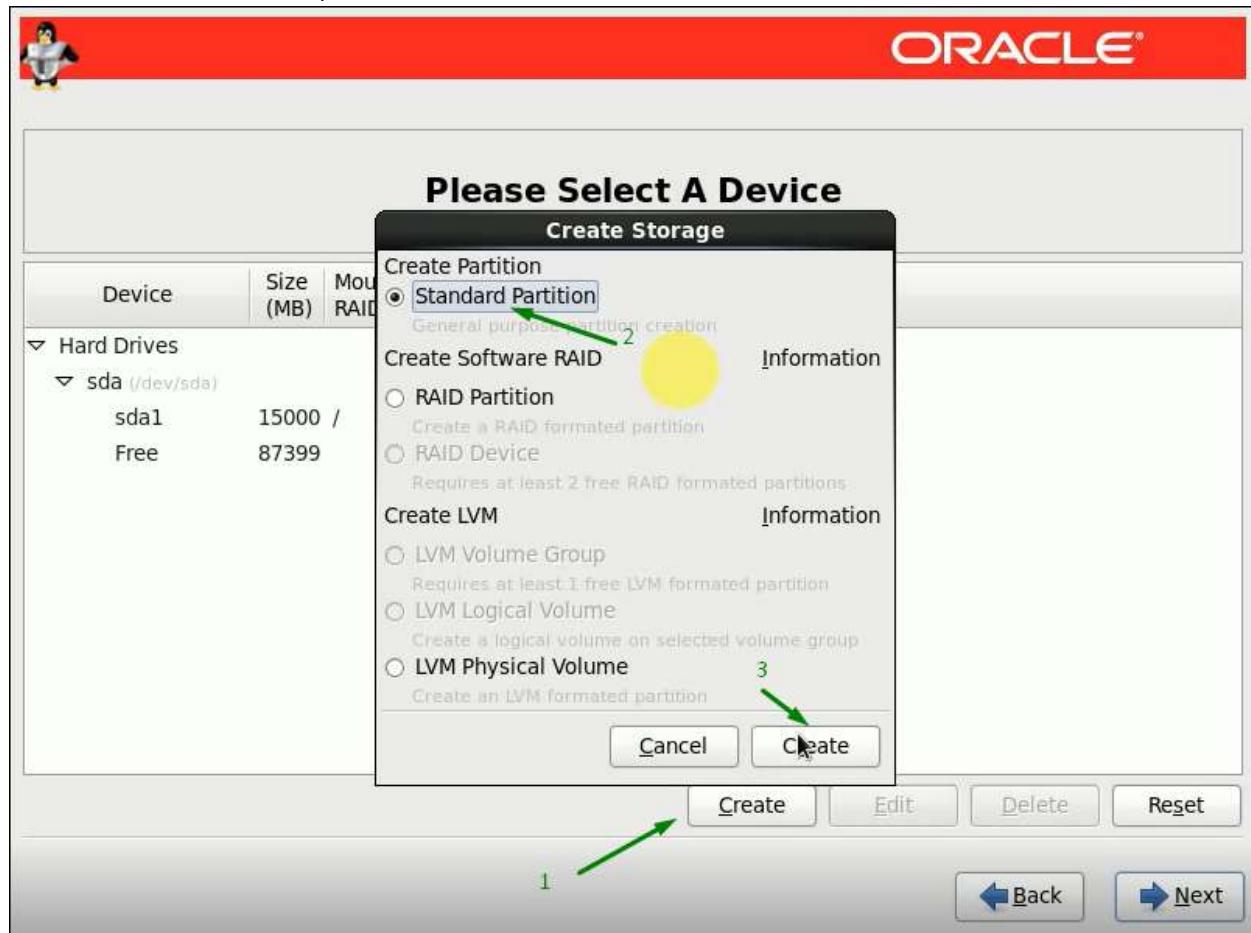
2.32. Proceed to create partition of OS Drive.



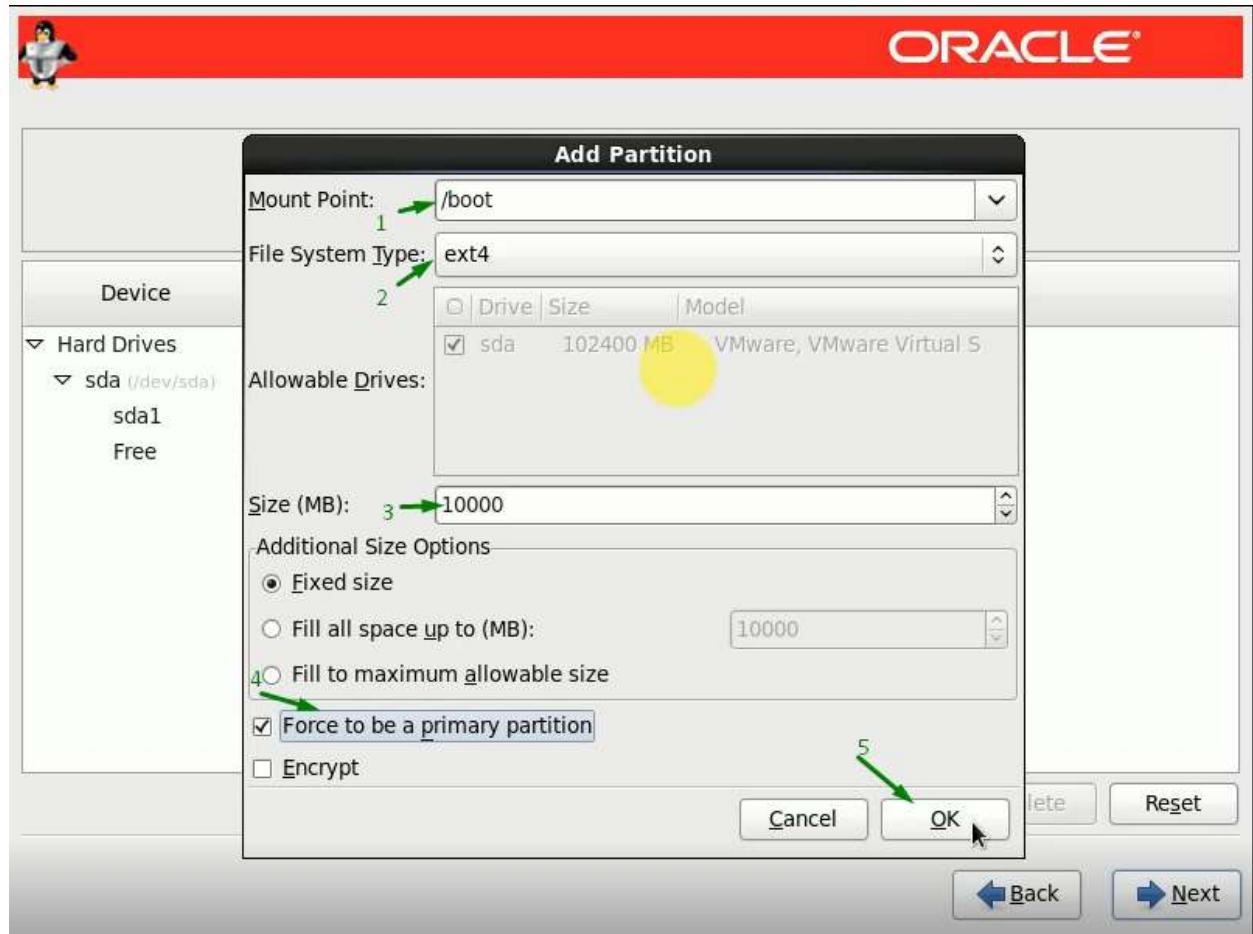
2.33. Create "/" root partition as Force to be a primary partition



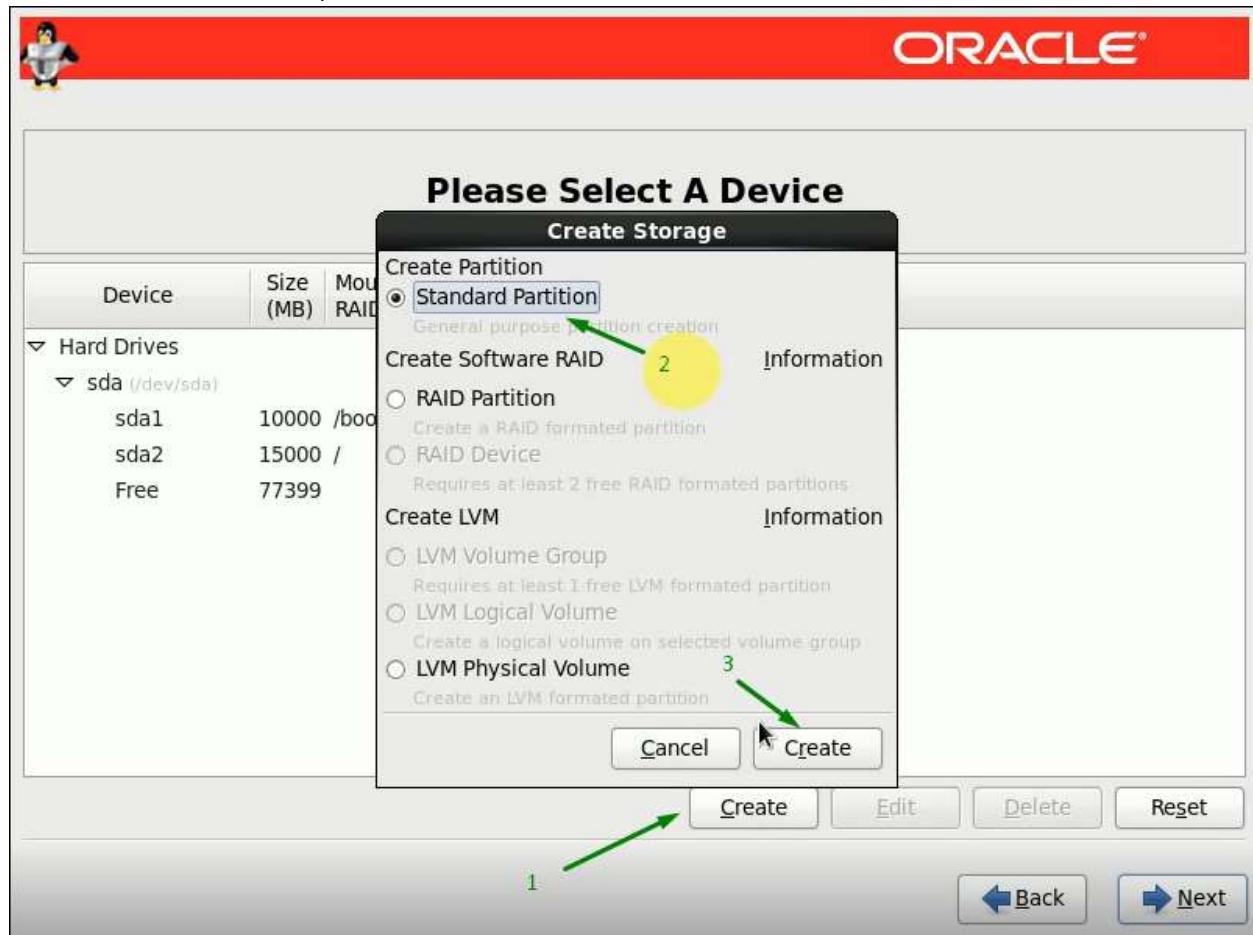
2.34. Proceed to create new partition



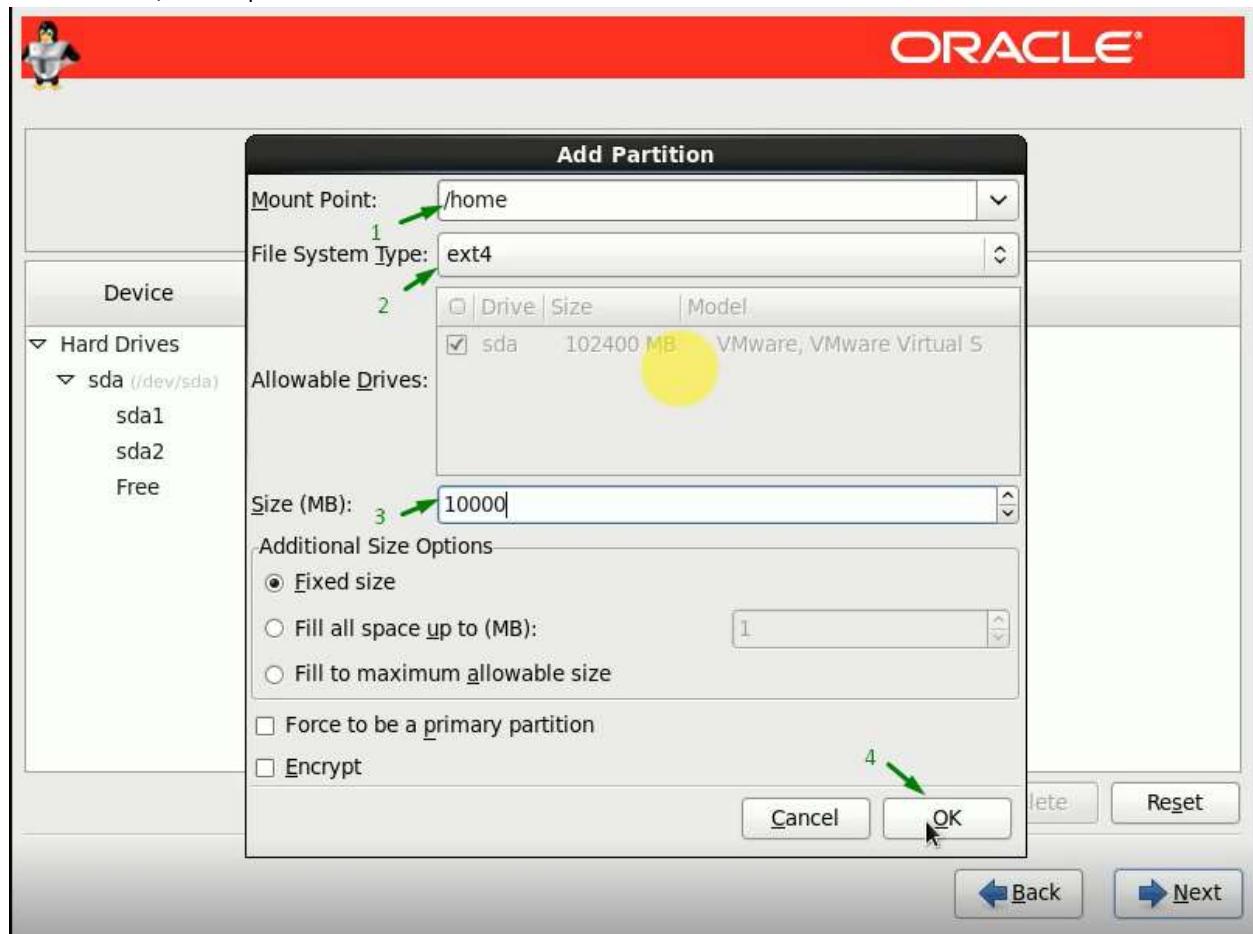
2.35. Create “/boot” partition as Force to be a primary partition



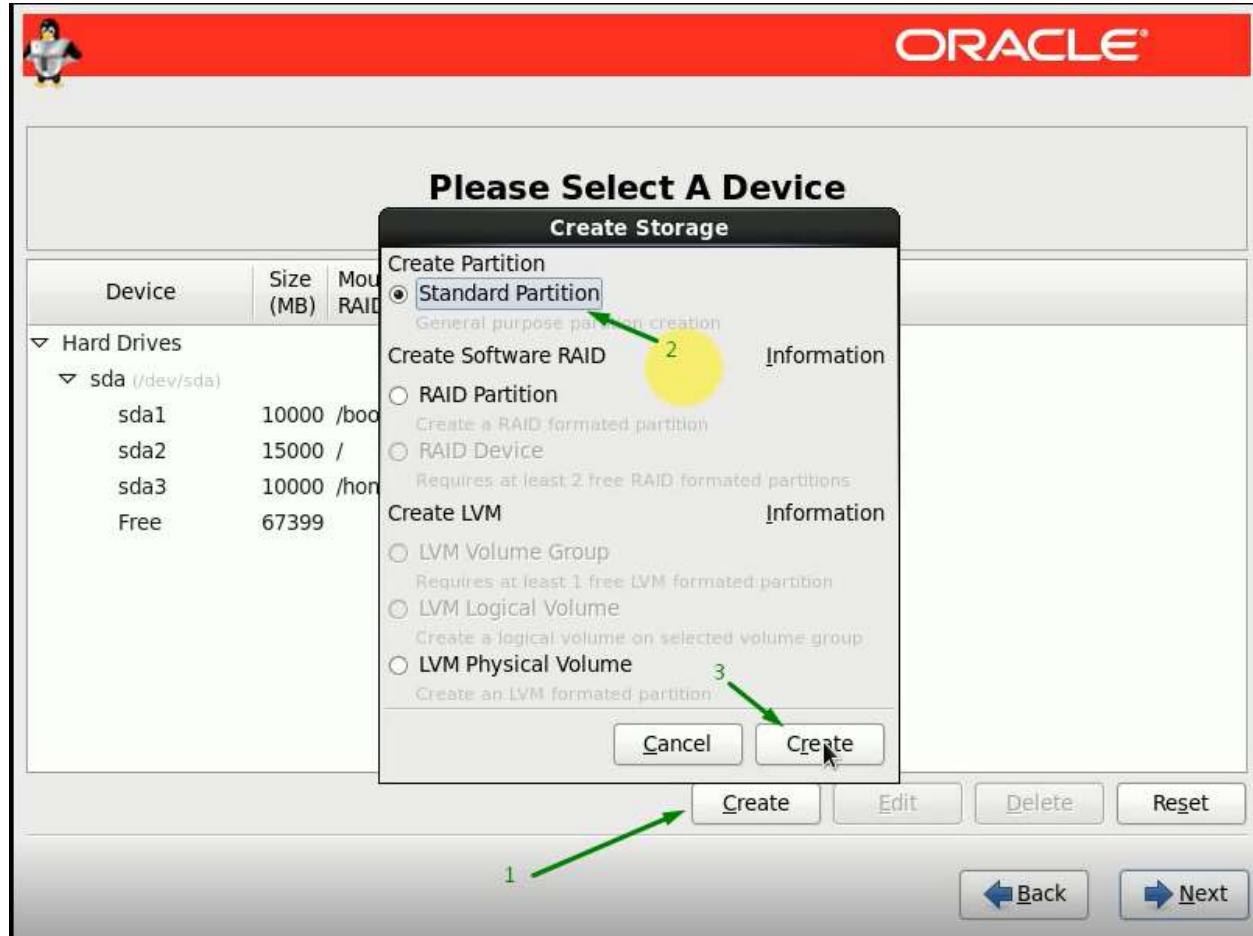
2.36. Proceed to create new partition



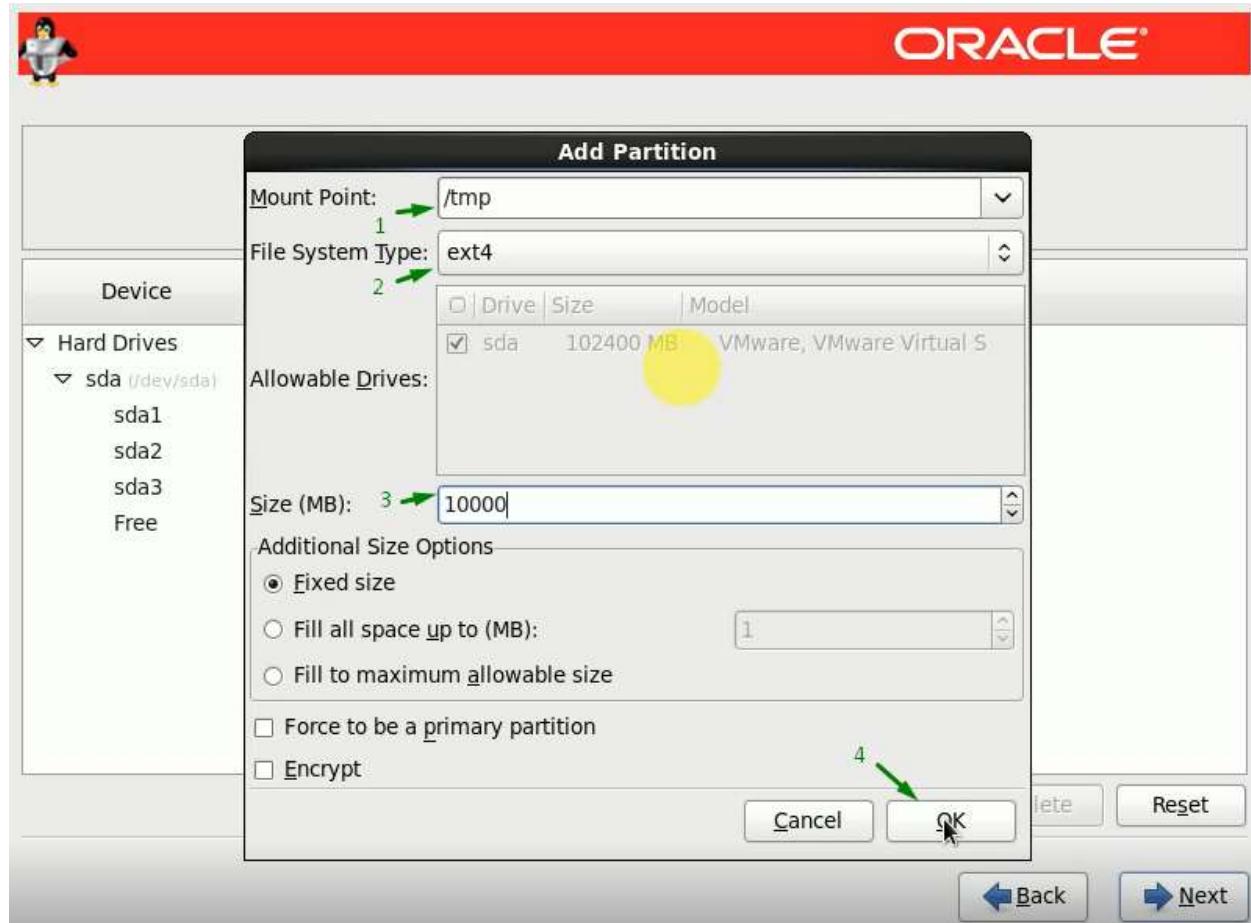
2.37. Create "/home" partition



2.38. Proceed to create new partition



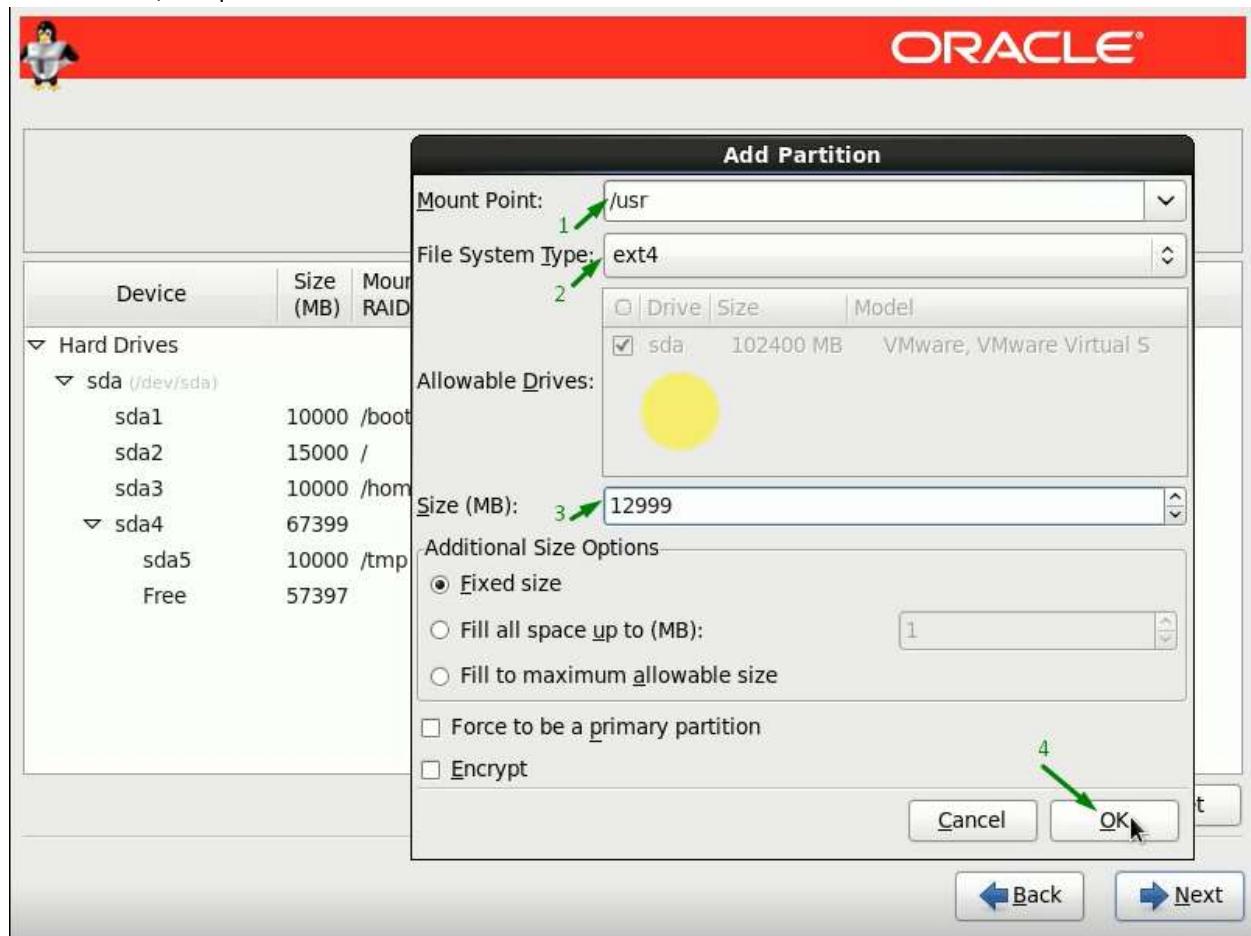
2.39. Create “/tmp” partition



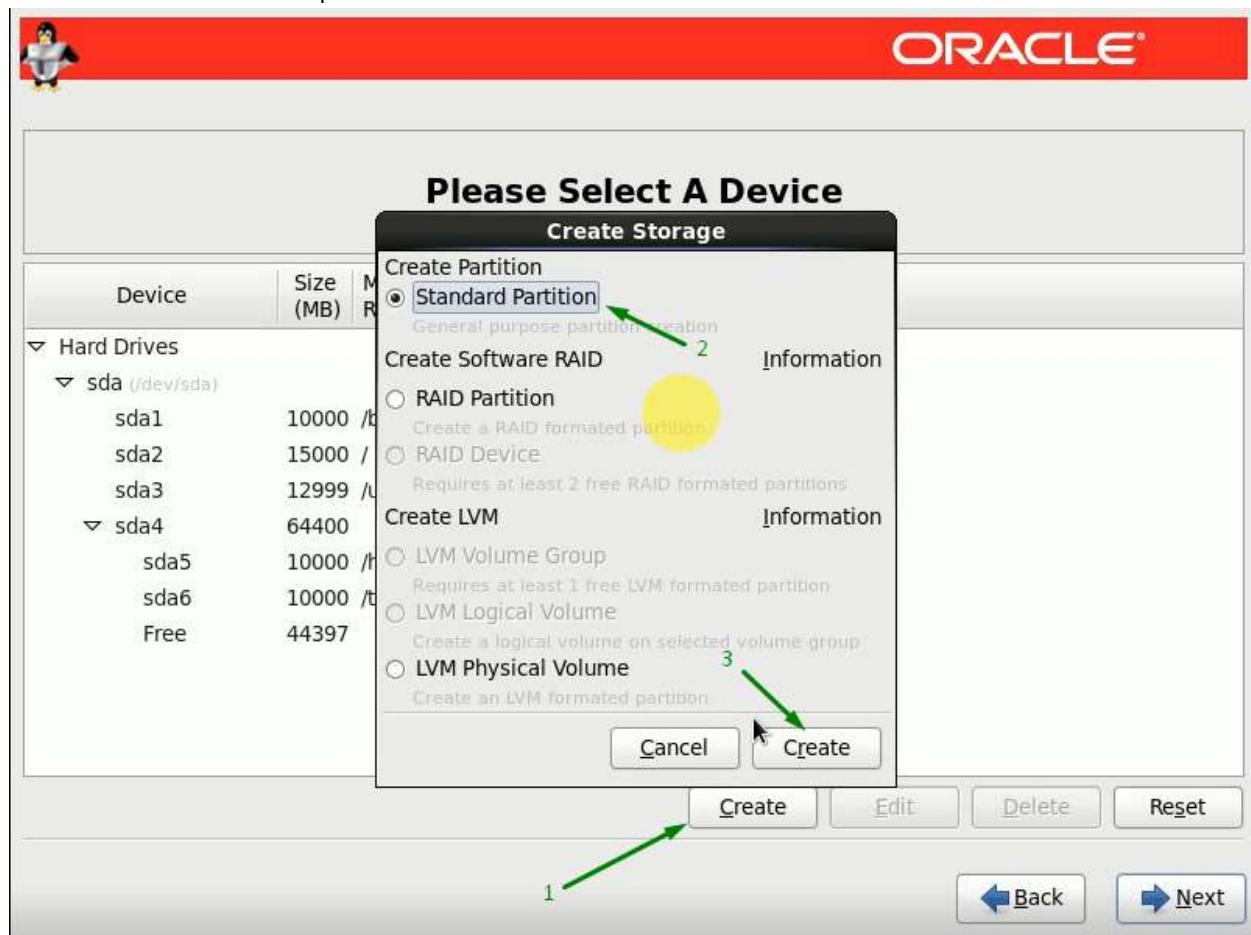
2.40. Proceed to create new partition



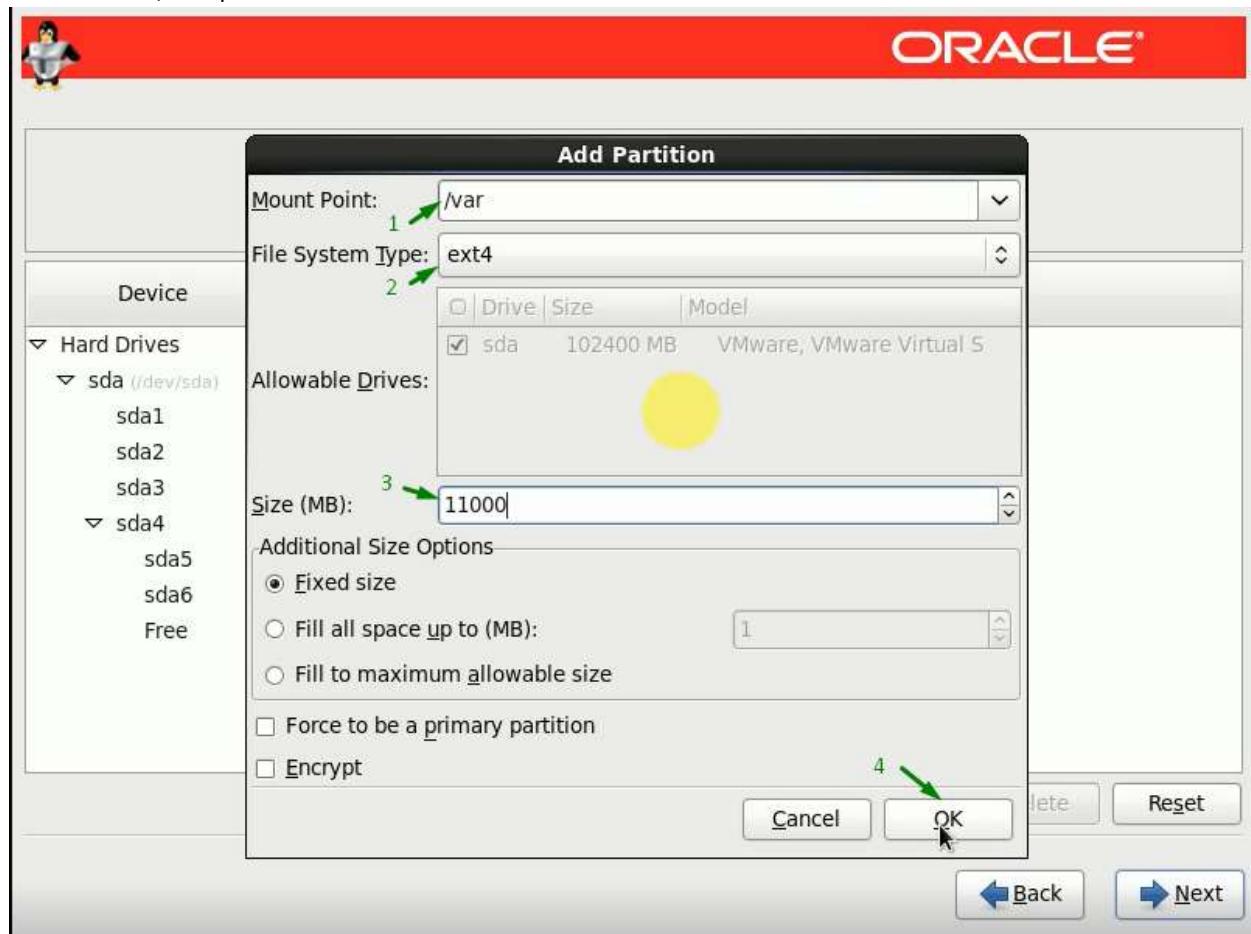
2.41. Create “/usr” partition



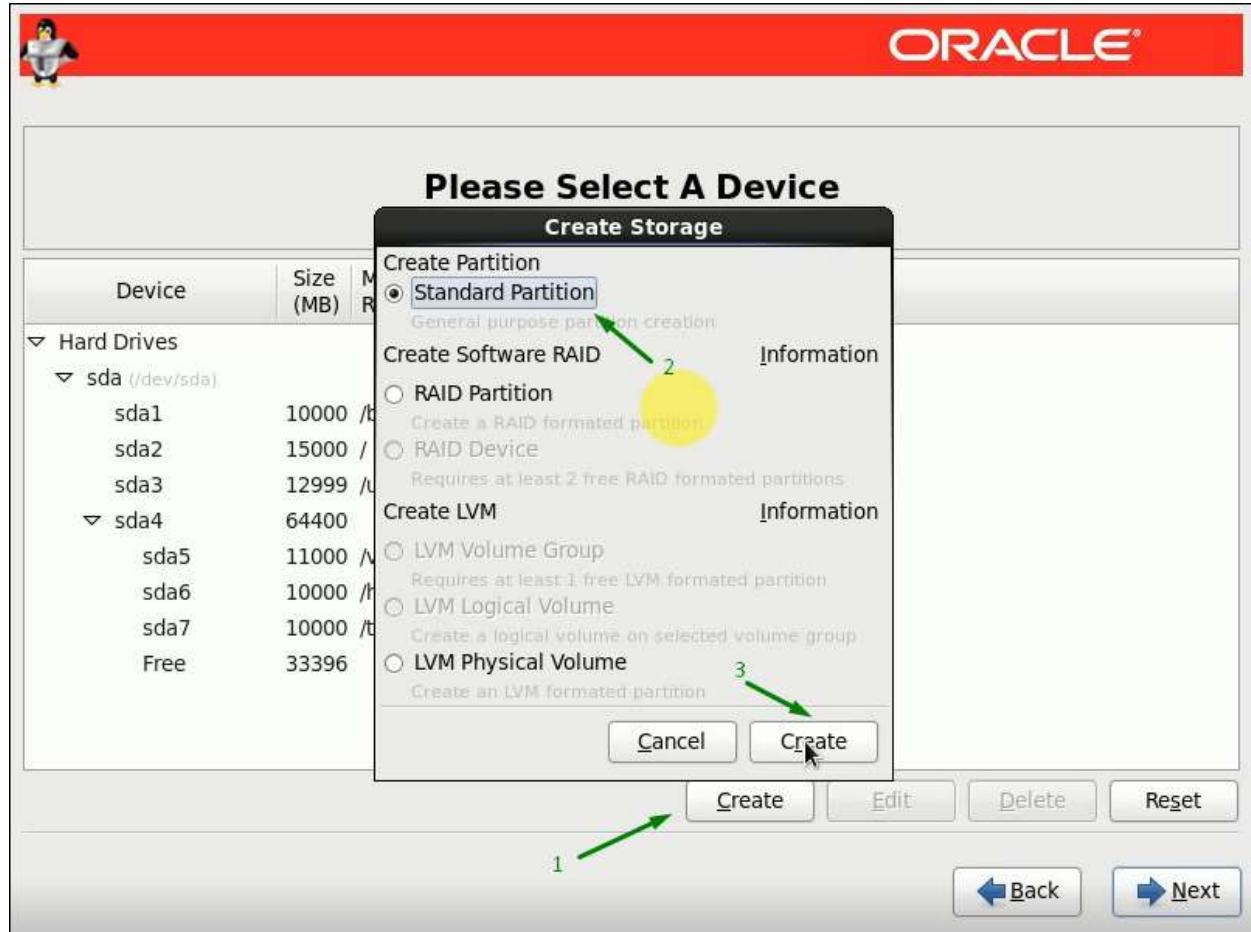
2.42. Proceed to create new partition



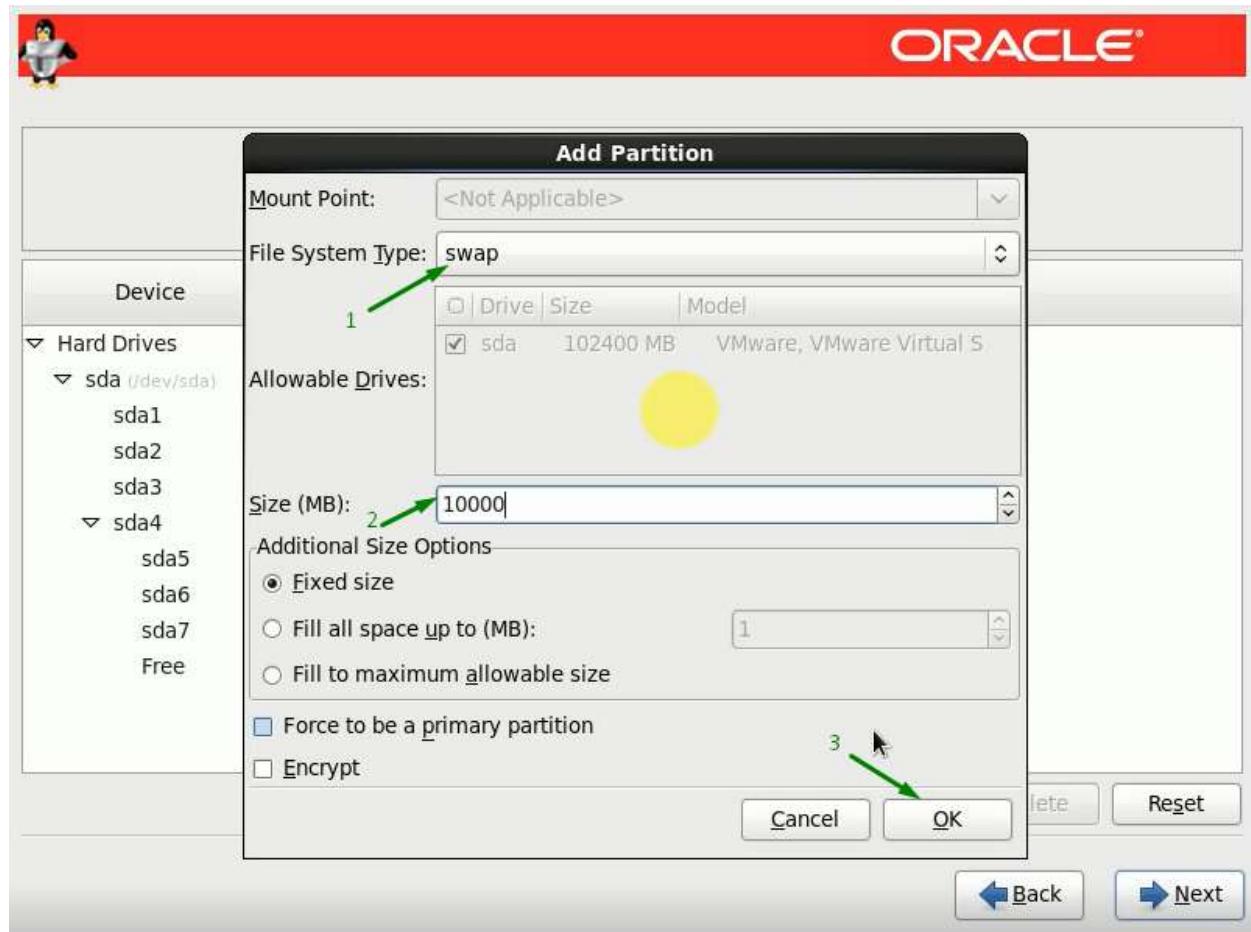
2.43. Create "/var" partition



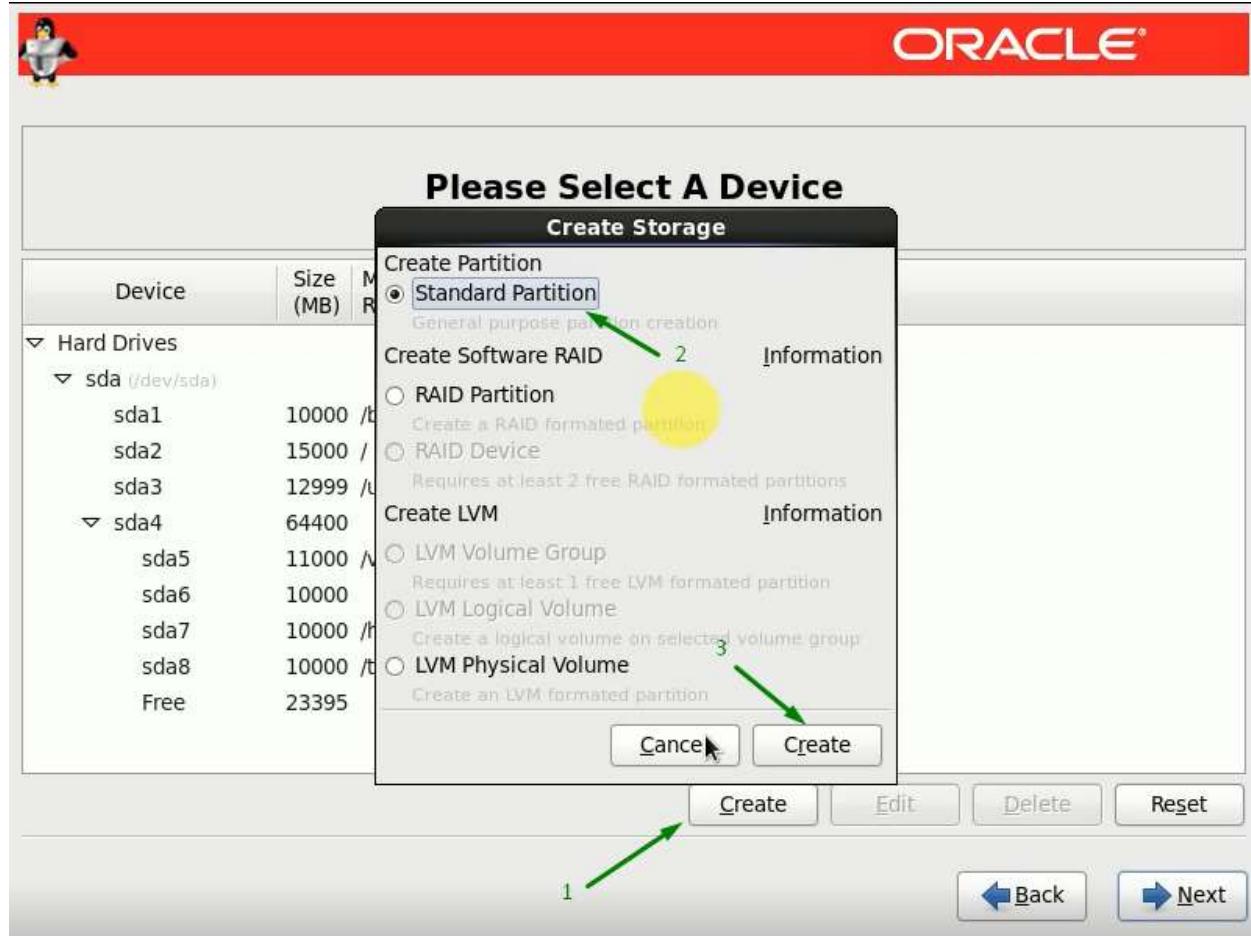
2.44. Proceed to create new partition



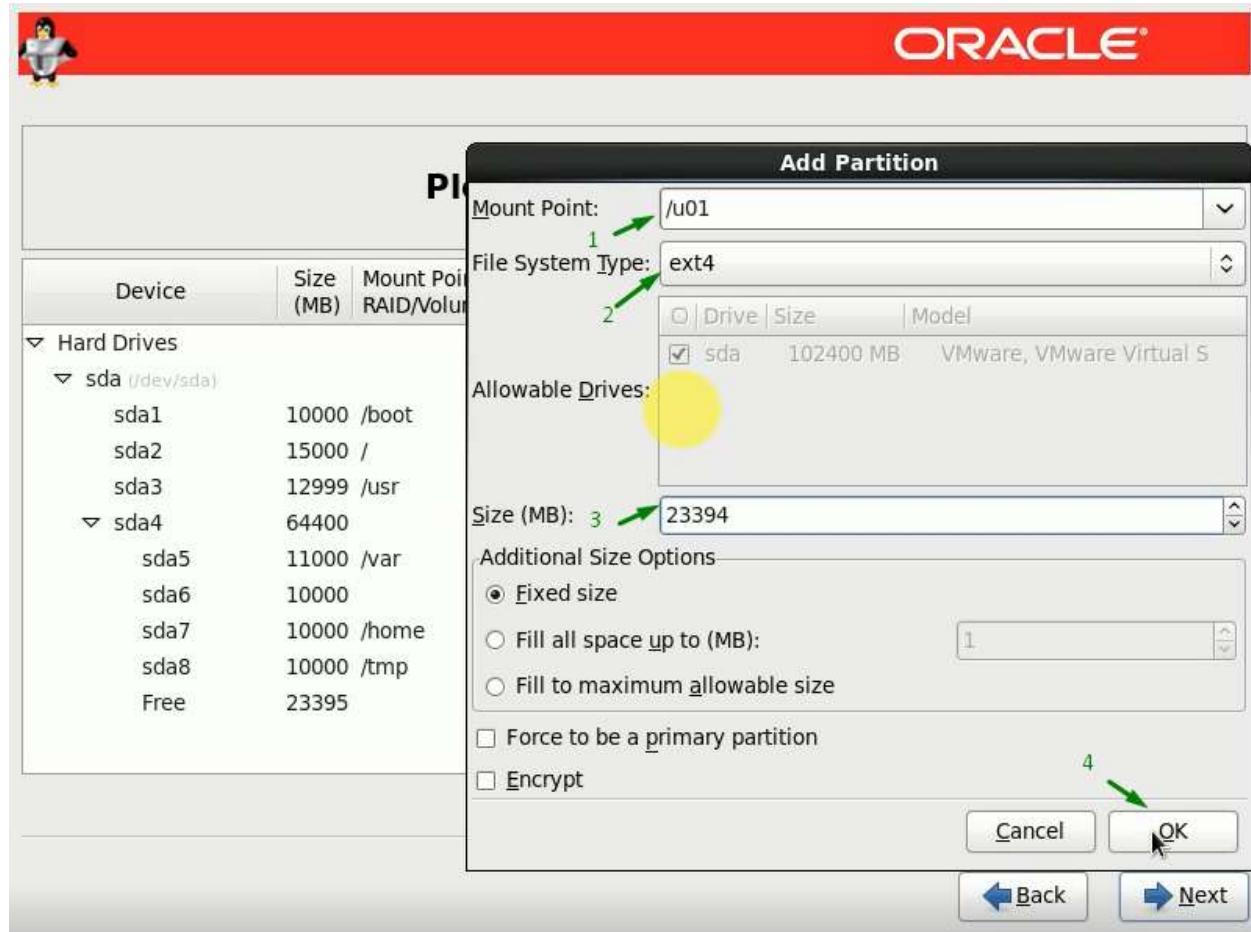
2.45. Create “swap” partition



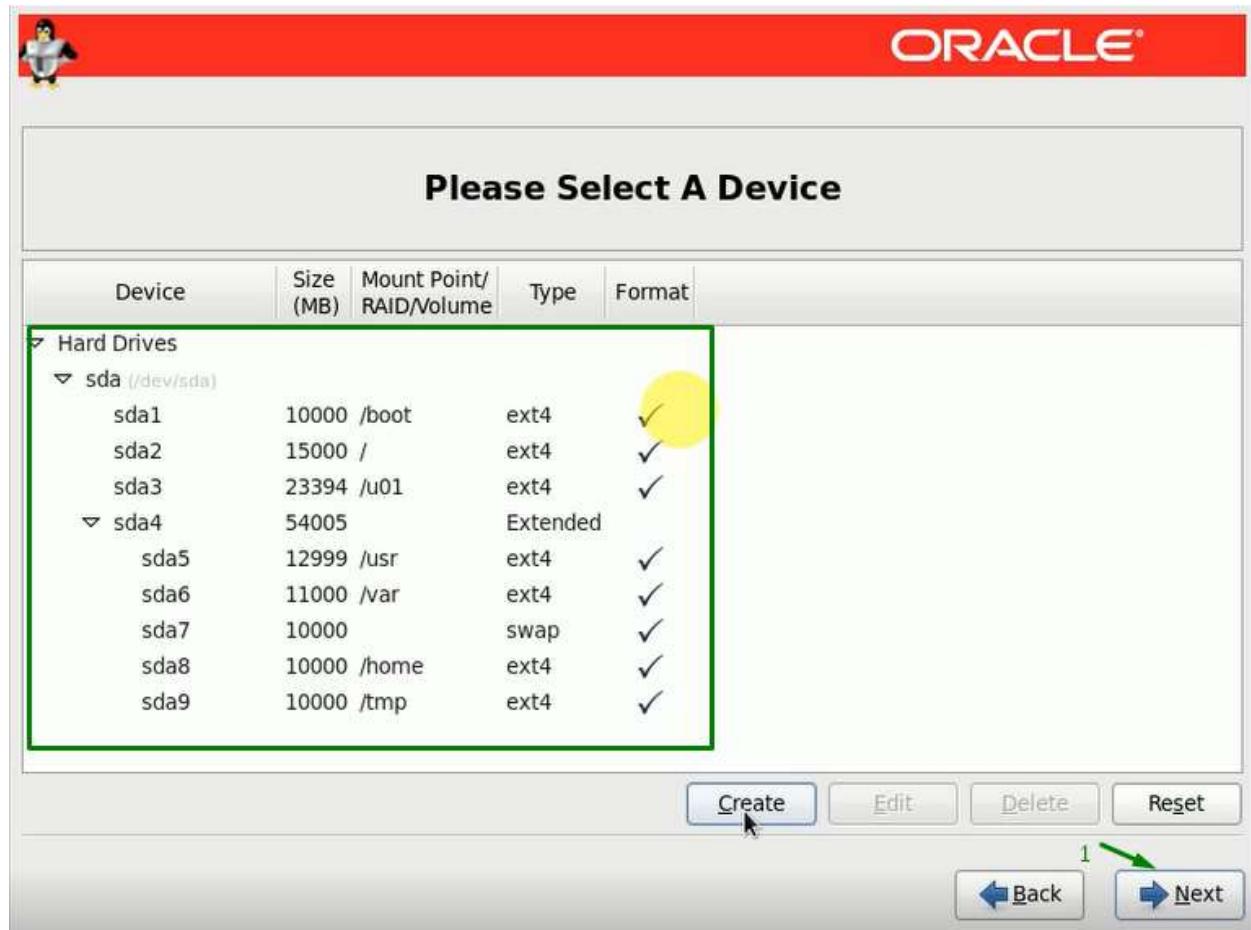
2.46. Proceed to create new partition



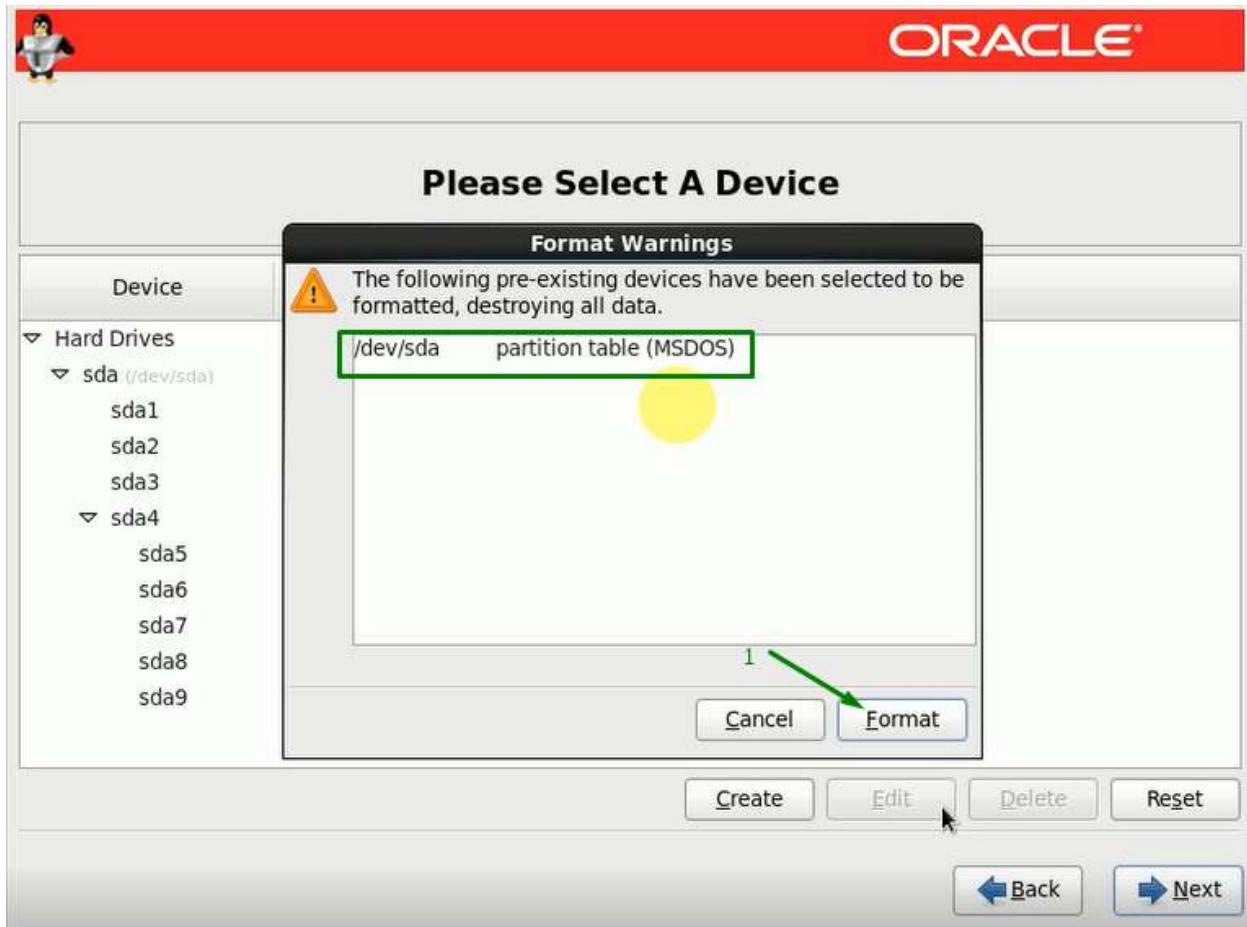
2.47. Create “swap” partition



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



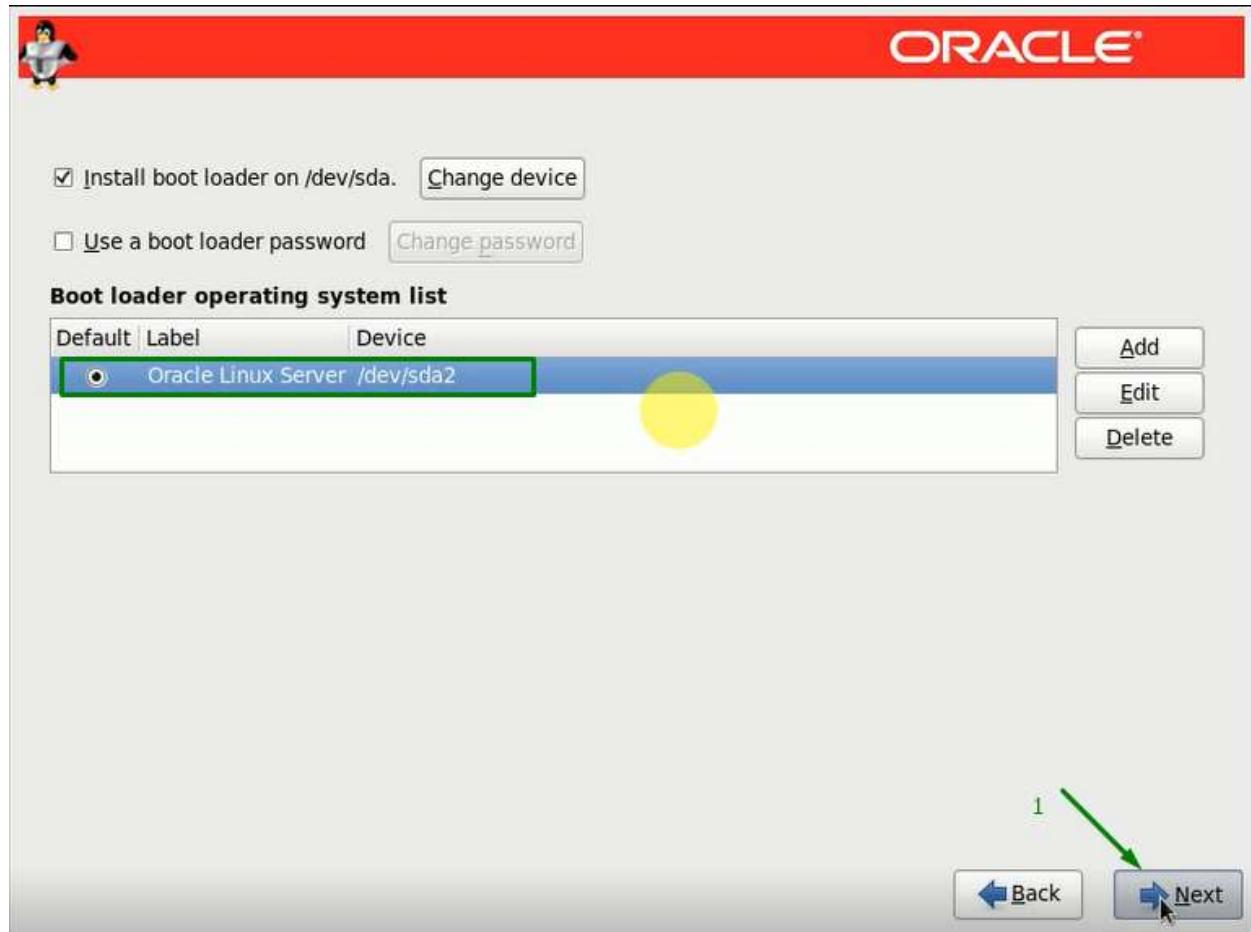
2.49. Proceed to erase our partitions, click on Format button.



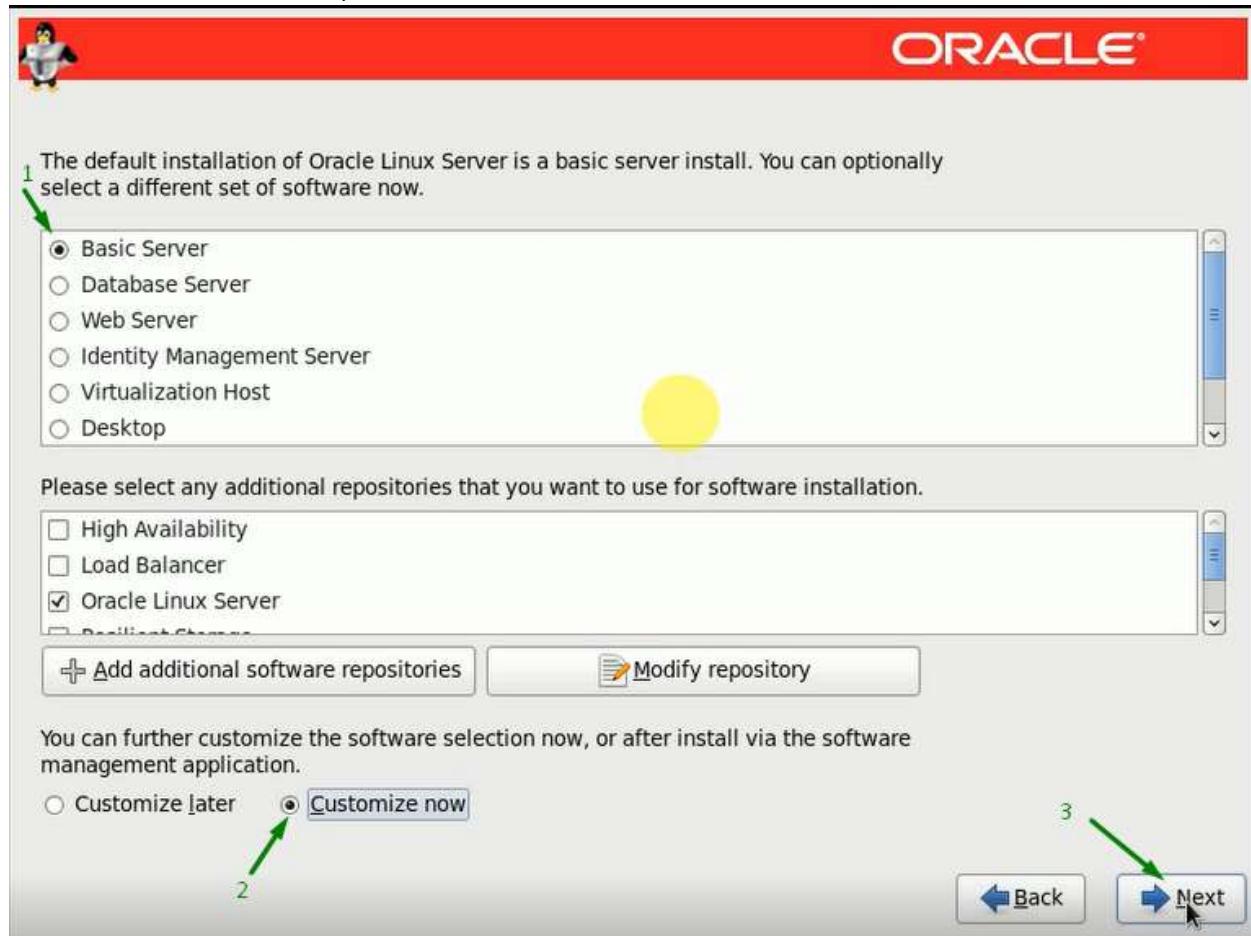
2.50. Click on Write changes to disk button.



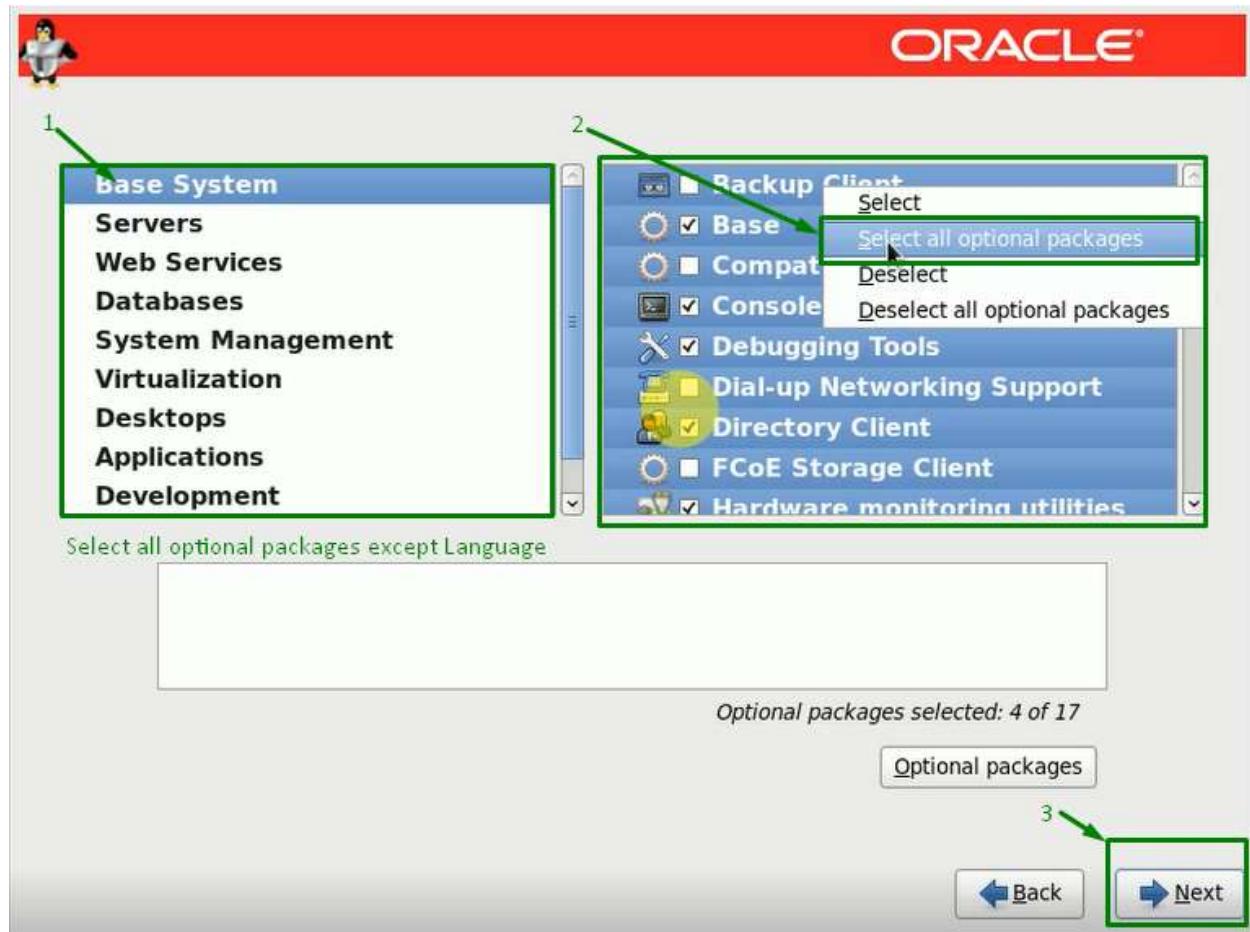
2.51. Select Boot loader operating system then Click on Next button.



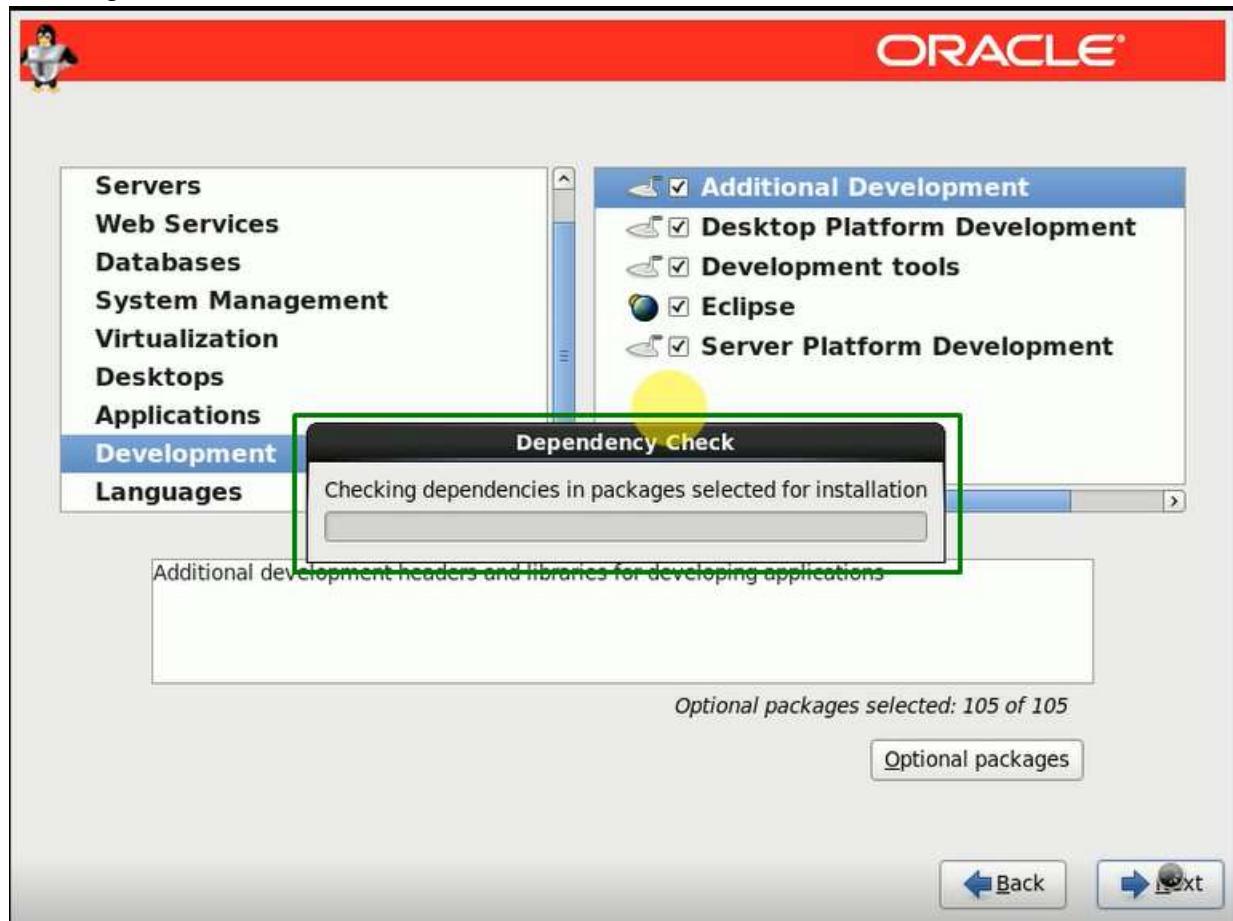
2.52. Choose Customize now option then Click on Next button.



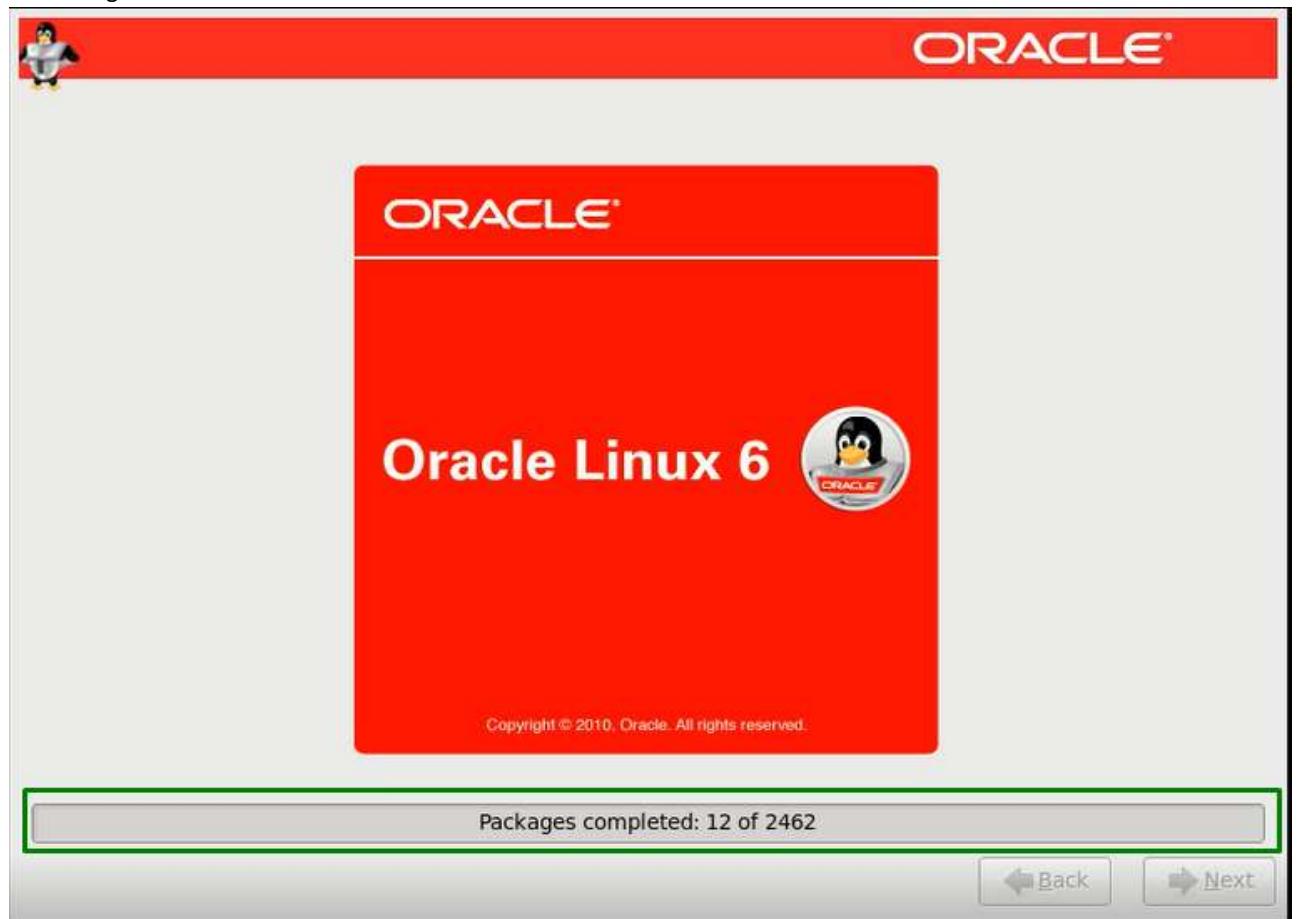
2.53. Choose all optional packages for relevant options except languages option then Click on Next button.



2.54. Progress looks like.



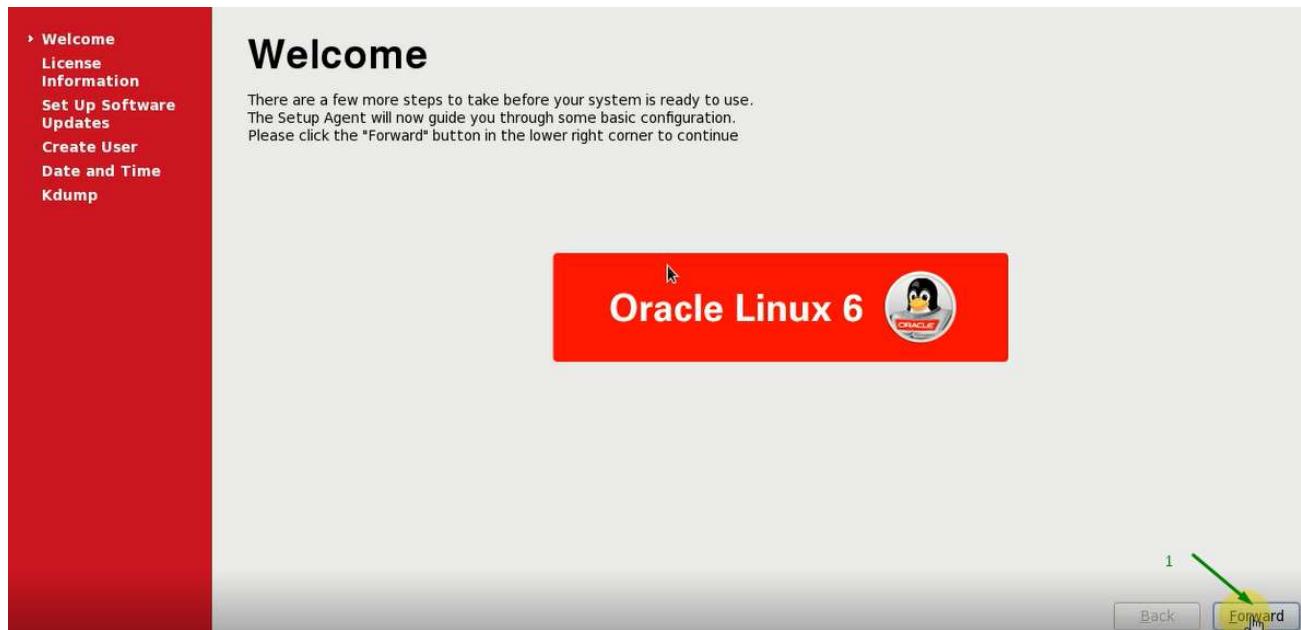
2.55. Progress looks like.



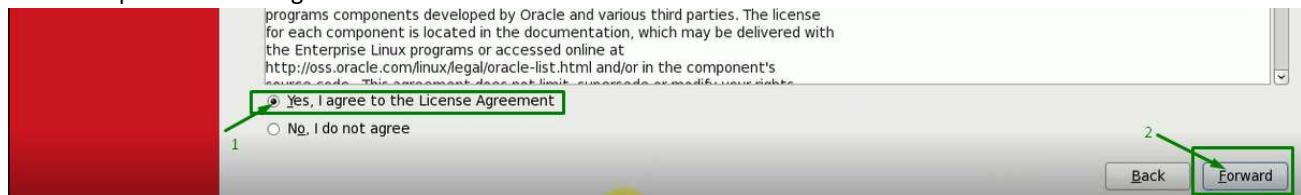
2.56. Click on Reboot button.



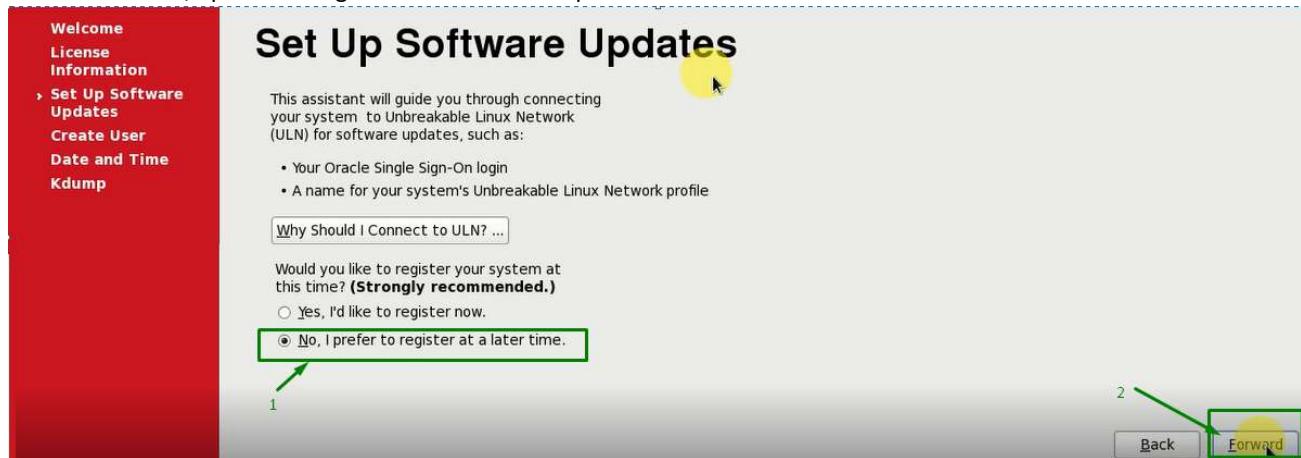
2.57. Click on Forward button.



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



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



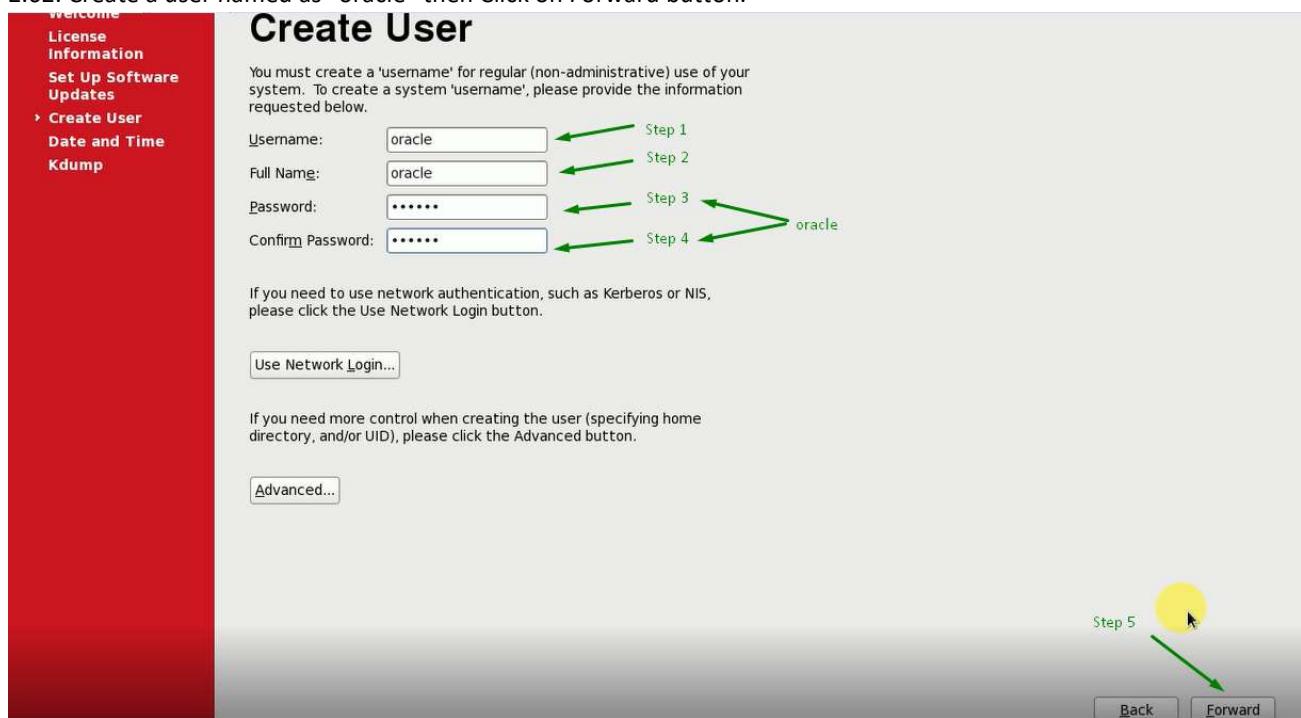
2.60. Click on No thanks, I'll connect later button.



2.61. Click on Forward button.



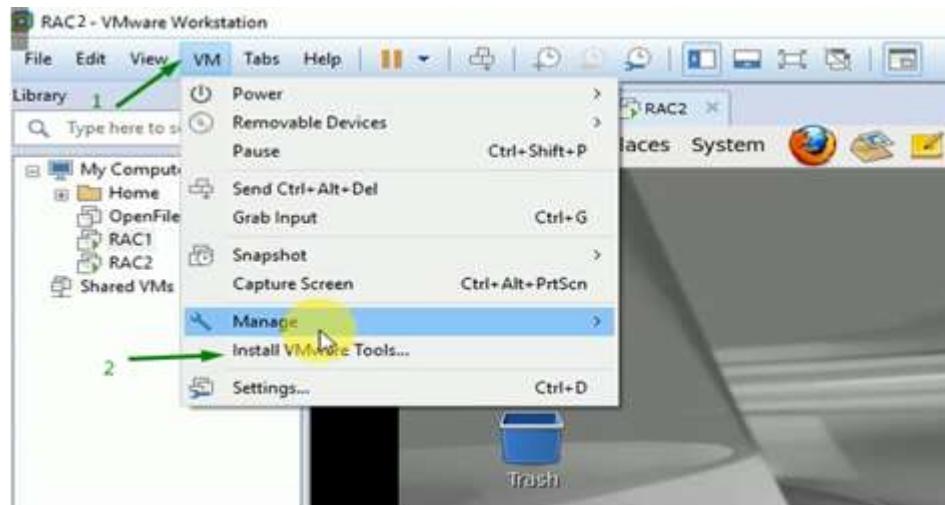
2.62. Create a user named as "oracle" then Click on Forward button.



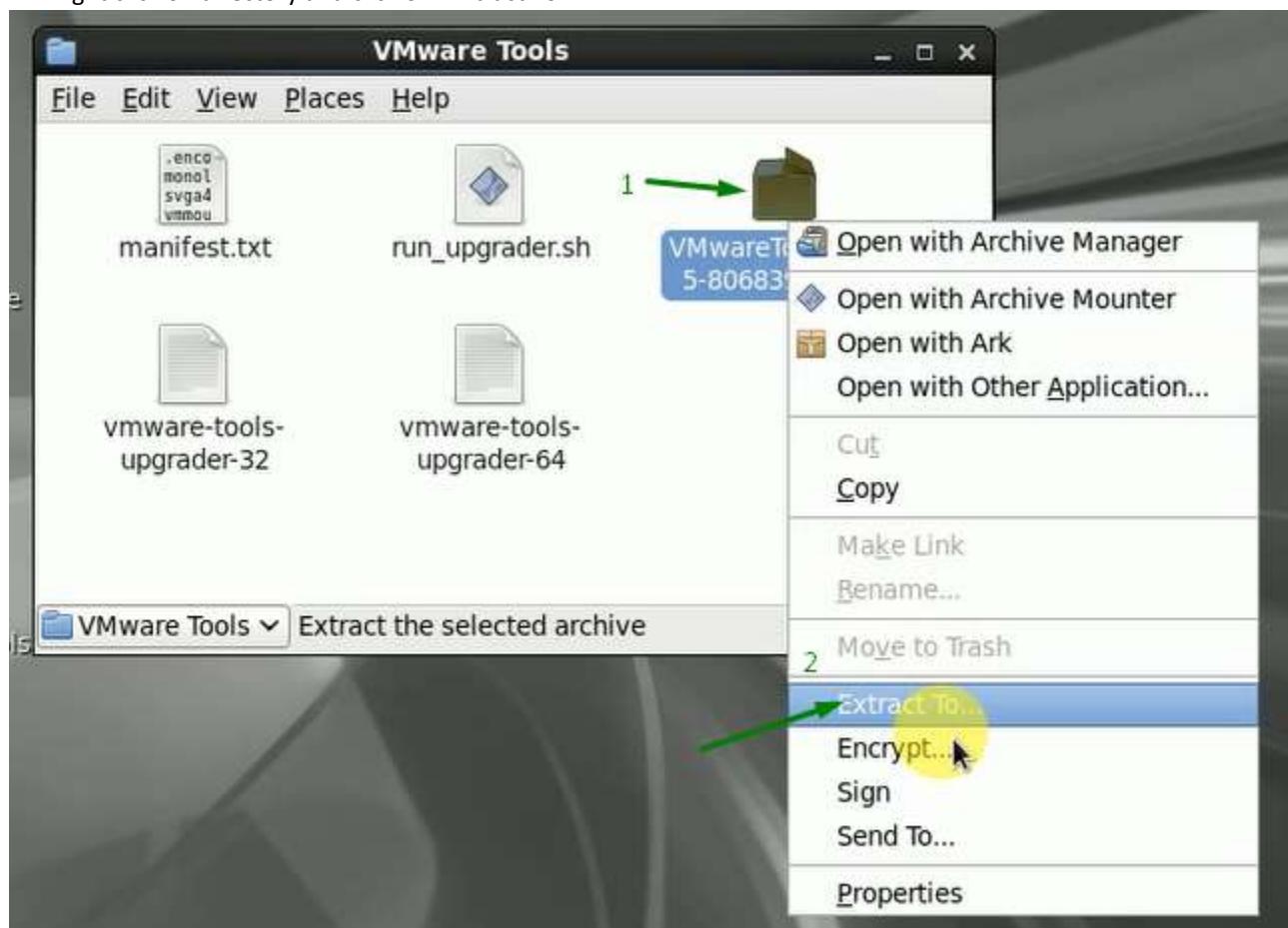
2.63. Login as "root" user with previously password then click on Log In button.



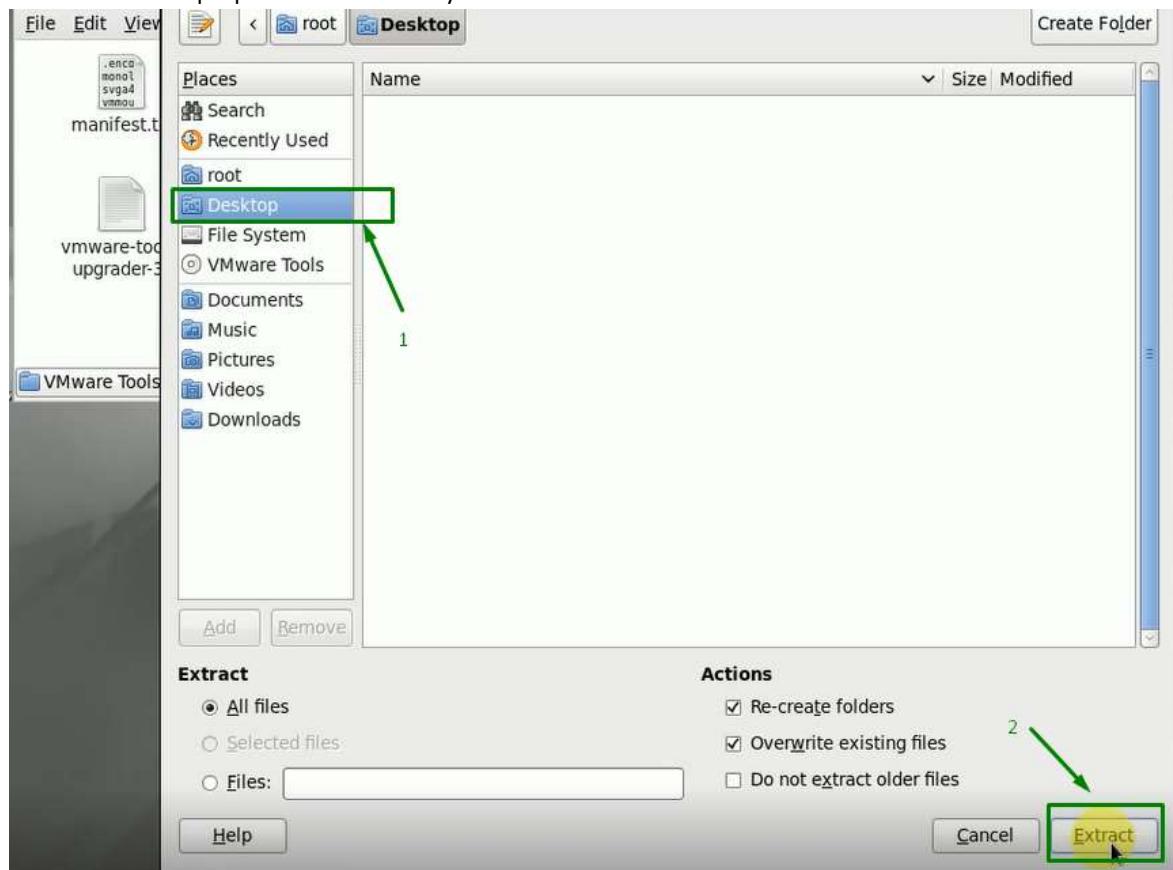
2.64. Go to VM menu then click on “Install VMware Tools”.



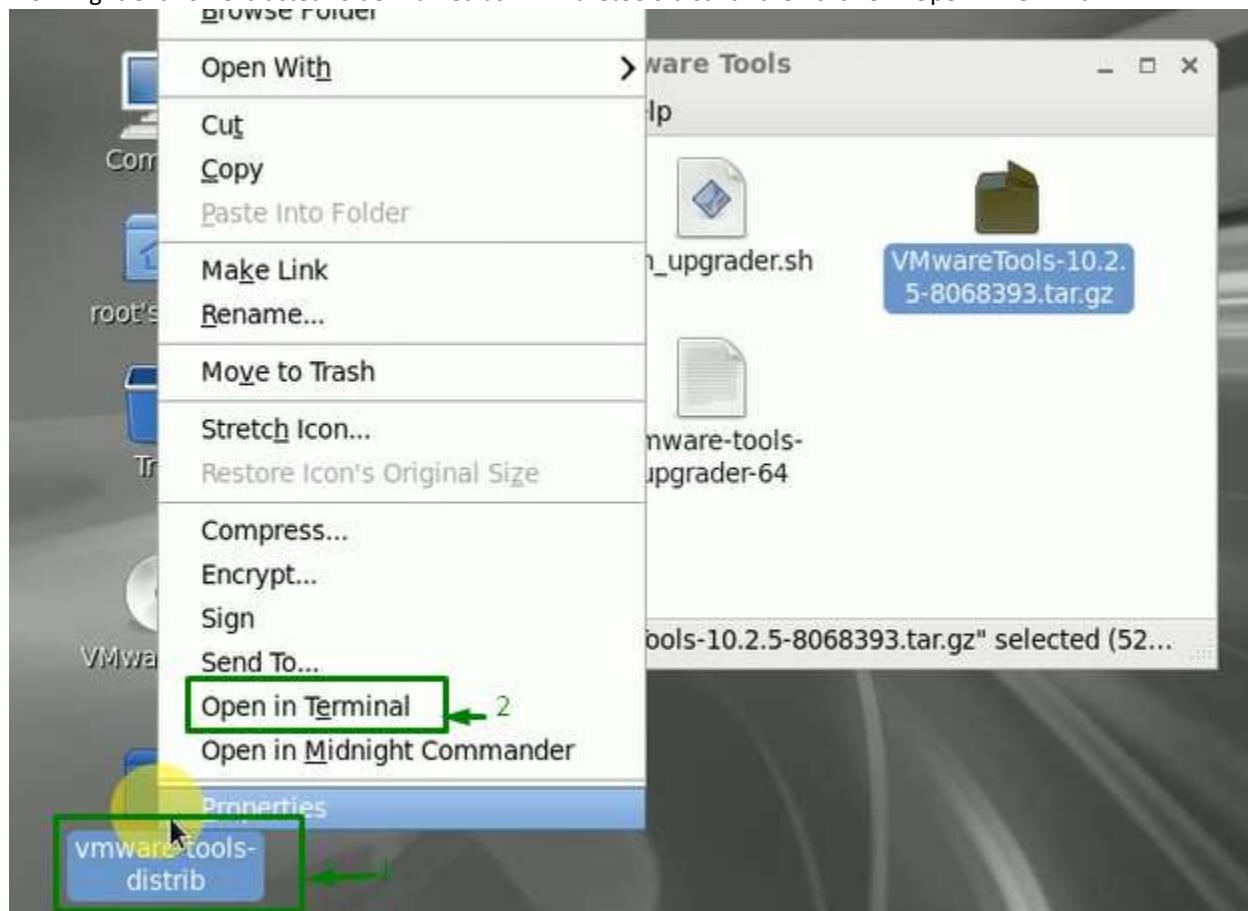
2.65. After step “1.64” there is a terminal with “VMwareTools-10.2.5-8068393.tar.gz” directory appeared then right click on directory and click on “Extract To”.



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



2.67. Right Click on extracted folder named as "vmwaretools-distrib" then click on "Open in Terminal"



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

The screenshot shows a terminal window titled "root@localhost:~/Desktop/vmware-tools-distrib". The command "ls" is run first, followed by "./vmware-install.pl". A green arrow points from the number "1" to the command line where "vmware-install.pl" is highlighted in green. The terminal is running on a Linux system with a root prompt.

```
root@localhost:~/Desktop/vmware-tools-distrib# ls  
bin  caf  doc  etc  FILES  INSTALL  installer  lib  vgaauth  vmware-install.pl  
[root@localhost vmware-tools-distrib]# ./vmware-install.pl
```

2.69. After successful installation of VM tools your terminal looks like

The screenshot shows a terminal window titled "root@localhost:~/Desktop/vmware-tools-distrib". It displays a success message from the VMware Tools configuration script. The message indicates that the configuration completed successfully, and it advises restarting the X session. It also lists steps to enable advanced X features and signs off from the VMware team. The terminal ends with a message about finding a VMware Tools CDROM and ejecting it.

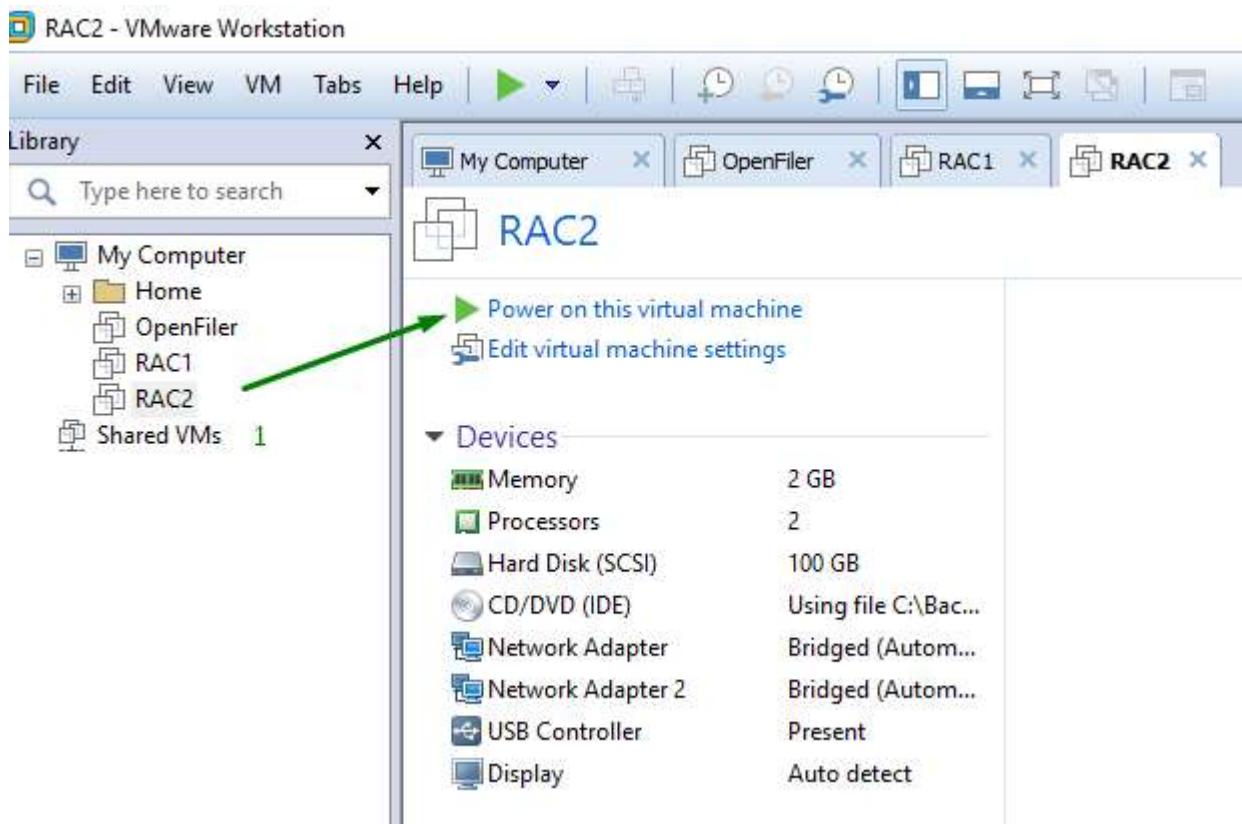
```
Guest filesystem driver: [ OK ]  
Mounting HGFS shares: [ OK ]  
Blocking file system: [ OK ]  
Guest operating system daemon: [ OK ]  
VGAuthService: [ OK ]  
The configuration of VMware Tools 10.2.5 build-8068393 for Linux for this  
running kernel completed successfully.  
You must restart your 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:  
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 CDROM mounted at /media/VMware Tools. Ejecting device  
/dev/sr0 ...  
[root@localhost vmware-tools-distrib]#
```

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

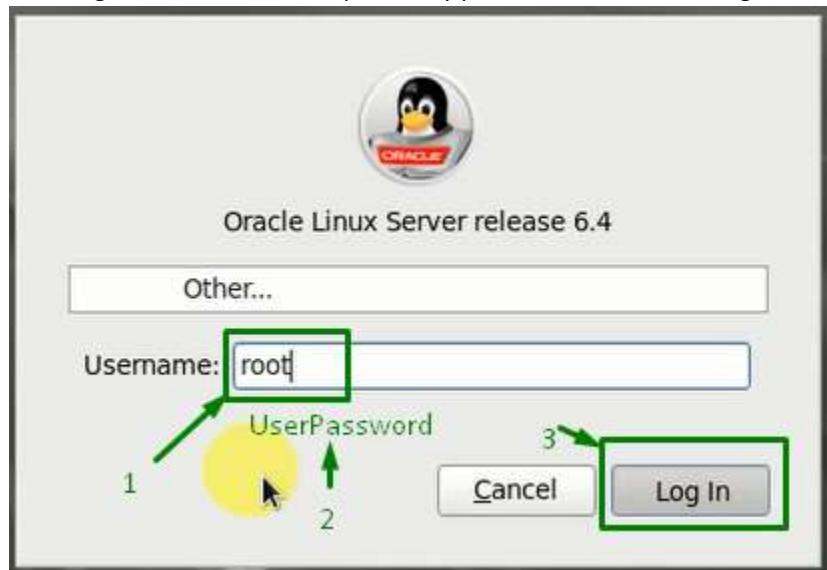
The screenshot shows a terminal window titled "root@localhost:~/Desktop/vmware-tools-distrib". The user has run the VMware Tools configuration script, which completed successfully. Now, they are typing the command "init 0" to shutdown the VM. A green arrow points from the text "Step 1" to the "init 0" command in the terminal. The terminal is running on a Linux system with a root prompt.

```
Guest filesystem driver: [ OK ]  
Mounting HGFS shares: [ OK ]  
Blocking file system: [ OK ]  
Guest operating system daemon: [ OK ]  
VGAuthService: [ 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:  
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 CDROM mounted at /media/VMware Tools. Ejecting device  
/dev/sr0 ...  
[root@localhost vmware-tools-distrib]# init 0 ← Step 1
```

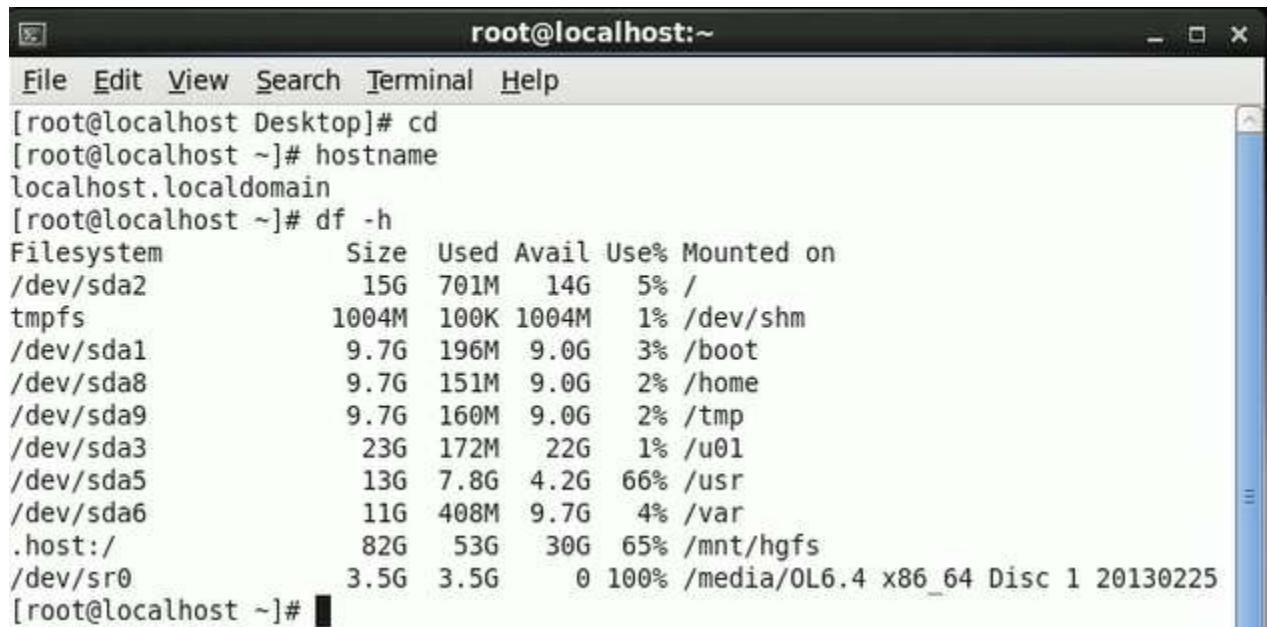
2.71. Power on your machine.



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



2.73. Your machine drives looks like



The screenshot shows a terminal window titled "root@localhost:~". The window contains the following command-line session:

```
[root@localhost Desktop]# cd
[root@localhost ~]# hostname
localhost.localdomain
[root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda2        15G  701M   14G  5% /
tmpfs           1004M 100K 1004M  1% /dev/shm
/dev/sda1        9.7G 196M  9.0G  3% /boot
/dev/sda8        9.7G 151M  9.0G  2% /home
/dev/sda9        9.7G 160M  9.0G  2% /tmp
/dev/sda3        23G 172M  22G  1% /u01
/dev/sda5        13G 7.8G  4.2G  66% /usr
/dev/sda6        11G 408M  9.7G  4% /var
/host:/          82G  53G  30G  65% /mnt/hgfs
/dev/sr0         3.5G  3.5G    0 100% /media/OL6.4_x86_64_Disc_1_20130225
[root@localhost ~]#
```

2.74. The "/etc/hosts" file must contain the following information.

```
[root@localhost ~]# vi /etc/hosts
/*
127.0.0.1 ... localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 .... localhost localhost.localdomain localhost6 localhost6.localdomain6

# Public
192.168.129.105 ... rac1.mydomain ..... rac1
192.168.129.106 ... rac2.mydomain ..... rac2

# Private
192.168.1.102 ... rac1-priv.mydomain ... rac1-priv
192.168.1.103 ... rac2-priv.mydomain ... rac2-priv

# Virtual
192.168.129.107 ... rac1-vip.mydomain ... rac1-vip
192.168.129.108 ... rac2-vip.mydomain ... rac2-vip

# Openfiler (SAN/NAS Storage)
192.168.129.104 ... openfiler.mydomain ... openfiler

# SCAN
192.168.129.109 ... rac-scan.mydomain ... rac-scan
192.168.129.110 ... rac-scan.mydomain ... rac-scan
*/
```

2.75. Disable secure Linux by editing the "/etc/selinux/config" file, making sure the SELINUX flag is set as follows.

```
[root@localhost ~]# vim /etc/selinux/config
/*
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#       enforcing -- SELinux security policy is enforced.
#       permissive -- SELinux prints warnings instead of enforcing.
#       disabled -- No SELinux policy is loaded.
#SELINUX=enforcing
SELINUX=disabled
# SELINUXTYPE= can take one of these two values:
#       targeted -- Targeted processes are protected,
#       mls -- Multi Level Security protection.
SELINUXTYPE=targeted
*/

```

2.76. The "/etc/sysconfig/network-scripts/ifcfg-eth0" file must contain the following information.

```
[root@rac2 ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth0
/*
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=static
IPADDR=192.168.129.106
NETMASK=255.255.255.0
GATEWAY=192.168.129.6
DNS1=192.168.129.16
DNS2=192.168.129.2
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
*/

```

2.77. The "/etc/sysconfig/network-scripts/ifcfg-eth1" file must contain the following information.

```
[root@rac2 ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth1
/*
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=static
IPADDR=192.168.1.103
NETMASK=255.255.255.0
GATEWAY=192.168.129.6
DNS1=192.168.129.16
DNS2=192.168.129.2
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
*/

```

2.78. Restart the network services

```
[root@localhost ~]# service network restart

Shutting down interface eth0: Device state: 3 (disconnected) [ OK ]
Shutting down interface eth1: Device state: 3 (disconnected) [ OK ]
Shutting down loopback interface: [ OK ]
Bringing up loopback interface: [ OK ]
Bringing up interface eth0: Active connection state: activated
Active connection path: /org/freedesktop/NetworkManager/ActiveConnection/2
[ OK ]
Bringing up interface eth1: Active connection state: activated
Active connection path: /org/freedesktop/NetworkManager/ActiveConnection/3
[ OK ]
[root@localhost ~]#
```

2.79. Disabling the firewall.

```
[root@localhost ~]# chkconfig --list iptables
/*
iptables 0:off 1:off 2:on 3:on 4:on 5:on 6:off
*/
[root@localhost ~]# service iptables stop
/*
iptables: Setting chains to policy ACCEPT: nat mangle filter [ OK ]
iptables: Flushing firewall rules: [ OK ]
iptables: Unloading modules: [ OK ]
*/
[root@localhost ~]# chkconfig iptables off
[root@localhost ~]# iptables -F
[root@localhost ~]# service iptables save
/*
iptables: Saving firewall rules to /etc/sysconfig/iptables: [ OK ]
*/
[root@localhost ~]# /etc/init.d/iptables stop
/*
iptables: Setting chains to policy ACCEPT: filter [ OK ]
iptables: Flushing firewall rules: [ OK ]
iptables: Unloading modules: [ OK ]
*/
[root@localhost ~]# chkconfig --list iptables
/*
iptables 0:off 1:off 2:off 3:off 4:off 5:off 6:off
*/
```

2.80. ntpd disable services and reboot the machine

```
[root@localhost ~]# service ntpd stop
/*
Shutting down ntpd:..... [FAILED]
*/
[root@localhost ~]# service ntpd status
/*
ntp is stopped
*/
[root@localhost ~]# chkconfig ntpd off
[root@localhost ~]# mv /etc/ntp.conf /etc/ntp.conf.backup
[root@localhost ~]# rm /etc/ntp.conf
[root@localhost ~]# rm /var/run/ntpd.pid
[root@localhost ~]# init 6
```

2.81. Perform either the Automatic Setup or the Manual Setup to complete the basic prerequisites.

```
[root@rac2 ~]# cd /media/OL6.4\x86_64\Disc\1\20130225/Server/Packages/
[root@rac2 Packages]# yum install oracle-rdbms-server-11gR2-preinstall
[root@rac2 Packages]# yum update
```

2.82. Manual setup the relevant RPMS

```
[root@rac2 Packages]# rpm -iUvh binutils-2*x86_64*
[root@rac2 Packages]# rpm -iUvh glibc-2*x86_64* nss-softokn-freebl-3*x86_64*
[root@rac2 Packages]# rpm -iUvh glibc-2*i686* nss-softokn-freebl-3*i686*
[root@rac2 Packages]# rpm -iUvh compat-libstdc++-33*x86_64*
[root@rac2 Packages]# rpm -iUvh glibc-common-2*x86_64*
[root@rac2 Packages]# rpm -iUvh glibc-devel-2*x86_64*
[root@rac2 Packages]# rpm -iUvh glibc-devel-2*i686*
[root@rac2 Packages]# rpm -iUvh glibc-headers-2*x86_64*
[root@rac2 Packages]# rpm -iUvh elfutils-libelf-0*x86_64*
[root@rac2 Packages]# rpm -iUvh elfutils-libelf-devel-0*x86_64*
[root@rac2 Packages]# rpm -iUvh gcc-4*x86_64*
[root@rac2 Packages]# rpm -iUvh gcc-c++-4*x86_64*
[root@rac2 Packages]# rpm -iUvh ksh-*x86_64*
[root@rac2 Packages]# rpm -iUvh libaio-0*x86_64*
[root@rac2 Packages]# rpm -iUvh libaio-devel-0*x86_64*
[root@rac2 Packages]# rpm -iUvh libaio-0*i686*
[root@rac2 Packages]# rpm -iUvh libaio-devel-0*i686*
[root@rac2 Packages]# rpm -iUvh libgcc-4*x86_64*
[root@rac2 Packages]# rpm -iUvh libgcc-4*i686*
[root@rac2 Packages]# rpm -iUvh libstdc++-4*x86_64*
[root@rac2 Packages]# rpm -iUvh libstdc++-4*i686*
[root@rac2 Packages]# rpm -iUvh libstdc++-devel-4*x86_64*
[root@rac2 Packages]# rpm -iUvh make-3.81*x86_64*
[root@rac2 Packages]# rpm -iUvh numactl-devel-2*x86_64*
[root@rac2 Packages]# rpm -iUvh sysstat-9*x86_64*
[root@rac2 Packages]# rpm -iUvh compat-libstdc++-33*i686*
[root@rac2 Packages]# rpm -iUvh compat-libcap*
[root@rac2 Packages]# rpm -iUvh libaio-devel-0.*
[root@rac2 Packages]# rpm -iUvh ksh-2*
[root@rac2 Packages]# rpm -iUvh libstdc++-4.*.i686*
[root@rac2 Packages]# rpm -iUvh elfutils-libelf-0*i686* elfutils-libelf-devel-0*i686*
[root@rac2 Packages]# rpm -iUvh libtool-ltdl*i686*
[root@rac2 Packages]# rpm -iUvh ncurses*i686*
[root@rac2 Packages]# rpm -iUvh readline*i686*
[root@rac2 Packages]# rpm -iUvh unixODBC*
[root@rac2 Packages]# rpm -Uvh oracleasm*.rpm
```

```
# rpm -q binutils compat-libstdc++-33 elfutils-libelf elfutils-devel elfutils-libelf-devel-static \
# rpm -q gcc gcc-c++ glibc glibc-common glibc-devel glibc-headers kernel-headers ksh libaio libaio-devel \
# rpm -q libgcc libgomp libstdc++ libstdc++-devel make numactl-devel sysstat unixODBC unixODBC-devel
```

2.83. Pre-Installation Steps for ASM

```
[root@rac2 ~]# cd /etc/yum.repos.d
[root@rac2 yum.repos.d]# uname -a
/*
Linux rac1/rac2.mydomain 2.6.39-400.313.1.el6uek.x86_64 #1
SMP Thu Aug 8 15:49:52 PDT 2019 x86_64 x86_64 x86_64 GNU/Linux
*/

[root@rac2 yum.repos.d]# cat /etc/os-release
/*
NAME="Oracle Linux Server"
VERSION="6.10"
ID="ol"
VERSION_ID="6.10"
PRETTY_NAME="Oracle Linux Server 6.10"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:oracle:linux:6:10:server"
HOME_URL="https://linux.oracle.com/"
BUG_REPORT_URL="https://bugzilla.oracle.com/"

ORACLE_BUGZILLA_PRODUCT="Oracle Linux 6"
ORACLE_BUGZILLA_PRODUCT_VERSION=6.10
ORACLE_SUPPORT_PRODUCT="Oracle Linux"
ORACLE_SUPPORT_PRODUCT_VERSION=6.10
*/
```

2.84. Creating an repo

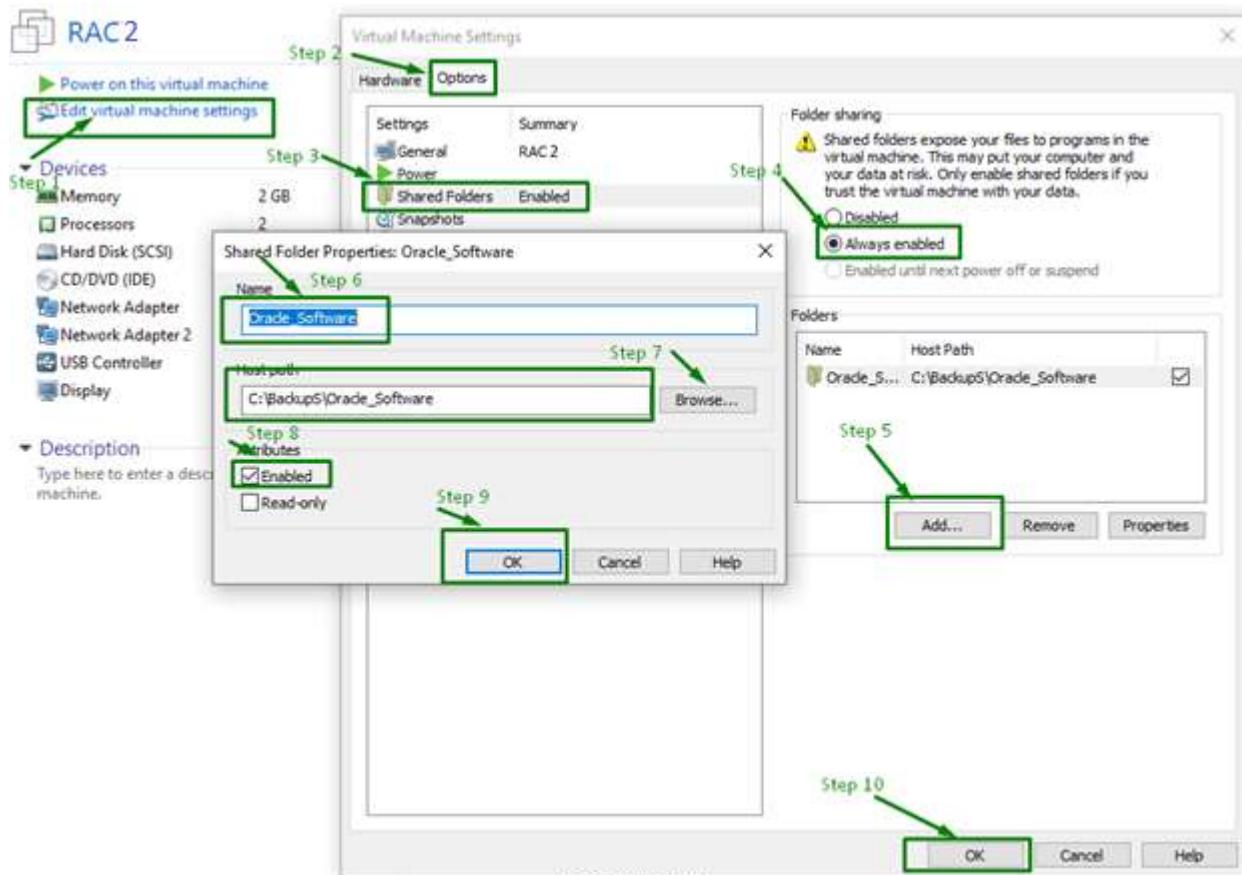
```
[root@rac2 yum.repos.d]# wget https://public-yum.oracle.com/public-yum-ol6.repo
/*
--2019-09-02 13:50:54-- https://public-yum.oracle.com/public-yum-ol6.repo
Resolving public-yum.oracle.com... 104.84.157.171
Connecting to public-yum.oracle.com|104.84.157.171|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 12045 (12K) [text/plain]
Saving to: "public-yum-ol6.repo.2"

100% [=====] 12,045      --.-K/s in 0s

2019-09-02 13:50:55 (95.3 MB/s) -- "public-yum-ol6.repo" saved [12045/12045]
*/
[root@rac2 yum.repos.d]# ls
/*
oracle-linux-ol6.repo.disabled public-yum-ol6.repo public-yum-ol6.repo.2
packagekit-media.repo public-yum-ol6.repo.1 uek-ol6.repo.disabled
*/

[root@rac2 yum.repos.d]# yum install kmod-oracleasm
[root@rac2 yum.repos.d]# yum install oracleasm-support
/*
Loaded plugins: aliases, changelog, kabi, presto, refresh-packagekit, security,
tmpprepo, ulninfo, verify, versionlock
Loading support for kernel ABI
Setting up Install Process
Package oracleasm-support-2.1.11-2.el6.x86_64 already installed and latest version
Nothing to do
*/
```

2.85. Creating a Shared folder to install relevant rpms by ASM



2.86. To install relevant rpms by ASM

```
[root@rac2 yum.repos.d]# cd /mnt/hgfs/Oracle_Software/OracleASM_Package/
[root@rac2 OracleASM_Package]# ls
/*
elfutils-libelf-devel-static-0.164-2.el6.x86_64.rpm
oracleasmlib-2.0.4-1.el6.x86_64.rpm
*/
[root@rac2 OracleASM_Package]# rpm -iUvh oracleasmlib-2.0.4-1.el6.x86_64.rpm
/*
Preparing..... ###### [100%]
... package oracleasmlib-2.0.4-1.el6.x86_64 is already installed
*/
[root@rac2 OracleASM_Package]# rpm -iUvh elfutils-libelf-devel-static-0.164-2.el6.x86_64.rpm
/*
Preparing..... ###### [100%]
... 1:elfutils-libelf-devel-s***** [100%]
*/
--- Oracle ASM Configuration
[root@rac2 ~]# rpm -qa | grep -i oracleasm
/*
kmod-oracleasm-2.0.8-16.1.el6_10.x86_64
oracleasmlib-2.0.4-1.el6.x86_64
oracleasm-support-2.1.11-2.el6.x86_64
*/
```

2.87. Add the kernel parameters file "/etc/sysctl.conf" and add oracle recommended kernel parameters

```
[root@rac2 ~]# vim /etc/sysctl.conf
/*
net.ipv4.ip_forward=0
net.ipv4.conf.default.accept_source_route=0
kernel.sysrq=0
kernel.core_uses_pid=1
net.ipv4.tcp_syncookies=1
net.bridge.bridge-nf-call-ip6tables=0
net.bridge.bridge-nf-call-iptables=0
net.bridge.bridge-nf-call-arptables=0
kernel.msgmnb=65536
kernel.msgmax=65536
fs.file-max=6815744
kernel.sem=250 32000 100 128
kernel.shmmni=65536
kernel.shmall=1073741824
kernel.shmmax=4398046511104
kernel.panic_on_oops=1
net.core.rmem_default=262144
net.core.rmem_max=4194304
net.core.wmem_default=262144
net.core.wmem_max=1048576
net.ipv4.conf.all.rp_filter=2
net.ipv4.conf.default.rp_filter=2
fs.aio-max-nr=1048576
net.ipv4.ip_local_port_range=9000 65500
*/
[root@rac2 ~]# /sbin/sysctl -p
```

2.88. Edit "/etc/security/limits.conf" file to limit user processes

```
[root@rac2 ~]# vim /etc/security/limits.conf
/*
oracle...soft...nofile...65536
oracle...hard...nofile...65536
oracle...soft...nproc...16384
oracle...hard...nproc...16384
oracle...soft...stack...10240
oracle...hard...stack...32768
oracle...hard...memlock...134217728
oracle...soft...memlock...134217728

grid...soft...nproc...16384
grid...hard...nproc...16384
grid...soft...nofile...65536
grid...hard...nofile...65536
grid...soft...stack...10240
grid...soft...memlock...134217728
grid...hard...memlock...134217728
*/
```

2.89. Add the following line to the "/etc/pam.d/login" file, if it does not already exist.

```
[root@rac2 ~]# vim /etc/pam.d/login
/*
#%PAM-1.0
auth [user_unknown=ignore success=ok ignore=ignore default=bad] pam_securetty.so
auth       include      system-auth
account    required    pam_nologin.so
account    include      system-auth
password   include      system-auth
# pam_selinux.so close should be the first session rule
session   required    pam_selinux.so close
session   required    pam_loginuid.so
session   optional    pam_console.so
# pam_selinux.so open should only be followed by sessions to be executed in the user context
session   required    pam_selinux.so open
session   required    pam_namespace.so
session   optional    pam_keyinit.so force revoke
session   include      system-auth
-session  optional    pam_ck_connector.so
session   required    pam_limits.so
*/

```

2.90. Create the new groups and users.

```
[root@rac2 ~]# cat /etc/group | grep -i oinstall
/*
oinstall:x:54321:
*/
[root@rac2 ~]# cat /etc/group | grep -i dba
/*
dba:x:54322:oracle
*/
[root@rac2 ~]# cat /etc/group | grep -i asm
[root@rac2 ~]# /usr/sbin/groupadd -g 503 oper
[root@rac2 ~]# /usr/sbin/groupadd -g 504 asmadmin
[root@rac2 ~]# /usr/sbin/groupadd -g 506 asmdba
[root@rac2 ~]# /usr/sbin/groupadd -g 507 asmoper
[root@rac2 ~]# /usr/sbin/useradd -g oinstall -G asmadmin,asmdba,asmoper,grid
[root@rac2 ~]# /usr/sbin/usermod -g oinstall -G dba,oper,asmdba oracle
```

2.91. Verify the groups and users.

```
[root@rac2 ~]# cat /etc/group | grep -i asm
/*
asmadmin:x:504:grid
asmdba:x:506:grid,oracle
asmoper:x:507:grid
*/
[root@rac2 ~]# cat /etc/group | grep -i oracle
/*
dba:x:54322:oracle
oper:x:503:oracle
asmdba:x:506:grid,oracle
*/
[root@rac2 ~]# cat /etc/group | grep -i grid
/*
asmadmin:x:504:grid
asmdba:x:506:grid,oracle
asmoper:x:507:grid
*/
```

2.92. Set the password for users.

```
[root@rac2 ~]# passwd oracle
}/*
Changing password for user oracle.
New password: oracle
BAD PASSWORD: it is based on a dictionary word
BAD PASSWORD: is too simple
Retype new password: oracle
passwd: all authentication tokens updated successfully.
*/
[root@rac2 ~]# passwd grid
}/*
Changing password for user grid.
New password: grid
BAD PASSWORD: it is too short
BAD PASSWORD: is too simple
Retype new password: grid
passwd: all authentication tokens updated successfully.
*/
```

2.93. Create number of directory required to install grid and oracle

```
--1.Create the Oracle Inventory Director:
[root@rac2 ~]# mkdir -p /u01/app/oraInventory
[root@rac2 ~]# chown -R grid:oinstall /u01/app/oraInventory
[root@rac2 ~]# chmod -R 775 /u01/app/oraInventory

--2.Creating the Oracle Grid Infrastructure Home Directory:
[root@rac2 ~]# mkdir -p /u01/11.2.0.3.0/grid
[root@rac2 ~]# chown -R grid:oinstall /u01/11.2.0.3.0/grid
[root@rac2 ~]# chmod -R 775 /u01/11.2.0.3.0/grid

--3.Creating the Oracle Base Directory
[root@rac2 ~]# mkdir -p /u01/app/oracle
[root@rac2 ~]# mkdir /u01/app/oracle/cfgtoollogs
[root@rac2 ~]# chown -R oracle:oinstall /u01/app/oracle
[root@rac2 ~]# chmod -R 775 /u01/app/oracle
[root@rac2 ~]# chown -R grid:oinstall /u01/app/oracle/cfgtoollogs
[root@rac2 ~]# chmod -R 775 /u01/app/oracle/cfgtoollogs

--4.Creating the Oracle RDBMS Home Directory
[root@rac2 ~]# mkdir -p /u01/app/oracle/product/11.2.0.3.0/db_1
[root@rac2 ~]# chown -R oracle:oinstall /u01/app/oracle/product/11.2.0.3.0/db_1
[root@rac2 ~]# chmod -R 775 /u01/app/oracle/product/11.2.0.3.0/db_1
[root@rac2 ~]# cd /u01/app/oracle
[root@rac2 oracle]# chown -R oracle:oinstall product/
[root@rac2 oracle]# chmod -R 775 product/
```

2.94. Make the following changes to the default shell startup file, add the following lines to the /etc/profile file

```
[root@rac2 ~]# vim /etc/profile
/*
if [ $USER == "oracle" ]; then
..... if [ $SHELL == "/bin/ksh" ]; then
..... ulimit -p 16384
..... ulimit -n 65536
.... else
..... ulimit -u 16384 -n 65536
.... fi
fi

if [ $USER == "grid" ]; then
..... if [ $SHELL == "/bin/ksh" ]; then
..... ulimit -p 16384
..... ulimit -n 65536
.... else
..... ulimit -u 16384 -n 65536
.... fi
fi
*/
```

2.95. For the C shell (csh or tcsh), add the following lines to the /etc/csh.login file

```
[root@rac2 ~]# vim /etc/csh.login
/*
if ($USER == "oracle") then
..... limit maxproc 16384
..... limit descriptors 65536
endif

if ($USER == "grid") then
..... limit maxproc 16384
..... limit descriptors 65536
endif
*/
```

2.96. Unzip the relevant setup files

```
[root@rac2 ~]# mkdir -p /home/grid/grid_software
[root@rac2 ~]# mkdir -p /home/oracle/oracle_software

---Unzip the files.
[root@rac2 oracle]# cd
[root@rac2 ~]# cd ./mnt/hgfs/Oracle_Software/Oracle\ Db\ 11.2.0.3.0\ \(64-bit\--Linux\)/
[root@rac2 Oracle_Db_11.2.0.3.0_(64-bit--Linux)]# ls
/*
p10404530_112030_Linux-x86-64_1of7.zip..p10404530_112030_Linux-x86-64_3of7-Clusterware.zip
p10404530_112030_Linux-x86-64_2of7.zip..software_patch
*/

# unzip p10404530_112030_Linux-x86-64_1of7.zip -d /home/oracle/oracle_software/
# unzip p10404530_112030_Linux-x86-64_2of7.zip -d /home/oracle/oracle_software/
# unzip p10404530_112030_Linux-x86-64_3of7-Clusterware.zip -d /home/grid/grid_software/

---Login as root user and issue the following command at rac1
[root@rac2 Oracle_Db_11.2.0.3.0_(64-bit--Linux)]# cd /home/grid/
[root@rac2 grid]# chown -R grid:oinstall grid_software
[root@rac2 grid]# chmod -R 775 /home/grid/
[root@rac2 grid]# cd /home/oracle/
[root@rac2 oracle]# chown -R oracle:oinstall /home/oracle/
[root@rac2 oracle]# chmod -R 775 /home/oracle/
```

2.97. To Disable the virbr0 Linux services and then reboot the VM machine

```
[root@rac2 ~]# cd /etc/sysconfig/
[root@rac2 sysconfig]# brctl show
/*
bridge.name.....bridge.id.....STP.enabled....interfaces
lxcbr0.....8000.000000000000....no.....
pan0.....8000.000000000000....no.....
virbr0.....8000.525400467a72....yes.....virbr0-nic
*/
[root@rac2 sysconfig]# virsh net-list
/*
Name.....State.....Autostart.....Persistent
-----
default.....active.....yes.....yes
*/
[root@rac2 sysconfig]# service libvirtd stop
/*
Stopping libvirtd daemon: ..... [ OK ]
*/
[root@rac2 sysconfig]# chkconfig --list | grep libvirtd
/*
libvirtd 0:off 1:off 2:off 3:on 4:on 5:on 6:off
*/
[root@rac2 sysconfig]# chkconfig libvirtd off
[root@rac2 sysconfig]# ip link set lxcbr0 down
[root@rac2 sysconfig]# brctl delbr lxcbr0
[root@rac2 sysconfig]# brctl show
[root@rac2 sysconfig]# init 6
```

2.98. To Verify the virbr0 Linux services

```
[root@rac2 ~]# brctl show
/*
bridge.name.....bridge.id.....STP.enabled....interfaces
lxcbr0.....8000.000000000000..no.....
pan0.....8000.000000000000..no.....
*/
[root@rac2 ~]# chkconfig --list | grep libvирtd
/*
libvirtd::0:off....1:off....2:off....3:off....4:off....5:off....6:off
*/
```

2.99. Login as the oracle user and add the following lines at the end of the ".bash_profile" file and reset the .bash_profile setting into Linux kernel.

```
[root@rac2 ~]# su -- oracle
[oracle@rac2 ~]$ vim .bash_profile
/*
#.bash_profile

#.Get.the.aliases.and.functions
if [ --f.~/bashrc. ]: then
.....~/.bashrc
fi

#.User.specfic.environment.and.startup.programs
#PATH=$PATH:$HOME/bin
#export PATH

#.Oracle.Settings
TMP=/tmp; export TMP
TMPDIR=$TMP; export TMPDIR

ORACLE_HOSTNAME=rac2.mydomain; export ORACLE_HOSTNAME
ORACLE_UNQNAME=racdb; export ORACLE_UNQNAME
ORACLE_BASE=/u01/app/oracle; export ORACLE_BASE
ORACLE_HOME=$ORACLE_BASE/product/11.2.0.3.0/db_1; export ORACLE_HOME
ORACLE_SID=racdb2; export ORACLE_SID

PATH=/usr/sbin:$PATH; export PATH
PATH=$ORACLE_HOME/bin:$PATH; export PATH

LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib; export LD_LIBRARY_PATH
CLASSPATH=$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib; export CLASSPATH
*/
[oracle@rac2 ~]$ . .bash_profile
```

2.100. Login as the grid user and add the following lines at the end of the ".bash_profile" file and reset the .bash_profile setting into Linux kernel.

```
[root@rac2 ~]# su -- grid
[grid@rac2 ~]$ vim .bash_profile
/*
# .bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
    . ~/.bashrc
fi

# User specific environment and startup programs
#PATH=$PATH:$HOME/bin
#export PATH

# Grid Settings
TMP=/tmp; export TMP
TMPDIR=$TMP; export TMPDIR

ORACLE_SID=+ASM2; export ORACLE_SID
ORACLE_BASE=/u01/app/oracle; export ORACLE_BASE
GRID_HOME=/u01/11.2.0.3.0/grid; export GRID_HOME
ORACLE_HOME=$GRID_HOME; export ORACLE_HOME

PATH=/usr/sbin:$PATH; export PATH
PATH=$ORACLE_HOME/bin:$PATH; export PATH

LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib; export LD_LIBRARY_PATH
CLASSPATH=$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib; export CLASSPATH
*/
[grid@rac2 ~]$ . .bash_profile
```

2.101. Edit the "/etc/sysconfig/network" file as

```
[root@rac2 ~]# vim /etc/sysconfig/network
/*
NETWORKING=yes
HOSTNAME=rac2.mydomain
# oracle-rdbms-server-11gR2-preinstall :: Add NOZEROCONF=yes
NOZEROCONF=yes
*/
```

3. SSH Configuration between two nodes RAC1 and RAC2

3.1. Create a RSA, DSA and Authorization key for RAC1 for “oracle” user

```
[root@rac1 ~]# su -- oracle
[oracle@rac1 ~]# mkdir ~/.ssh
[oracle@rac1 ~]# chmod 700 ~/.ssh

--Generate the RSA and DSA keys:
[oracle@rac1 ~]# /usr/bin/ssh-keygen -t rsa
[oracle@rac1 ~]# /usr/bin/ssh-keygen -t dsa

[oracle@rac1 ~]# touch ~/.ssh/authorized_keys
[oracle@rac1 ~]# cd ~/.ssh

--(a) Add these Keys to the Authorized_keys file.
[oracle@rac1 ~]# cat id_rsa.pub >> authorized_keys
[oracle@rac1 ~]# cat id_dsa.pub >> authorized_keys
```

3.2. Create a RSA and DSA for RAC2 for “oracle” user

```
[root@rac2 ~]# su -- oracle
[oracle@rac2 ~]# mkdir ~/.ssh
[oracle@rac2 ~]# chmod 700 ~/.ssh

--Generate the RSA and DSA keys:
[oracle@rac2 ~]# /usr/bin/ssh-keygen -t rsa
[oracle@rac2 ~]# /usr/bin/ssh-keygen -t dsa
[oracle@rac2 ~]# cd ~/.ssh
```

3.3. Copy the Authorization key from RAC1 to RAC2 for “oracle” user

```
[oracle@rac1 .ssh]# scp authorized_keys oracle@rac2:~/.ssh/
/*
The authenticity of host 'rac2 (192.168.129.106)' can't be established.
RSA key fingerprint is 87:1a:ad:6d:f8:cc:fb:37:b7:60:66:c1:20:55:97:53.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'rac2,192.168.129.106' (RSA) to the list of known hosts.
oracle@rac2's password: .
authorized_keys.....100% 1020.....1.0KB/s 00:0
*/
```

oracle

3.4. Provide the necessary permissions to Authorization key from RAC1 for “oracle” user

```
[oracle@rac1 ~]# chmod 600 ~/.ssh/authorized_keys
```

3.5. Provide the necessary permissions to Authorization key from RAC2 for “oracle” user

```
[oracle@rac2 ~]# chmod 600 ~/.ssh/authorized_keys
```

3.6. Connect RAC2 from RAC1 for “oracle” user

```
[oracle@rac1 ~]$ ssh oracle@rac2
/*
oracle@rac2's password:
*/
[oracle@rac2 ~]$ exit
/*
oracle
logout
Connection to rac2 closed.
*/.
```

3.7. Connect RAC1 from RAC2 for “oracle” user

```
[oracle@rac2 ~]$ ssh oracle@rac1
/*
The authenticity of host 'rac1 (192.168.129.105)' can't be established.
RSA key fingerprint is 4a:f2:44:d8:f2:82:93:17:27:d5:86:36:9a:ef:6f:25.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'rac1,192.168.129.105' (RSA) to the list of known hosts.
oracle@rac1's password:
*/
[oracle@rac1 ~]$ exit
/*
oracle
logout
Connection to rac1 closed.
*/
```

3.8. Create a RSA, DSA and Authorization key for RAC1 for “grid” user

```
[root@rac1 ~]# su -- grid
[grid@rac1 ~]$ mkdir ~/.ssh
[grid@rac1 ~]$ chmod 700 ~/.ssh

--Generate the RSA and DSA keys:
[grid@rac1 ~]$ /usr/bin/ssh-keygen -t rsa
[grid@rac1 ~]$ /usr/bin/ssh-keygen -t dsa

[grid@rac1 ~]$ touch ~/.ssh/authorized_keys
[grid@rac1 ~]$ cd ~/.ssh

--(a) Add these Keys to the Authorized_keys file.
[grid@rac1 .ssh]$ cat id_rsa.pub >> authorized_keys
[grid@rac1 .ssh]$ cat id_dsa.pub >> authorized_keys
```

3.9. Create a RSA and DSA for RAC2 for “grid” user

```
[root@rac2 ~]# su -- grid
[grid@rac2 ~]$ mkdir ~/.ssh
[grid@rac2 ~]$ chmod 700 ~/.ssh

--Generate the RSA and DSA keys:
[grid@rac2 ~]$ /usr/bin/ssh-keygen -t rsa
[grid@rac2 ~]$ /usr/bin/ssh-keygen -t dsa
[grid@rac2 ~]$ cd ~/.ssh
```

3.10. Copy the Authorization key from RAC1 to RAC2 for “grid” user

```
[grid@rac1 .ssh]$ scp authorized_keys grid@rac2:~/ssh/  
/*  
The authenticity of host 'rac2 (192.168.129.106)' can't be established.  
RSA key fingerprint is 87:1a:ad:6d:f8:cc:fb:37:b7:60:66:c1:20:55:97:53.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'rac2,192.168.129.106' (RSA) to the list of known hosts.  
grid@rac2's password:  
authorized_keys.....100% 1016.....1.0KB/s 00:00....  
*/
```



3.11. Provide the necessary permissions to Authorization key from RAC1 for “grid” user

```
[grid@rac1 .ssh]$ chmod 600 ~/ssh/authorized_keys
```

3.12. Provide the necessary permissions to Authorization key from RAC1 for “grid” user

```
[grid@rac2 .ssh]$ chmod 600 ~/ssh/authorized_keys
```

3.13. Connect RAC2 from RAC1 for “grid” user

```
[grid@rac1 .ssh]$ ssh grid@rac2  
/*  
grid@rac2's password:  
*/.  
[grid@rac2 ~]$ exit  
/*  
logout  
Connection to rac2 closed.  
*/
```



3.14. Connect RAC1 from RAC2 for “grid” user

```
[grid@rac2 .ssh]$ ssh grid@rac1  
/*  
The authenticity of host 'rac1 (192.168.129.105)' can't be established.  
RSA key fingerprint is 4a:f2:44:d8:f2:82:93:17:27:d5:86:36:9a:ef:6f:25.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'rac1,192.168.129.105' (RSA) to the list of known hosts.  
grid@rac1's password:  
*/  
[grid@rac1 ~]$ exit  
/*  
logout  
Connection to rac1 closed.  
*/
```



3.15. Connect RAC2 from RAC1 for “root” user

```
[root@rac1 ~]# ssh rac2
/*
The authenticity of host 'rac2 (192.168.129.106)' can't be established.
RSA key fingerprint is 87:1a:ad:6d:f8:cc:fb:37:b7:60:66:c1:20:55:97:53.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'rac2,192.168.129.106' (RSA) to the list of known hosts.
root@rac2's password: P@ssw0rd
*/
[root@rac2 ~]# exit
/*
logout
Connection to rac2 closed.
*/
```

3.16. Connect RAC1 from RAC2 for “root” user

```
[root@rac2 ~]# ssh rac1
/*
The authenticity of host 'rac1 (192.168.129.105)' can't be established.
RSA key fingerprint is 4a:f2:44:d8:f2:82:93:17:27:d5:86:36:9a:ef:6f:25.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'rac1,192.168.129.105' (RSA) to the list of known hosts.
root@rac1's password: P@ssw0rd
*/
[root@rac1 ~]# exit
/*
logout
Connection to rac1 closed.
*/
```

3.17. Restart the services of openfiler (SAN/NAS Storage)

```
[root@openfiler ~]# service iscsi-target status
ietd (pid 925) is running...
[root@openfiler ~]# service iscsi-target restart
Stopping iSCSI target service: .....
Starting iSCSI target service: [ OK ]
[root@openfiler ~]# [ OK ]
```

4. Oracle ASM configuration for nodes RAC1 and RAC2

4.1. Verify the Oracle ASM for RAC1

```
[root@rac1 ~]# which oracleasm
/*
/usr/sbin/oracleasm
*/
[root@rac1 ~]# oracleasm configure
/*
ORACLEASM_ENABLED=false
ORACLEASM_UID=
ORACLEASM_GID=
ORACLEASM_SCANBOOT=true
ORACLEASM_SCANORDER=""
ORACLEASM_SCANEXCLUDE=""
ORACLEASM_SCAN_DIRECTORIES=""
ORACLEASM_USE_LOGICAL_BLOCK_SIZE="false"
*/
[root@rac1 ~]# oracleasm status
/*
Checking if ASM is loaded: no
Checking if /dev/oracleasm is mounted: no
*/
```

4.2. Verify the Oracle ASM for RAC2

```
[root@rac2 ~]# which oracleasm
/*
/usr/sbin/oracleasm
*/
[root@rac2 ~]# oracleasm configure
/*
ORACLEASM_ENABLED=false
ORACLEASM_UID=
ORACLEASM_GID=
ORACLEASM_SCANBOOT=true
ORACLEASM_SCANORDER=""
ORACLEASM_SCANEXCLUDE=""
ORACLEASM_SCAN_DIRECTORIES=""
ORACLEASM_USE_LOGICAL_BLOCK_SIZE="false"
*/
[root@rac2 ~]# oracleasm status
/*
Checking if ASM is loaded: no
Checking if /dev/oracleasm is mounted: no
*/
```

4.3. Run command to configure and initialized for RAC1

```
[root@rac1 ~]# oracleasm configure -i
}/*
Configuring the Oracle ASM library driver.
This will configure the on-boot properties of the Oracle ASM library
driver... The following questions will determine whether the driver is
loaded on boot and what permissions it will have... The current values
will be shown in brackets ('[]')... Hitting <ENTER> without typing an
answer will keep that current value... Ctrl-C will abort.

Default user to own the driver interface []::grid
Default group to own the driver interface []::asmadmin
Start Oracle ASM library driver on boot (y/n) [n]::y
Scan for Oracle ASM disks on boot (y/n) [y]::y
Writing Oracle ASM library driver configuration: done
}/*

[root@rac1 ~]# oracleasm configure
}/*
ORACLEASM_ENABLED=true
ORACLEASM_UID=grid
ORACLEASM_GID=asmadmin
ORACLEASM_SCANBOOT=true
ORACLEASM_SCANORDER=""
ORACLEASM_SCANEXCLUDE=""
ORACLEASM_SCAN_DIRECTORIES=""
ORACLEASM_USE_LOGICAL_BLOCK_SIZE="false"
}/*

[root@rac1 ~]# oracleasm init
}/*
Creating /dev/oracleasm mount point:/dev/oracleasm
Loading module "oracleasm": oracleasm
Configuring "oracleasm" to use device physical block size
Mounting ASMLib driver filesystem:/dev/oracleasm
}/*

[root@rac1 ~]# oracleasm status
}/*
Checking if ASM is loaded: yes
Checking if /dev/oracleasm is mounted: yes
}/*

[root@rac1 ~]# oracleasm scandisks
}/*
Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
}/*
```

4.4. Run command to configure and initialized for RAC2

```
[root@rac2 ~]# oracleasm configure -i
/*
Configuring the Oracle ASM library driver.
This will configure the on-boot properties of the Oracle ASM library
driver... The following questions will determine whether the driver is
loaded on boot and what permissions it will have... The current values
will be shown in brackets ('[]')... Hitting <ENTER> without typing an
answer will keep that current value... Ctrl-C will abort.

Default user to own the driver interface []::grid
Default group to own the driver interface []::asmadmin
Start Oracle ASM library driver on boot (y/n) [n]::y
Scan for Oracle ASM disks on boot (y/n) [y]::y
Writing Oracle ASM library driver configuration: done
*/
[root@rac2 ~]# oracleasm configure
/*
ORACLEASM_ENABLED=true
ORACLEASM_UID=grid
ORACLEASM_GID=asmadmin
ORACLEASM_SCANBOOT=true
ORACLEASM_SCANORDER=""
ORACLEASM_SCANEXCLUDE=""
ORACLEASM_SCAN_DIRECTORIES=""
ORACLEASM_USE_LOGICAL_BLOCK_SIZE="false"
*/
[root@rac2 ~]# oracleasm init
/*
Creating /dev/oracleasm mount point: /dev/oracleasm
Loading module "oracleasm": oracleasm
Configuring "oracleasm" to use device physical block size
Mounting ASMLib driver filesystem: /dev/oracleasm
*/
[root@rac2 ~]# oracleasm scandisks
/*
Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
*/
[root@rac2 ~]# oracleasm status
/*
Checking if ASM is loaded: yes
Checking if /dev/oracleasm is mounted: yes
*/
```

4.5. Edit the “/etc/iscsi/initiatorname.iscsi” file with restarting services iscsi for RAC1

```
[root@rac1 ~]# oracleasm listdisks
[root@rac1 ~]# rpm -qa | grep -i iscsi
/*
iscsi-initiator-utils-6.2.0.873-27.0.10.el6_10.x86_64
*/
[root@rac1 ~]# service iscsi stop
/*
Stopping iscsi:..... [ OK ]
*/
[root@rac1 ~]# service iscsi status
/*
iscsi is stopped
*/
[root@rac1 ~]# cd /etc/iscsi/
[root@rac1 iscsi]# ls
/*
initiatorname.iscsi  iscsid.conf
*/
[root@rac1 iscsi]# vim initiatorname.iscsi
/*
InitiatorName=iqn.rac1:oracle
*/
[root@rac1 iscsi]# service iscsi start
[root@rac1 iscsi]# chkconfig iscsi on
[root@rac1 iscsi]# chkconfig iscsid on
[root@rac1 iscsi]# lsscsi
/*
[1:0:0:0] cd/dvd  NECVMWar  VMware  IDE  CDR10 1.00  /dev/sr0
[2:0:0:0] disk   VMware,  VMware  Virtual S 1.0  /dev/sda
*/
[root@rac1 iscsi]# iscsiadm -m discovery -t sendtargets -p openfiler
/*
192.168.129.104:3260,1 iqn.openfiler:fra1
192.168.129.104:3260,1 iqn.openfiler:datal
192.168.129.104:3260,1 iqn.openfiler:ocr
*/
[root@rac1 iscsi]# lsscsi
/*
[1:0:0:0] cd/dvd  NECVMWar  VMware  IDE  CDR10 1.00  /dev/sr0
[2:0:0:0] disk   VMware,  VMware  Virtual S 1.0  /dev/sda
*/
[root@rac1 iscsi]# ls /var/lib/iscsi/send_targets/
/*
openfiler,3260
*/
```

```

[root@rac1 iscsi]# ls /var/lib/iscsi/nodes/
/*
iqn.openfiler:data1 iqn.openfiler:fra1 iqn.openfiler:ocr
*/
[root@rac1 iscsi]# service iscsi restart
/*
Stopping iscsi: ..... [ OK ]
Starting iscsi: ..... [ OK ]
*/
[root@rac1 iscsi]# lsscsi
/*
[1:0:0:0] cd/dvd  NECMVMWar VMware IDE CDR10 1.00  /dev/sr0
[2:0:0:0] disk   VMware, VMware Virtual S 1.0  /dev/sda
[4:0:0:0] disk   OPNFILER VIRTUAL-DISK 0  /dev/sdb
[6:0:0:0] disk   OPNFILER VIRTUAL-DISK 0  /dev/sdc
[8:0:0:0] disk   OPNFILER VIRTUAL-DISK 0  /dev/sdd
*/
[root@rac1 iscsi]# iscsiadm -m session
/*
tcp:[2] 192.168.129.104:3260,1 iqn.openfiler:data1 (non-flash)
tcp:[4] 192.168.129.104:3260,1 iqn.openfiler:fra1 (non-flash)
tcp:[6] 192.168.129.104:3260,1 iqn.openfiler:ocr (non-flash)
*/

```

4.6. Edit the “/etc/iscsi/initiatorname.iscsi” file with restarting services iscsi for RAC2

```

[root@rac2 ~]# oracleasm listdisks
[root@rac2 ~]# rpm -qa | grep -i iscsi
/*
iscsi-initiator-utils-6.2.0.873-27.0.10.el6_10.x86_64
*/
[root@rac2 ~]# service iscsi stop
/*
Stopping iscsi: ..... [ OK ]
*/
[root@rac2 ~]# service iscsi status
/*
iscsi is stopped
*/
[root@rac2 ~]# cd /etc/iscsi/
[root@rac2 iscsi]# ls
/*
initiatorname.iscsi iscsid.conf
*/
[root@rac2 iscsi]# vim initiatorname.iscsi
/*
InitiatorName=iqn.rac2:oracle
*/

```

```
[root@rac2 iscsi]# service iscsi start
[root@rac2 iscsi]# chkconfig iscsi on
[root@rac2 iscsi]# chkconfig iscsid on
[root@rac2 iscsi]# lsscsi
/*
[1:0:0:0] cd/dvd  ···· NECVMWar · VMware · IDE · CDR10 · 1.00 ··· /dev/sr0
[2:0:0:0] disk  ···· VMware, ··· VMware · Virtual · S · 1.0 ··· /dev/sda
*/
[root@rac2 iscsi]# iscsiadm -m discovery -t sendtargets -p openfiler
/*
192.168.129.104:3260,1 iqn.openfiler:fral
192.168.129.104:3260,1 iqn.openfiler:dat1
192.168.129.104:3260,1 iqn.openfiler:ocr
*/
[root@rac2 iscsi]# lsscsi
/*
[1:0:0:0] cd/dvd  ···· NECVMWar · VMware · IDE · CDR10 · 1.00 ··· /dev/sr0
[2:0:0:0] disk  ···· VMware, ··· VMware · Virtual · S · 1.0 ··· /dev/sda
*/
[root@rac2 iscsi]# ls /var/lib/iscsi/send_targets/
/*
openfiler,3260
*/
[root@rac2 iscsi]# ls /var/lib/iscsi/nodes/
/*
iqn.openfiler:dat1 ··· iqn.openfiler:fral ··· iqn.openfiler:ocr
*/
[root@rac2 iscsi]# service iscsi restart
/*
Stopping iscsi: ..... [···OK···]
Starting iscsi: ..... [···OK···]
*/
[root@rac2 iscsi]# lsscsi
/*
[1:0:0:0] cd/dvd  ···· NECVMWar · VMware · IDE · CDR10 · 1.00 ··· /dev/sr0
[2:0:0:0] disk  ···· VMware, ··· VMware · Virtual · S · 1.0 ··· /dev/sda
[4:0:0:0] disk  ···· OPNFILER · VIRTUAL-DISK ···· 0 ··· /dev/sdb
[6:0:0:0] disk  ···· OPNFILER · VIRTUAL-DISK ···· 0 ··· /dev/sdc
[8:0:0:0] disk  ···· OPNFILER · VIRTUAL-DISK ···· 0 ··· /dev/sdd
*/
[root@rac2 iscsi]# iscsiadm -m session
/*
tcp: [2] 192.168.129.104:3260,1 iqn.openfiler:dat1 · (non-flash)
tcp: [4] 192.168.129.104:3260,1 iqn.openfiler:fral · (non-flash)
tcp: [6] 192.168.129.104:3260,1 iqn.openfiler:ocr · (non-flash)
*/
```

4.7. Bind the openfiler storage (ocr, data1 and fra1) with primary node as RAC1 and verify from RAC1

```
[root@rac1 iscsi]# iscsiamd -m node -T iqn.openfiler:ocr -p 192.168.129.104 --op update -n node.startup -v automatic
[root@rac1 iscsi]# iscsiamd -m node -T iqn.openfiler:data1 -p 192.168.129.104 --op update -n node.startup -v automatic
[root@rac1 iscsi]# iscsiamd -m node -T iqn.openfiler:fra1 -p 192.168.129.104 --op update -n node.startup -v automatic

[root@rac1 iscsi]# lsscsi
/*
[1:0:0:0]...cd/dvd...NECVMWar...VMware...IDE...CDR10...1.00.../dev/sr0
[2:0:0:0]...disk...VMware,...VMware...Virtual...S...1.0.../dev/sda
[4:0:0:0]...disk...OPNFILER...VIRTUAL-DISK...0.../dev/sdb
[6:0:0:0]...disk...OPNFILER...VIRTUAL-DISK...0.../dev/sdc
[8:0:0:0]...disk...OPNFILER...VIRTUAL-DISK...0.../dev/sdd
*/
[root@rac1 iscsi]# ls /dev/sd*
/*
/dev/sda.../dev/sda2.../dev/sda4.../dev/sda6.../dev/sda8.../dev/sdb.../dev/sdd
/dev/sda1.../dev/sda3.../dev/sda5.../dev/sda7.../dev/sda9.../dev/sdc
*/
[root@rac1 iscsi]# iscsiamd -m session -P 3 > scsi_drives.txt
[root@rac1 iscsi]# vim scsi_drives.txt
[root@rac1 iscsi]# cat scsi_drives.txt
/*
# iscsiamd -m session -P 3

Target: iqn.openfiler:data1 (non-flash)
.....Attached scsi disk sdb ..... State: running
Target: iqn.openfiler:fra1 (non-flash)
.....Attached scsi disk sdc ..... State: running
Target: iqn.openfiler:ocr (non-flash)
.....Attached scsi disk sdd ..... State: running
*/
[root@rac1 ~]# oracleasm status
/*
Checking if ASM is loaded: yes
Checking if /dev/oracleasm is mounted: yes
*/
[root@rac1 ~]# oracleasm scandisks
/*
Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
*/
[root@rac1 ~]# oracleasm listdisks

[root@rac1 ~]# ls /dev/sd*
/*
/dev/sda.../dev/sda2.../dev/sda4.../dev/sda6.../dev/sda8.../dev/sdb.../dev/sdd
/dev/sda1.../dev/sda3.../dev/sda5.../dev/sda7.../dev/sda9.../dev/sdc
*/
```

4.8. Format and create new partition for sdb, sdc and sdd for ocr, data1 and fra1 on RAC1

```
[root@rac1 ~]# ls -ltr /dev/sd*
/*
brw-rw---- 1 root disk 8, 0 Sep  3 12:46 /dev/sda
brw-rw---- 1 root disk 8, 4 Sep  3 12:46 /dev/sda4
brw-rw---- 1 root disk 8, 7 Sep  3 12:46 /dev/sda7
brw-rw---- 1 root disk 8, 2 Sep  3 12:46 /dev/sda2
brw-rw---- 1 root disk 8, 1 Sep  3 12:46 /dev/sda1
brw-rw---- 1 root disk 8, 8 Sep  3 12:46 /dev/sda8
brw-rw---- 1 root disk 8, 9 Sep  3 12:46 /dev/sda9
brw-rw---- 1 root disk 8, 3 Sep  3 12:46 /dev/sda3
brw-rw---- 1 root disk 8, 5 Sep  3 12:46 /dev/sda5
brw-rw---- 1 root disk 8, 6 Sep  3 12:46 /dev/sda6
brw-rw---- 1 root disk 8, 16 Sep  3 12:47 /dev/sdb
brw-rw---- 1 root disk 8, 32 Sep  3 12:47 /dev/sdc
brw-rw---- 1 root disk 8, 48 Sep  3 12:47 /dev/sdd
*/
[root@rac1 ~]# fdisk /dev/sdb
/*
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel with disk identifier 0x033c67f4.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.
Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(write)
WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
         switch off the mode (command 'c') and change display units to
         sectors (command 'u').
Command (m for help): p
Disk /dev/sdb: 21.5 GB, 21474836480 bytes
64 heads, 32 sectors/track, 20480 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x033c67f4

Device Boot Start End Blocks Id System
Command (m for help): n
Command action
e extended
p primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-20480, default 1):
Using default value 1
Last cylinder, +cylinders or +size{K,M,G} (1-20480, default 20480):
Using default value 20480

Command (m for help): p
```

```
Disk /dev/sdb: 21.5 GB, 21474836480 bytes
64 heads, 32 sectors/track, 20480 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x033c67f4

... Device Boot Start End Blocks Id System
/dev/sdb1 1 20480 20971504 83 Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
*/
[root@rac1 ~]# fdisk /dev/sdc
/*
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel with disk identifier 0x76d4b187.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').

Command (m for help): p

Disk /dev/sdc: 16.1 GB, 16106127360 bytes
64 heads, 32 sectors/track, 15360 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x76d4b187

... Device Boot Start End Blocks Id System

Command (m for help): n
Command action
e extended
p primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-15360, default 1):
Using default value 1
Last cylinder, +cylinders or +size{K,M,G} (1-15360, default 15360):
Using default value 15360

Command (m for help): p

Disk /dev/sdc: 16.1 GB, 16106127360 bytes
64 heads, 32 sectors/track, 15360 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
```

```

I/O size (minimum/optimal) : 512 bytes / 512 bytes
Disk identifier: 0x76d4b187

... Device Boot Start End Blocks Id System
/dev/sdc1 1 15360 15728624 83 Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
 */

[root@rac1 ~]# fdisk /dev/sdd
/*
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel with disk identifier 0x42a82d1b.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').

Command (m for help): p

Disk /dev/sdd: 5368 MB, 5368709120 bytes
166 heads, 62 sectors/track, 1018 cylinders
Units = cylinders of 10292 * 512 = 5269504 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x42a82d1b

... Device Boot Start End Blocks Id System

Command (m for help): n
Command action
e extended
p primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-1018, default 1):
Using default value 1
Last cylinder, +cylinders or +size{K,M,G} (1-1018, default 1018):
Using default value 1018

Command (m for help): p

Disk /dev/sdd: 5368 MB, 5368709120 bytes
166 heads, 62 sectors/track, 1018 cylinders
Units = cylinders of 10292 * 512 = 5269504 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x42a82d1b

... Device Boot Start End Blocks Id System
/dev/sdd1 1 1018 5238597 83 Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
*/

```

```

[root@rac1 ~]# ls -ltr /dev/sd*
/*
brw-rw---- 1 root disk 8, 0 Sep  3 12:46 /dev/sda
brw-rw---- 1 root disk 8, 4 Sep  3 12:46 /dev/sda4
brw-rw---- 1 root disk 8, 7 Sep  3 12:46 /dev/sda7
brw-rw---- 1 root disk 8, 2 Sep  3 12:46 /dev/sda2
brw-rw---- 1 root disk 8, 1 Sep  3 12:46 /dev/sda1
brw-rw---- 1 root disk 8, 8 Sep  3 12:46 /dev/sda8
brw-rw---- 1 root disk 8, 9 Sep  3 12:46 /dev/sda9
brw-rw---- 1 root disk 8, 3 Sep  3 12:46 /dev/sda3
brw-rw---- 1 root disk 8, 5 Sep  3 12:46 /dev/sda5
brw-rw---- 1 root disk 8, 6 Sep  3 12:46 /dev/sda6
brw-rw---- 1 root disk 8, 16 Sep  3 13:31 /dev/sdb
brw-rw---- 1 root disk 8, 17 Sep  3 13:31 /dev/sdb1
brw-rw---- 1 root disk 8, 32 Sep  3 13:33 /dev/sdc
brw-rw---- 1 root disk 8, 33 Sep  3 13:33 /dev/sdc1
brw-rw---- 1 root disk 8, 48 Sep  3 13:35 /dev/sdd
brw-rw---- 1 root disk 8, 49 Sep  3 13:35 /dev/sdd1
*/
--- Step 71 -->> On Node 1
[root@rac1 iscsi]# fdisk -l
/*
Disk /dev/sda: 107.4 GB, 107374182400 bytes
255 heads, 63 sectors/track, 13054 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000bfaf6

Device Boot Start End Blocks Id System
/dev/sda1 * 1 1275 10240000 83 Linux
/dev/sda2 1275 3188 15360000 83 Linux
/dev/sda3 3188 6170 23955456 83 Linux
/dev/sda4 6170 13055 55301120 5 Extended
/dev/sda5 6170 7827 13310976 83 Linux
/dev/sda6 7828 9230 11264000 83 Linux
/dev/sda7 9230 10505 10240000 82 Linux swap / Solaris
/dev/sda8 10505 11780 10240000 83 Linux
/dev/sda9 11780 13055 10240000 83 Linux

Disk /dev/sdb: 26.2 GB, 26239565824 bytes
64 heads, 32 sectors/track, 25024 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x31093014

Device Boot Start End Blocks Id System
/dev/sdb1 1 25024 25624560 83 Linux

```

```

Disk /dev/sdc: 42.9 GB, 42949672960 bytes
64 heads, 32 sectors/track, 40960 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0xcb59a453

... Device Boot Start End Blocks Id System
/dev/sdc1 1 40960 41943024 83 Linux

Disk /dev/sdd: 21.5 GB, 21474836480 bytes
64 heads, 32 sectors/track, 20480 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x2bdc6dd6

... Device Boot Start End Blocks Id System
/dev/sdd1 1 20480 20971504 83 Linux
[root@rac1 iscsi]# 

*/

```

4.9. Create disk for ocr, data and fra & verify the disks on RAC1

```

[root@rac1 ~]# oracleasm createdisk OCR /dev/sdd1
/*
Writing disk header: done
Instantiating disk: done
*/
[root@rac1 ~]# oracleasm createdisk DATA /dev/sdc1
/*
Writing disk header: done
Instantiating disk: done
*/
[root@rac1 ~]# oracleasm createdisk FRA /dev/sdb1
/*
Writing disk header: done
Instantiating disk: done
*/
[root@rac1 ~]# hostname
/*
rac1.mydomain
*/
[root@rac1 ~]# oracleasm scandisks
/*
Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
*/
[root@rac1 ~]# oracleasm listdisks
/*
DATA
FRA
OCR
*/

```

4.10. Map all disks on RAC2

```
[root@rac2 ~]# cd /etc/iscsi/
[root@rac2 iscsi]# service iscsi restart
}/*
Stopping iscsi..... [ OK ]
Starting iscsi..... [ OK ]
}/*

[root@rac2 iscsi]# ls -ltr /dev/sd*
}/*
brw-rw---- 1 root disk 8, 0 Sep 16 09:28 /dev/sda
brw-rw---- 1 root disk 8, 4 Sep 16 09:28 /dev/sda4
brw-rw---- 1 root disk 8, 7 Sep 16 09:28 /dev/sda7
brw-rw---- 1 root disk 8, 2 Sep 16 09:28 /dev/sda2
brw-rw---- 1 root disk 8, 1 Sep 16 09:28 /dev/sda1
brw-rw---- 1 root disk 8, 8 Sep 16 09:28 /dev/sda8
brw-rw---- 1 root disk 8, 9 Sep 16 09:28 /dev/sda9
brw-rw---- 1 root disk 8, 3 Sep 16 09:28 /dev/sda3
brw-rw---- 1 root disk 8, 5 Sep 16 09:28 /dev/sda5
brw-rw---- 1 root disk 8, 6 Sep 16 09:28 /dev/sda6
brw-rw---- 1 root disk 8, 16 Sep 16 10:45 /dev/sdb
brw-rw---- 1 root disk 8, 32 Sep 16 10:45 /dev/sdc
brw-rw---- 1 root disk 8, 48 Sep 16 10:45 /dev/sdd
brw-rw---- 1 root disk 8, 49 Sep 16 10:45 /dev/sdd1
brw-rw---- 1 root disk 8, 17 Sep 16 10:45 /dev/sdb1
brw-rw---- 1 root disk 8, 33 Sep 16 10:45 /dev/sdc1
}/*
[root@rac2 iscsi]# oracleasm scandisks
}/*
Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
Instantiating disk "DATA"
Instantiating disk "OCR"
Instantiating disk "FRA"
}/*

[root@rac2 iscsi]# oracleasm listdisks
}*
DATA
FRA
OCR
}*
[root@rac2 iscsi]# iscsiadm -m session -P 3 > scsi_drives.txt
[root@rac2 iscsi]# vim scsi_drives.txt
```

```
[root@rac2 iscsi]# cat scsi_drives.txt
/*
Target::iqn.openfiler:dat1 (non-flash)
.....Attached scsi disk sdb ..... State: running
Target::iqn.openfiler:fra1 (non-flash)
.....Attached scsi disk sdd ..... State: running
Target::iqn.openfiler:ocr (non-flash)
.....Attached scsi disk sdc ..... State: running
*/

[root@rac2 iscsi]# oracleasm status
/*
Checking if ASM is loaded: yes
Checking if /dev/oracleasm is mounted: yes
*/
```

4.11. Install the rpm "cvuqdisk-1.0.9-1.rpm" on RAC1

```
[root@rac1 ~]# cd /home/grid/grid_software/grid/rpm/
[root@rac1 rpm]# ls -ltr
/*
-rwxrwxr-x 1 grid oinstall 8551 Sep 22 2011 cvuqdisk-1.0.9-1.rpm
*/

[root@rac1 rpm]# CVUQDISK_GRP=oinstall; export CVUQDISK_GRP
[root@rac1 rpm]# rpm -iv cvuqdisk-1.0.9-1.rpm
/*
Preparing packages for installation...
cvuqdisk-1.0.9-1
*/

[root@rac1 rpm]# rpm -iUvh cvuqdisk-1.0.9-1.rpm
/*
Preparing.....##### [100%]
...package cvuqdisk-1.0.9-1.x86_64 is already installed
*/

[root@rac1 rpm]# init 0
```

4.12. Install the rpm "cvuqdisk-1.0.9-1.rpm" on RAC2

```
[root@rac2 ~]# cd /home/grid/grid_software/grid/rpm/  
[root@rac2 rpm]# ls -ltr  
/*  
-rwxrwxr-x 1 grid oinstall 8551 Sep 22 2011 cvuqdisk-1.0.9-1.rpm  
*/  
  
[root@rac2 rpm]# CVUQDISK_GRP=oinstall; export CVUQDISK_GRP  
[root@rac2 rpm]# rpm -iv cvuqdisk-1.0.9-1.rpm  
/*  
Preparing packages for installation...  
cvuqdisk-1.0.9-1  
*/  
  
[root@rac2 rpm]# rpm -iUvh cvuqdisk-1.0.9-1.rpm  
/*  
Preparing..... ##### [100%]  
... package cvuqdisk-1.0.9-1.x86_64 is already installed  
*/  
  
[root@rac2 rpm]# init 0  
--  
--
```

5. Install Oracle Cluster ware (Grid) on RAC1 and RAC2

5.1. Login as grid user and issue the following command from Terminal at RAC1

```
[grid@rac1 Desktop]$ cd  
[grid@rac1 ~]$ hostname  
/*  
rac1.mydomain  
*/  
  
[grid@rac1 ~]$ xhost + rac1.mydomain  
/*  
rac1.mydomain being added to access control list  
*/
```

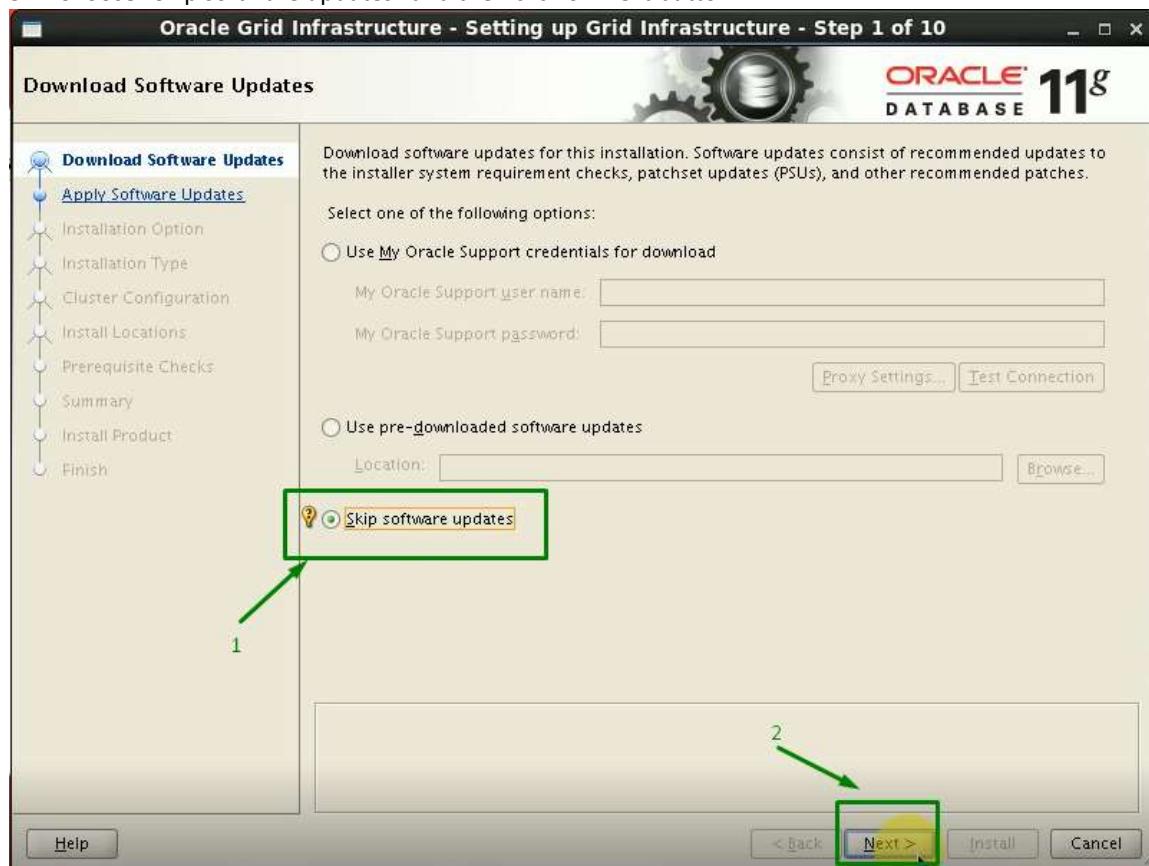
5.2. Login as grid user and issue the following command from New Terminal at RAC1

```
[grid@rac1 ~]$ cd /home/grid/grid_software/grid/  
[grid@rac1 grid]$ ls  
/*  
doc..... readme.html .. rpm ..... runInstaller .. stage  
install .. response .. runcluvfy.sh .. sshsetup .. welcome.html  
*/  
[grid@rac1 grid]$ sh ./runInstaller
```

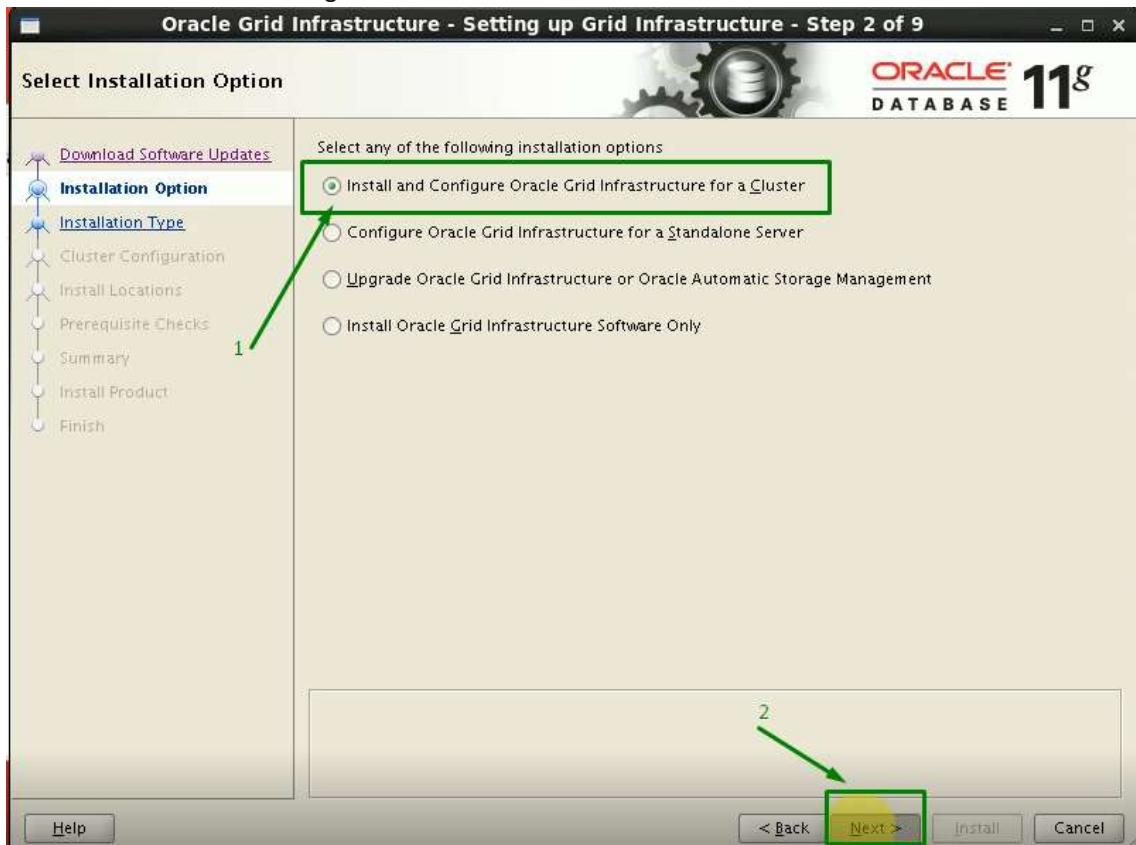
5.3. Installation of Grid start from screen at RAC1



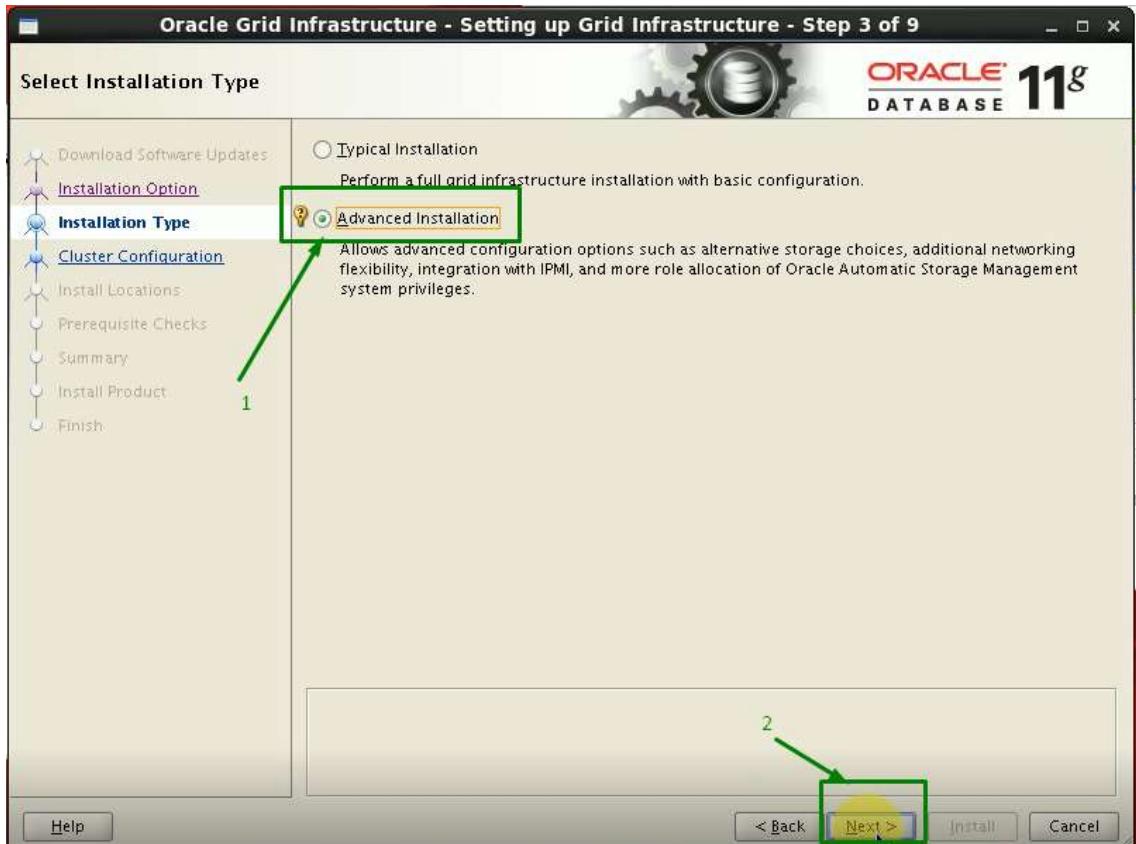
5.4. Choose "Skip software updates" and then click on Next button



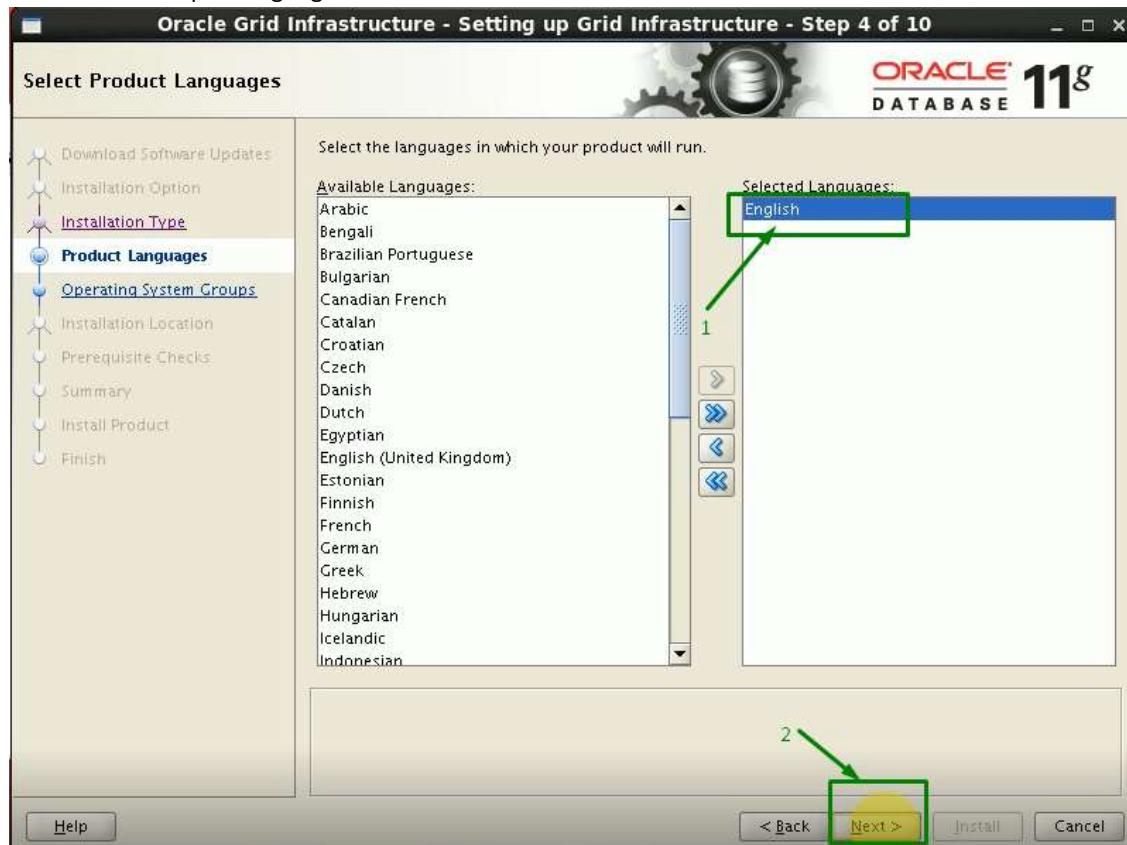
5.5. Choose “Install and Configure Oracle Grid Infrastructure for a Cluster” and then click on Next button



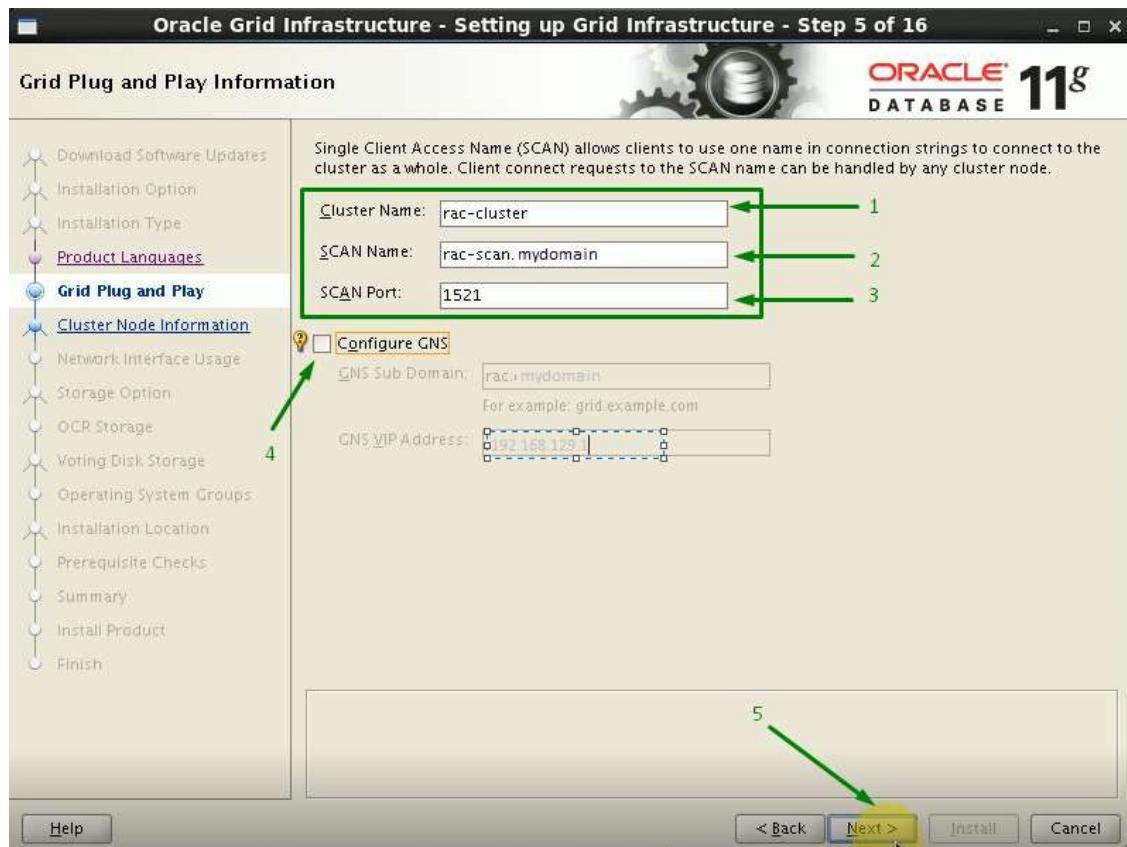
5.6. Choose “Advance Installation” and then click on Next button



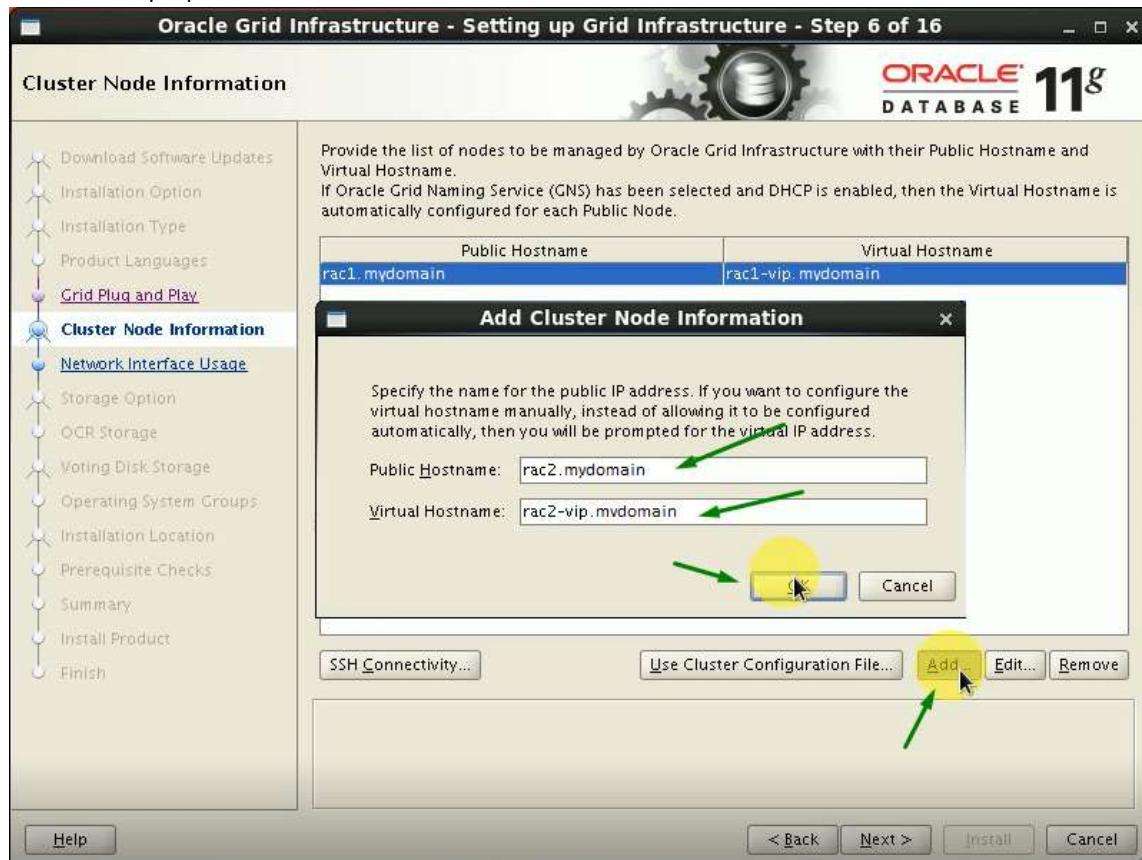
5.7. Choose “Proper Language” and then click on Next button



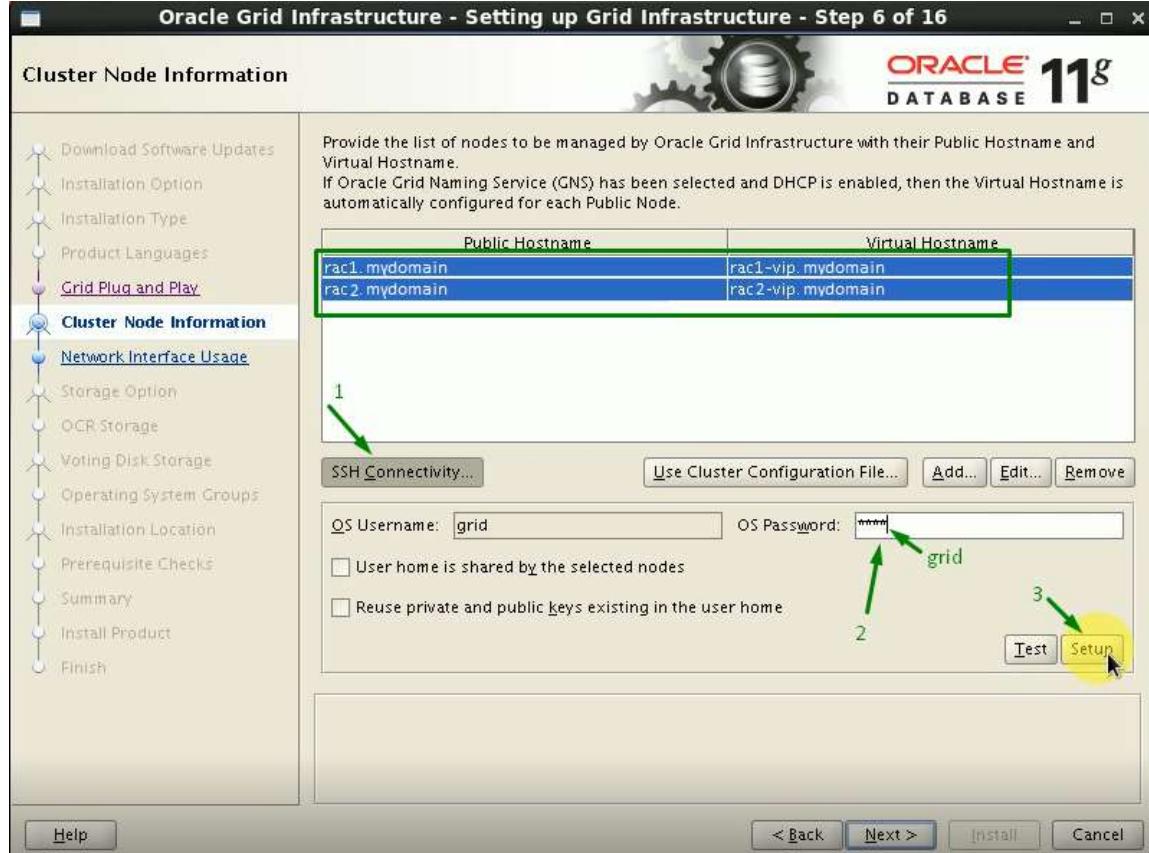
5.8. Provide the proper Cluster name, SCAN Name & SCNA Port and then uncheck “Configure GNS” option then click on Next button



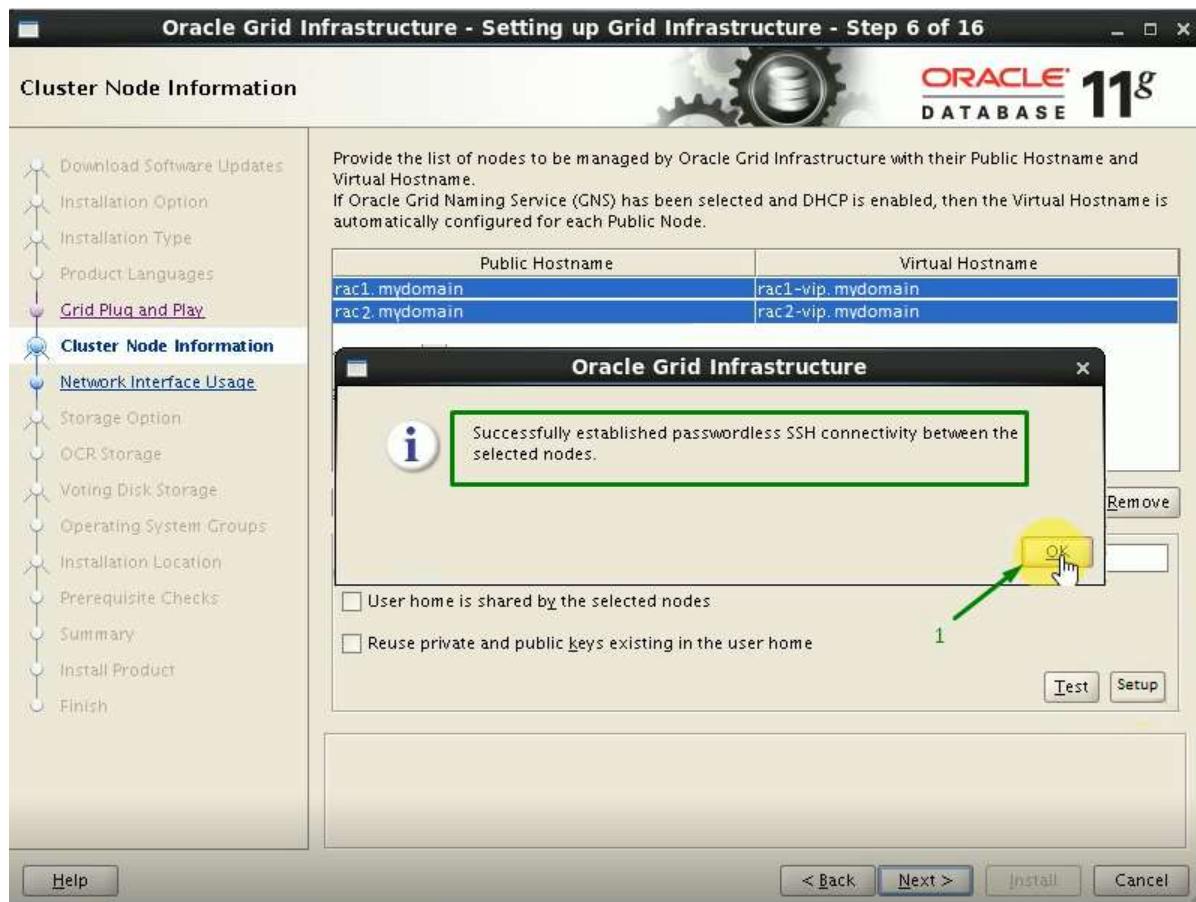
5.9. Add the proper Public Hostname and Virtual Hostname and then click on Ok button



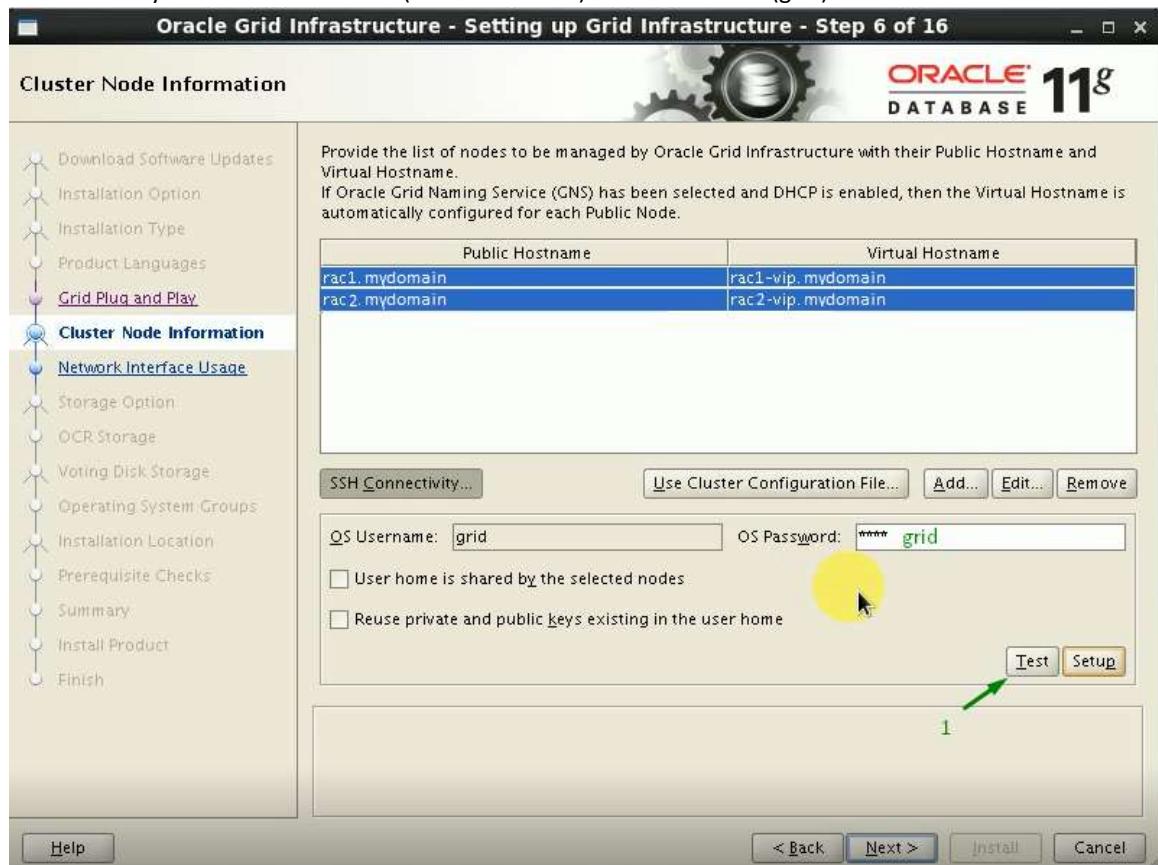
5.10. Verify the Hostnames for both nodes and then click on SSH Connectivity button then put the password for OS Grid user (grid) then click on Setup button



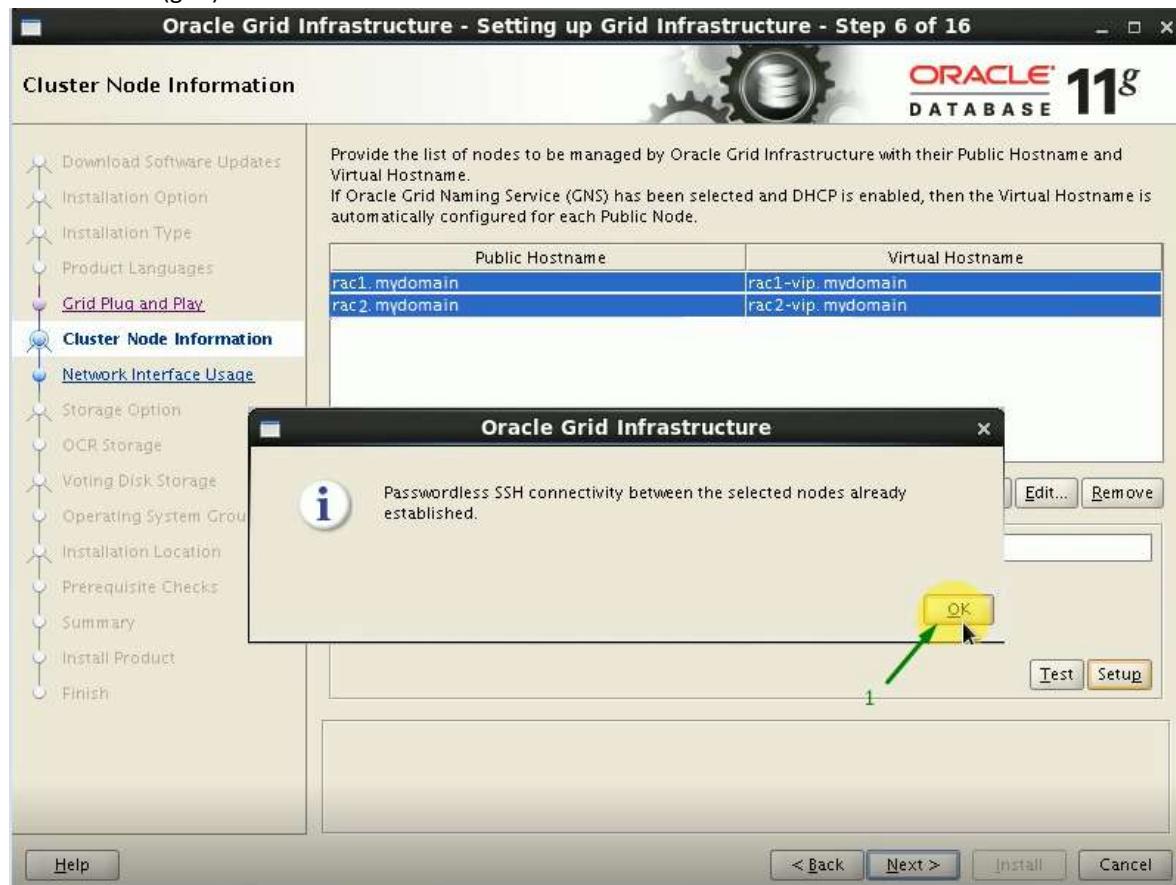
5.11. After Successful setup of SSH Connectivity between both Nodes (RAC1 and RAC2) for OS Grid user (grid) then click on Ok button



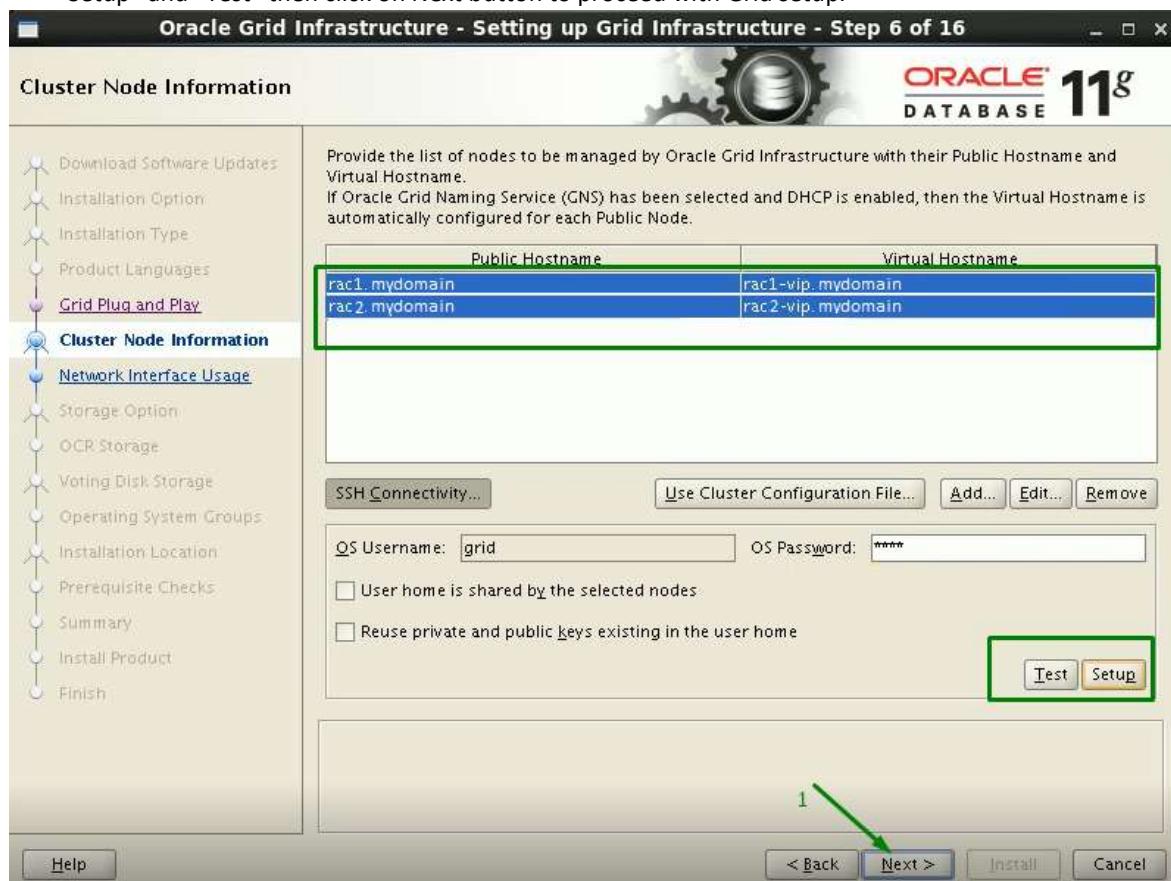
5.12. To verify between both Nodes (RAC1 and RAC2) for OS Grid user (grid) click on Test button



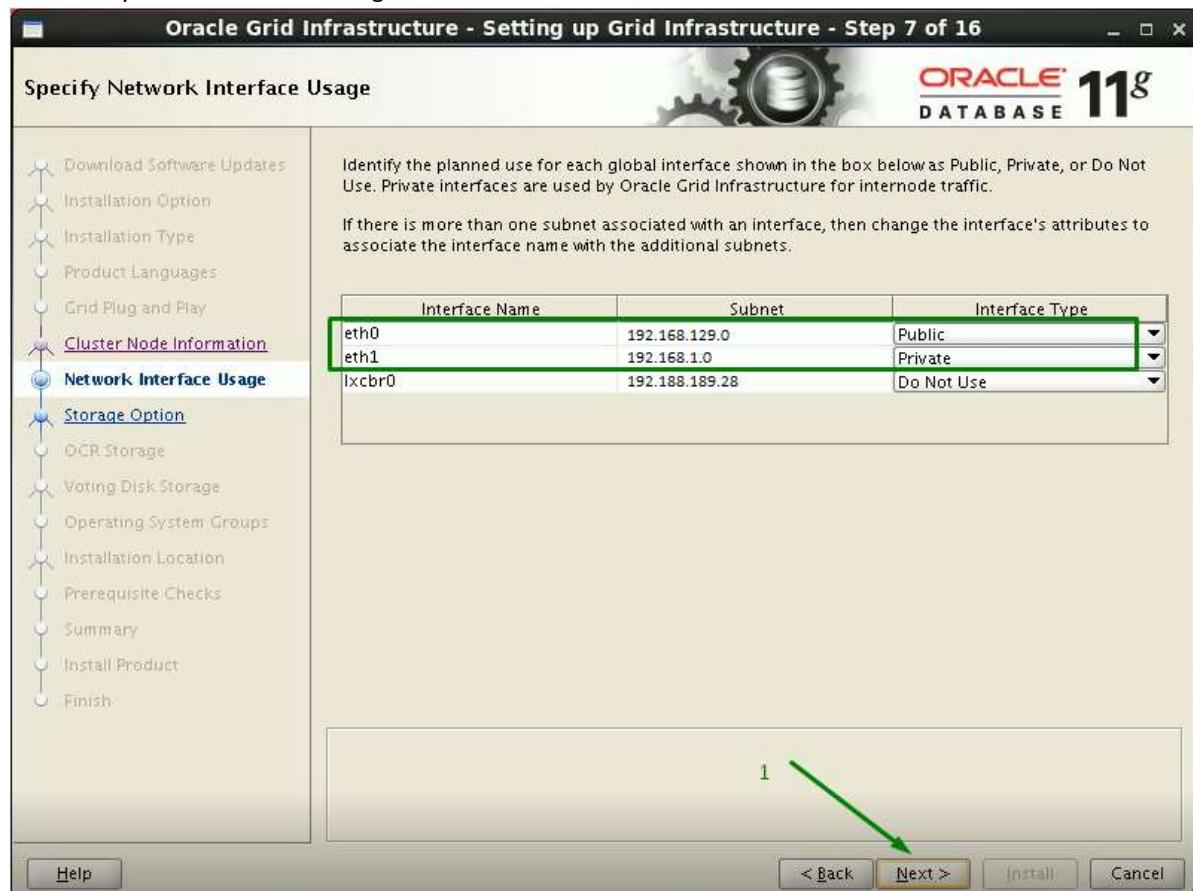
5.13. After Successful test of password less SSH Connectivity between both Nodes (RAC1 and RAC2) for OS Grid user (grid) then click on Ok button



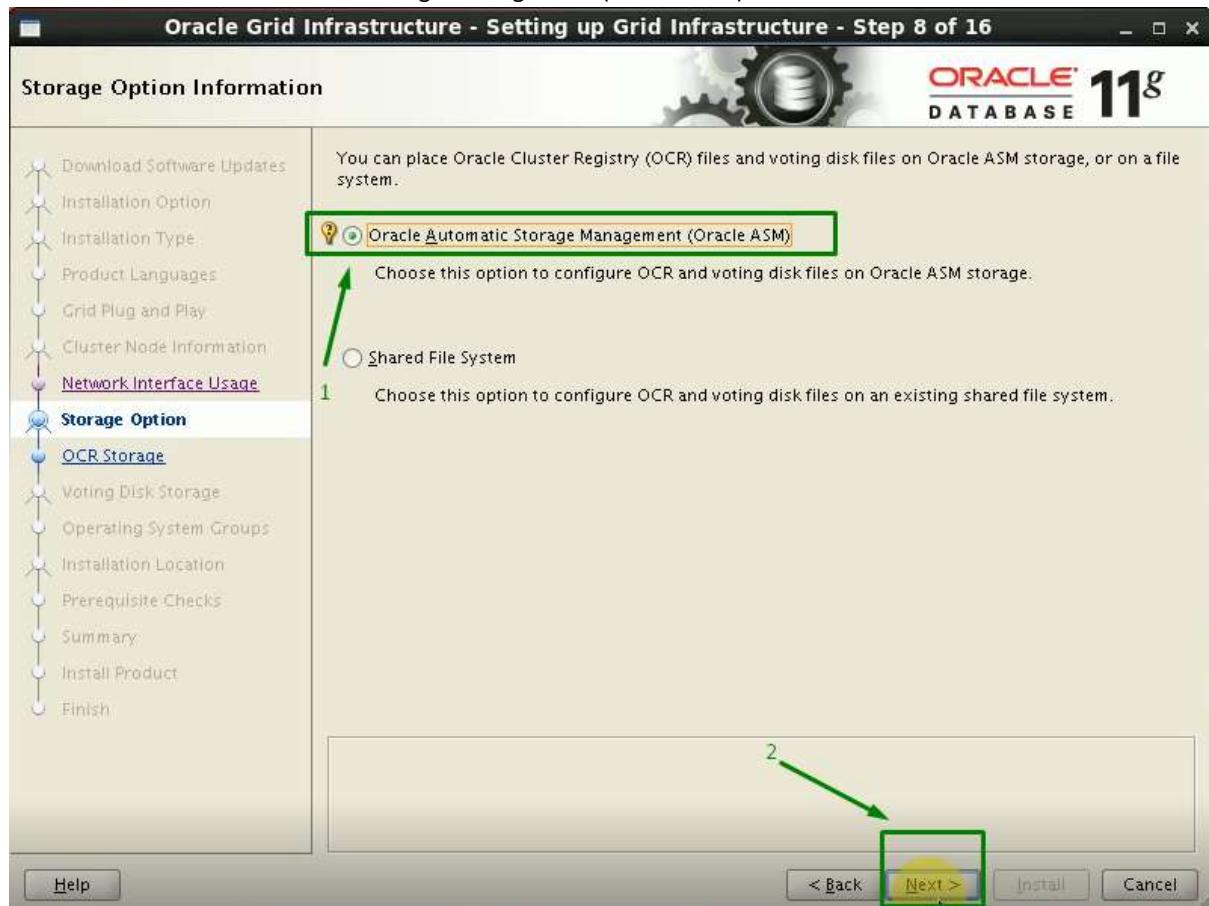
5.14. After verification of SSH Connectivity between both Nodes (RAC1 and RAC2) for OS Grid user (grid) using "Setup" and "Test" then click on Next button to proceed with Grid setup.



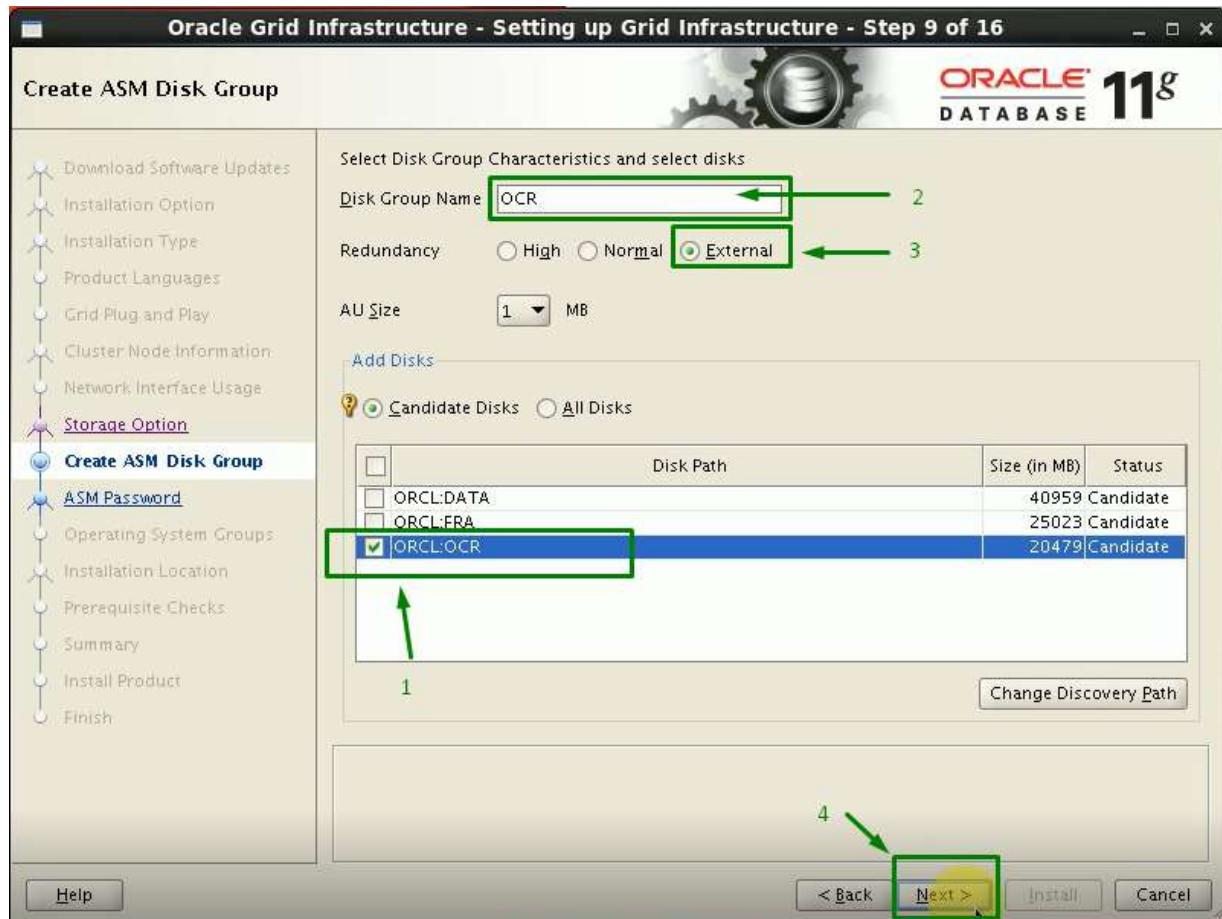
5.15. Verify the Ethernet IP Setting then click on Next button.



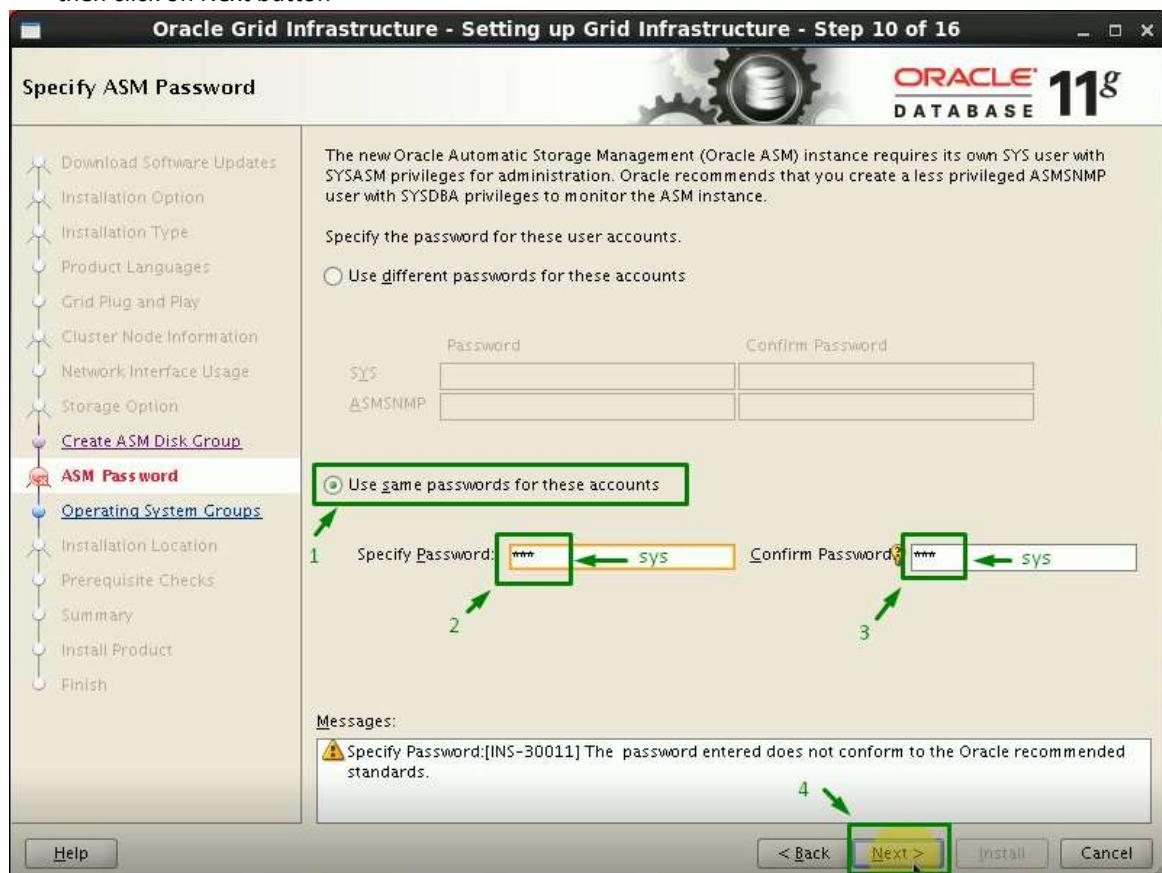
5.16. Choose “Oracle Automatic Storage Management (Oracle ASM)” then click on Next button



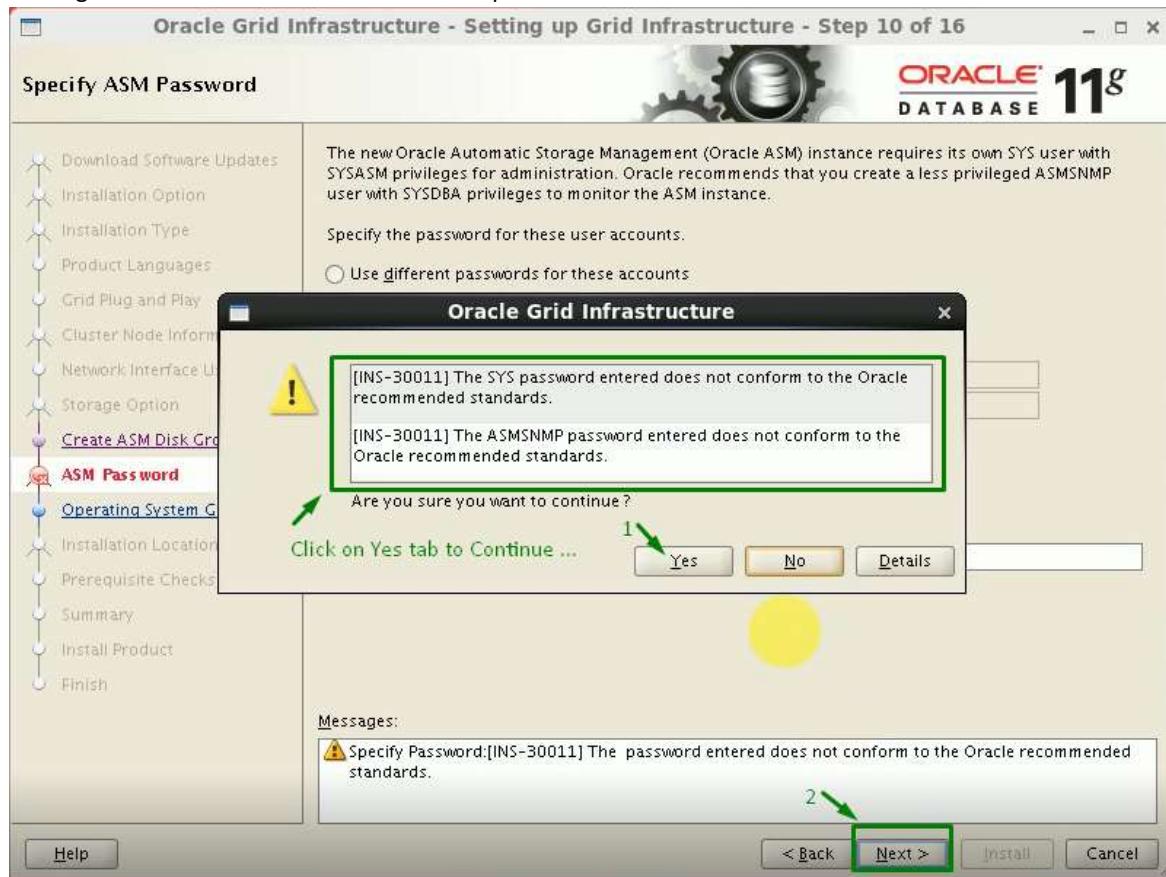
5.17. Choose “Candidate Disk, Put name of Disk Group, Select Redundancy as External and AU Size minimum 1 MB” then click on Next button



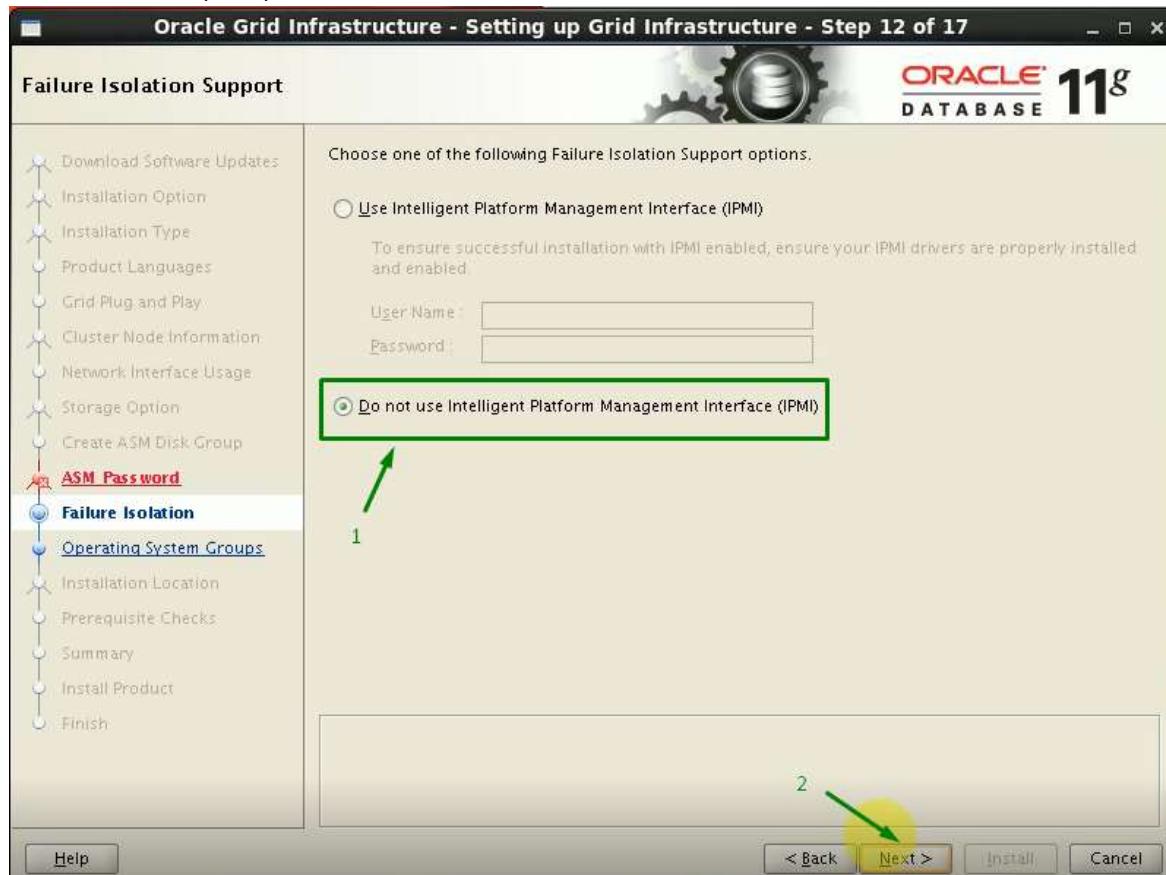
5.18. Choose “Use same passwords for these accounts, Specify Password and Conformed Password as sys” then click on Next button



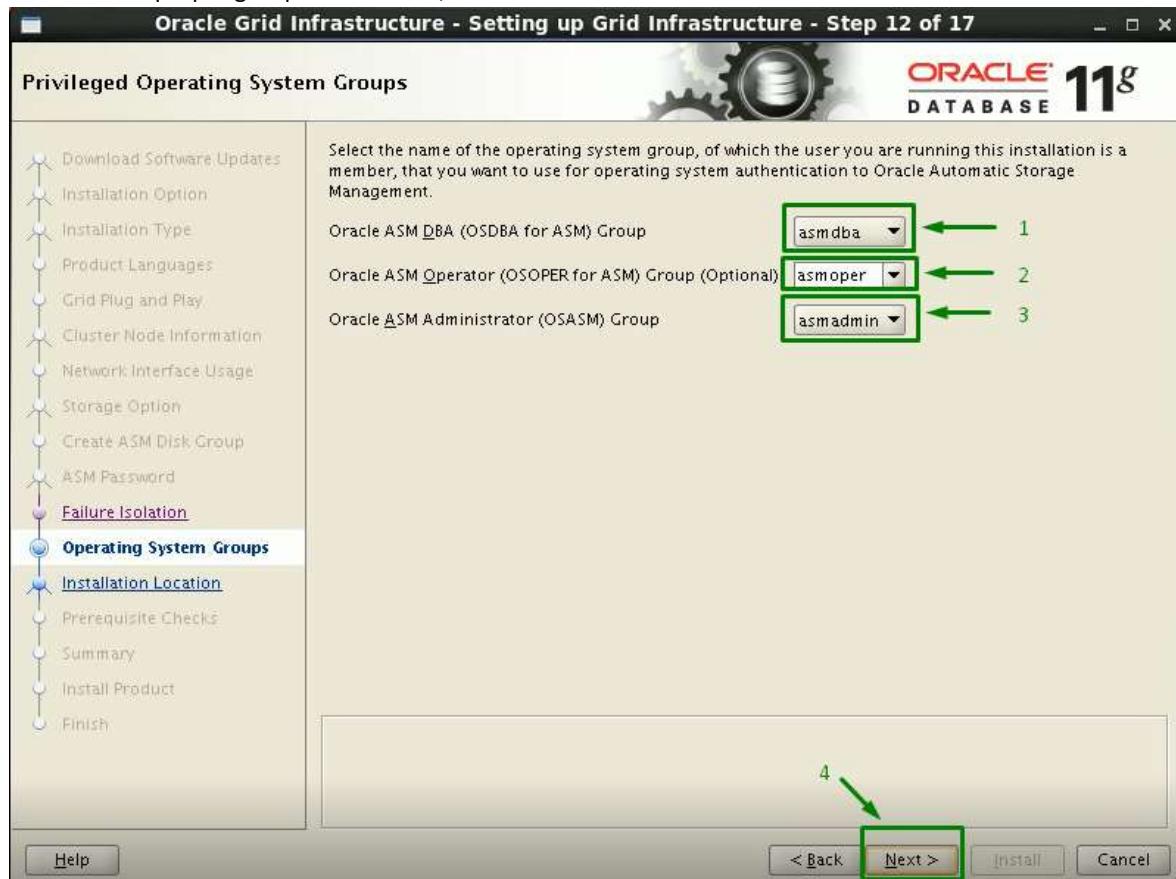
5.19. Ignore the recommended standard for password and then click on Next button



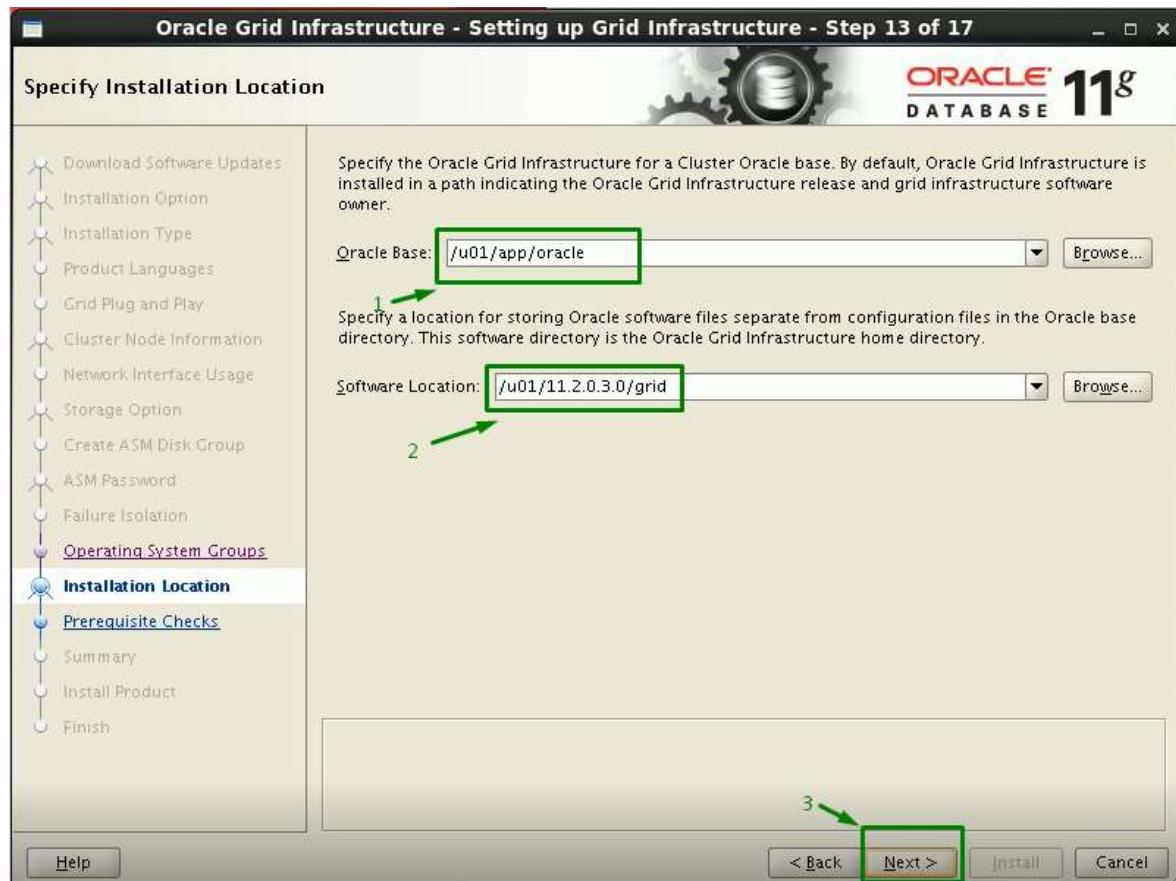
5.20. Choose "Proper Option as IPM" then click on Next button



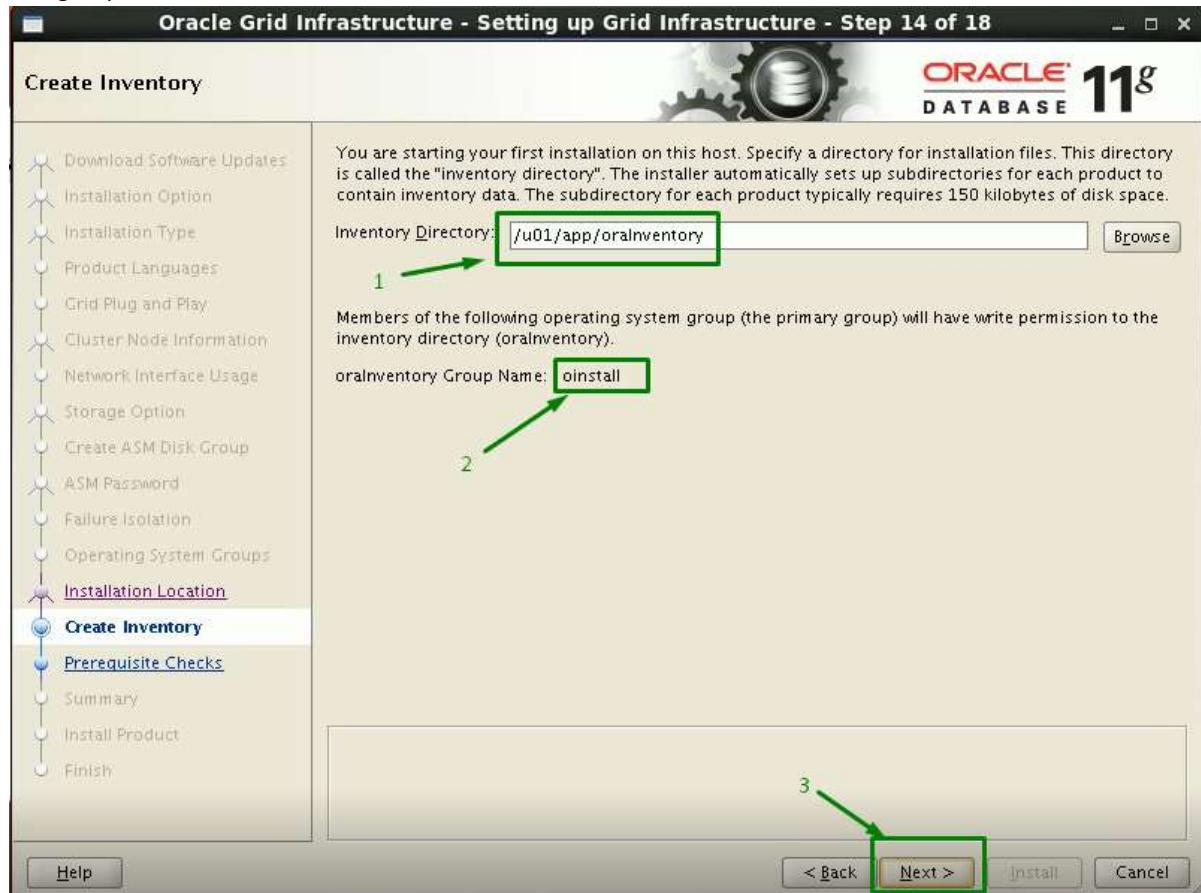
5.21. Choose proper groups for “OSDBA, OSOPER & OSASM” then click on Next button



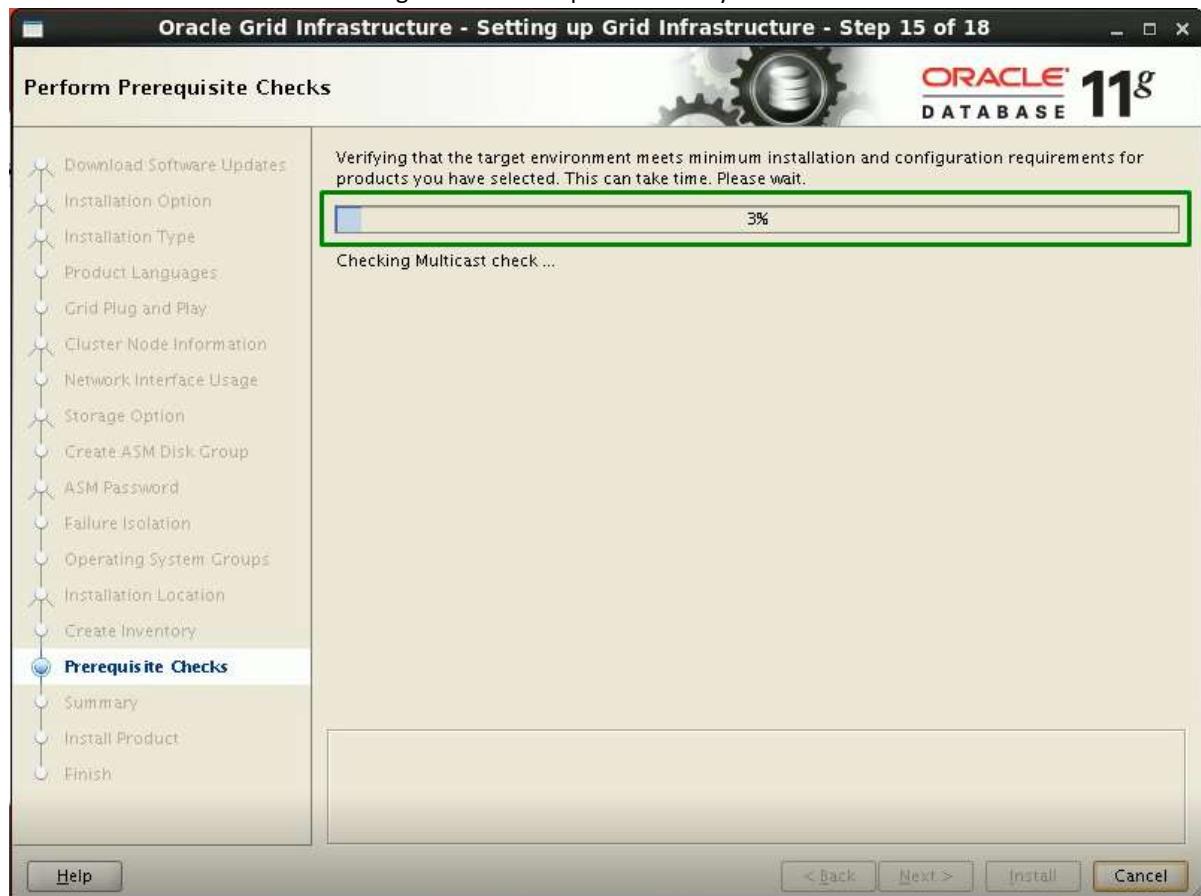
5.22. Verify the “Oracle Base Path & Software Location on Both Nodes(RAC1 & RAC2) then click on Next button



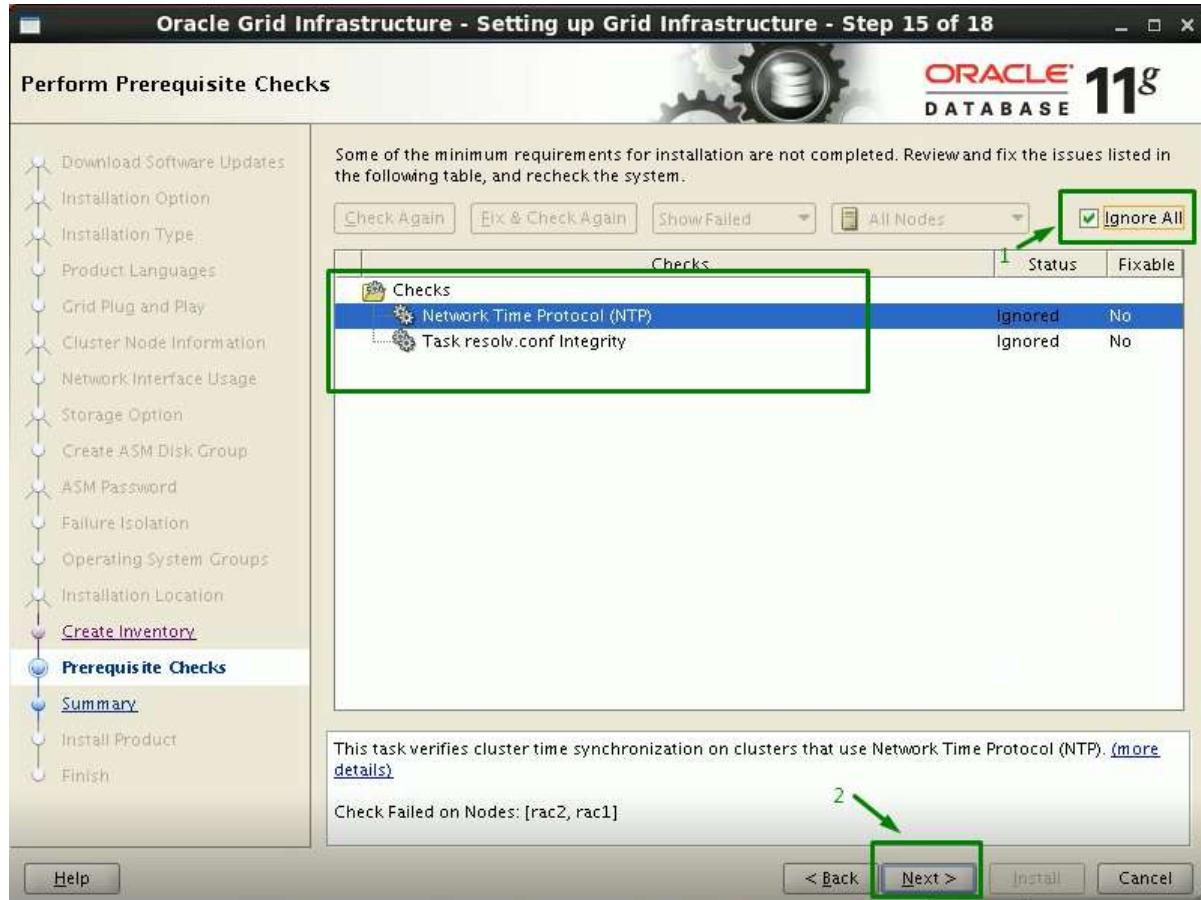
5.23. Verify the “Inventory Directories on Both Nodes(RAC1 & RAC2)” and make sure the “oracle inventory group name as oinstall” then click on Next button



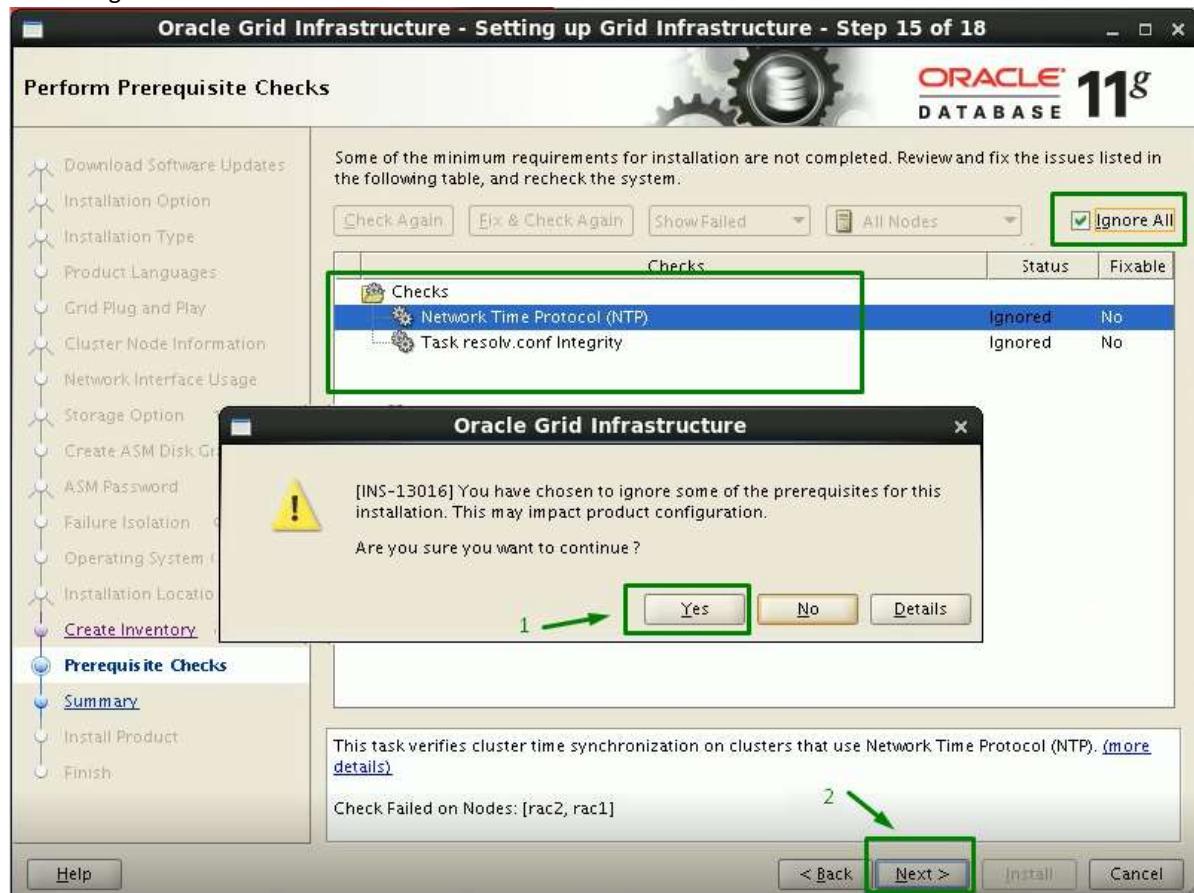
5.24. After click on Next button the grid installation perform the system check



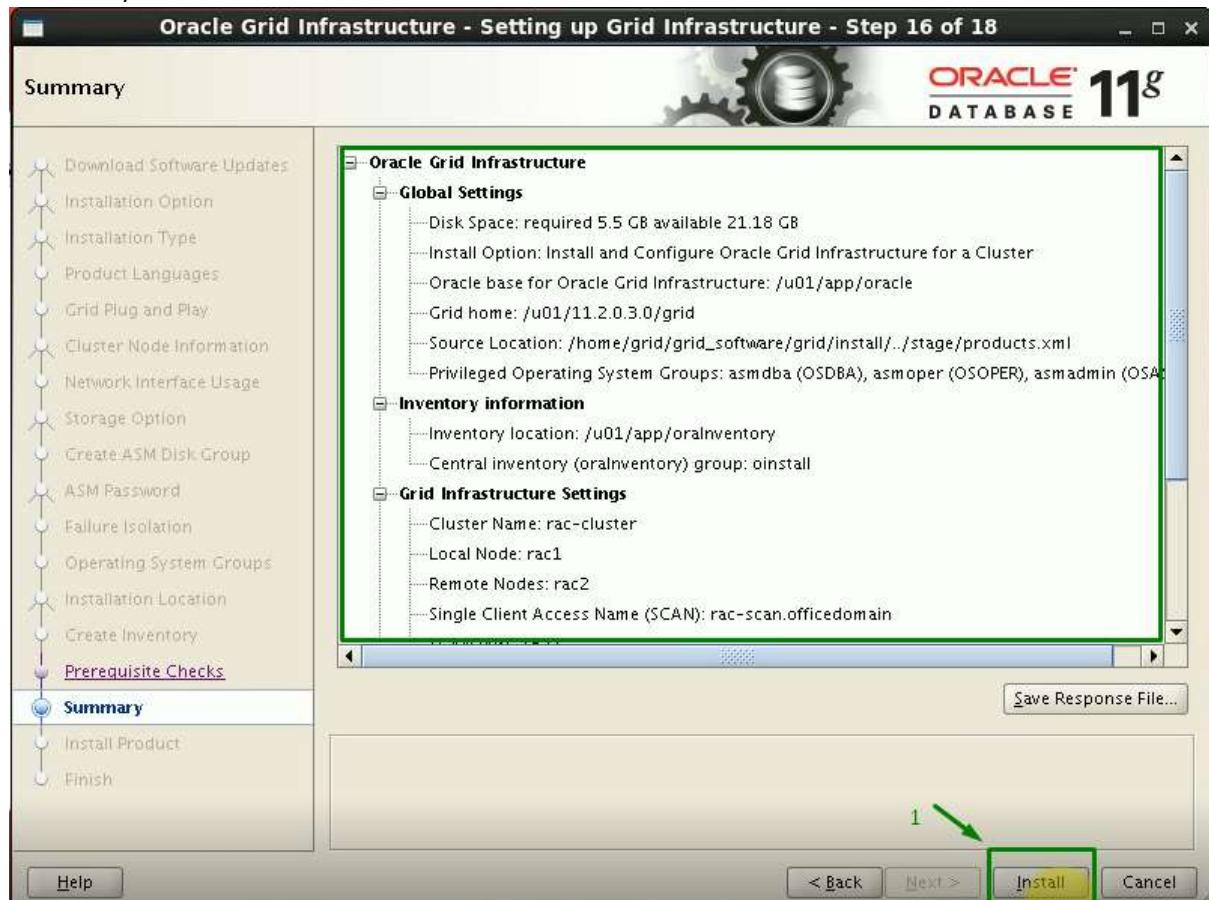
5.25. Regarding NTP and resolve service Ignore that grid checks we fix it latte so select the check box name as "Ignore All" option and then click on Next button



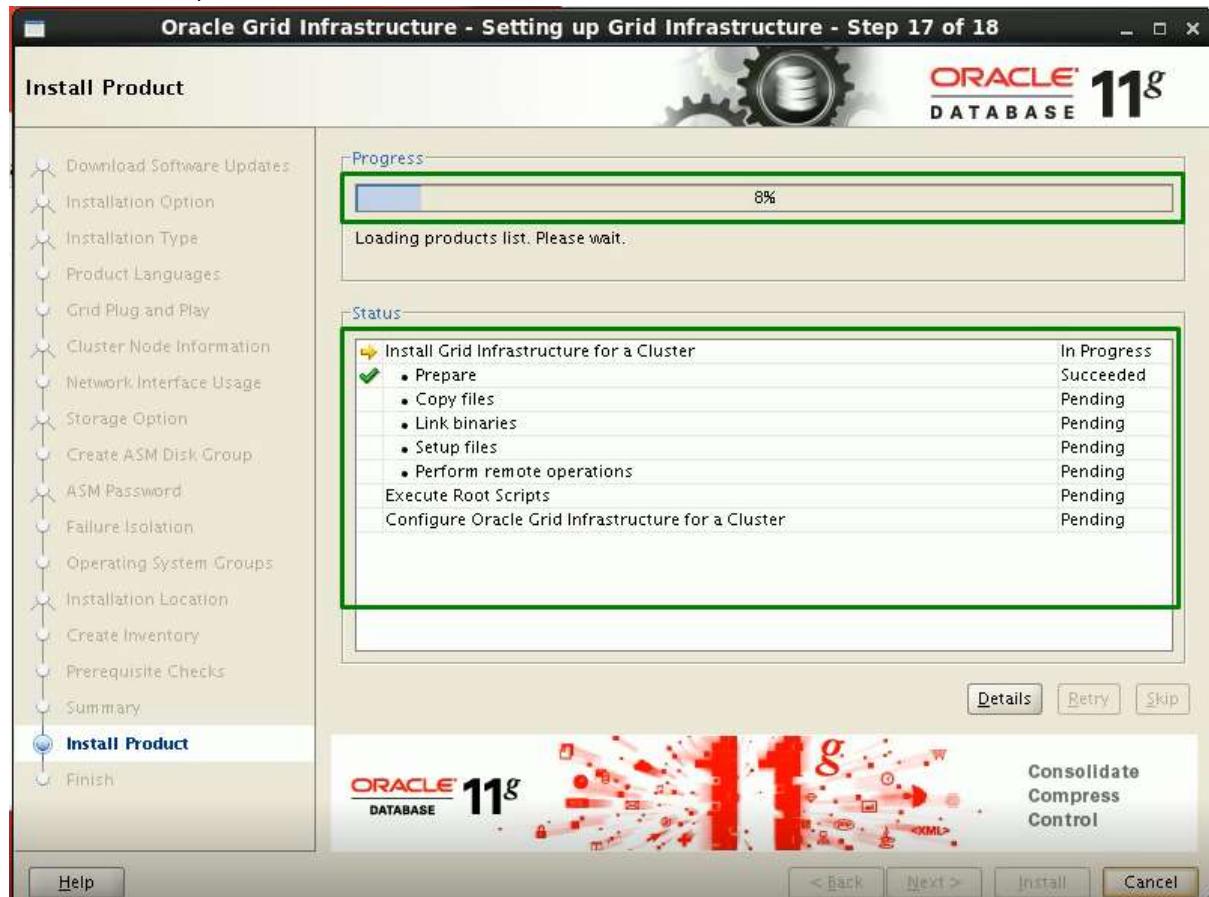
5.26. To Ignore click on Yes button and then click on Next button



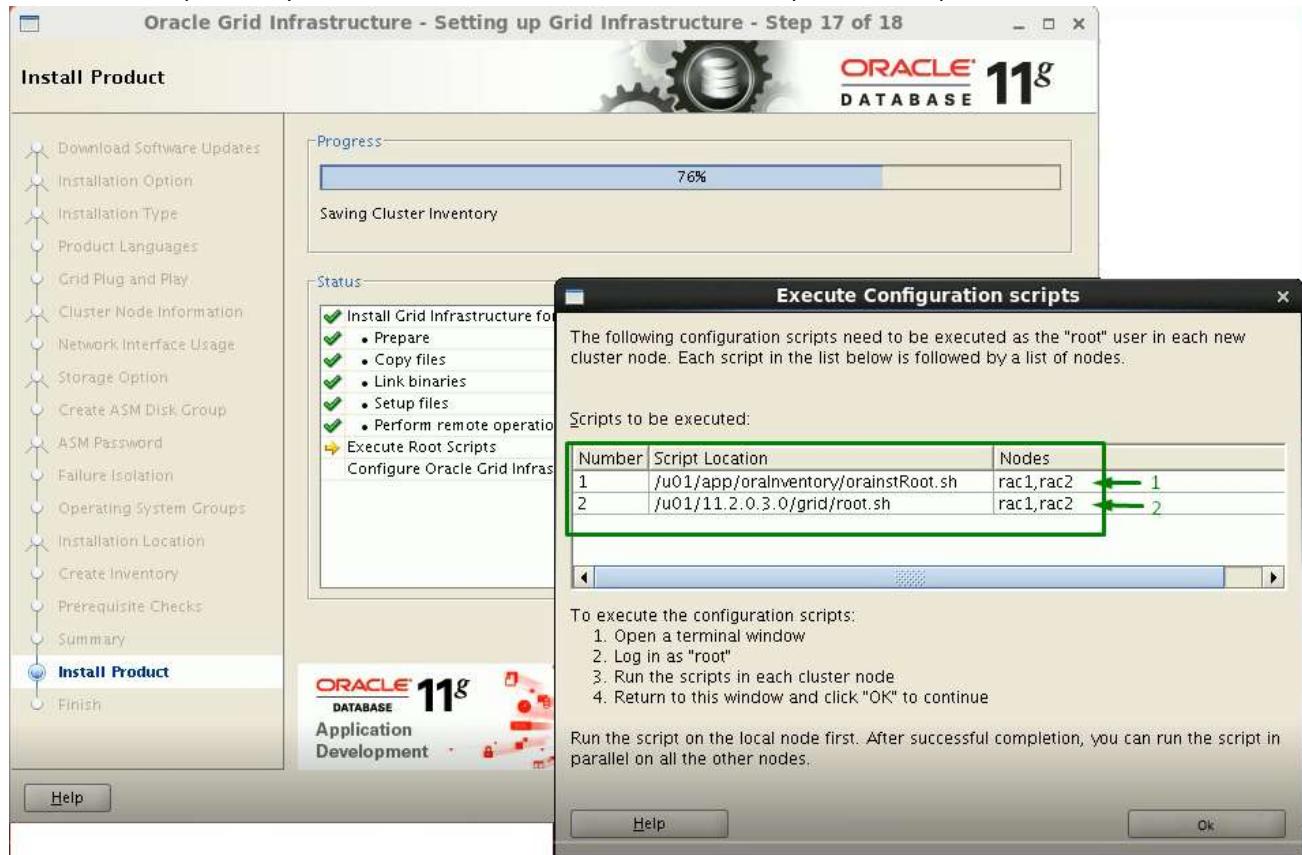
5.27. Verify the Grid installation location & size of Disk and then click on Install button



5.28. Installation process looks like now we have to wait



5.29. Now we have to run two specified scripts on both nodes (RAC1 & RAC2). So just open a terminal to run the two scripts one by one. Now we have to wait for successful completion of scripts.



5.30. Run the first script from root user at RAC1

```
--> Run the first script from Node 1  
[root@rac1 ~]#/u01/app/oraInventory/orainstRoot.sh
```

5.31. Run the first script from root user at RAC2

```
--> Run the first script from Node 2  
[root@rac2 ~]#/u01/app/oraInventory/orainstRoot.sh
```

5.32. Run the second script from root user at RAC1

```
--> Run the Second script from Node 1  
[root@rac1 ~]#/u01/11.2.0.3.0/grid/root.sh
```

5.33. Run the second script from root user at RAC2

```
--> Run the Second script from Node 2  
[root@rac2 ~]#/u01/11.2.0.3.0/grid/root.sh
```

5.34. After successful completion of scripts let's verify the node 1 cluster status at RAC1

```
[root@rac1 ~]# cd /u01/app/11.2.0.3/grid/bin/  
[root@rac1 bin]# ./crsctl check cluster  
/*  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*/
```

5.35. After successful completion of scripts let's verify the node 2 cluster status at RAC2

```
[root@rac2 ~]# cd /u01/app/11.2.0.3/grid/bin/  
[root@rac2 bin]# ./crsctl check cluster  
/*  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*/
```

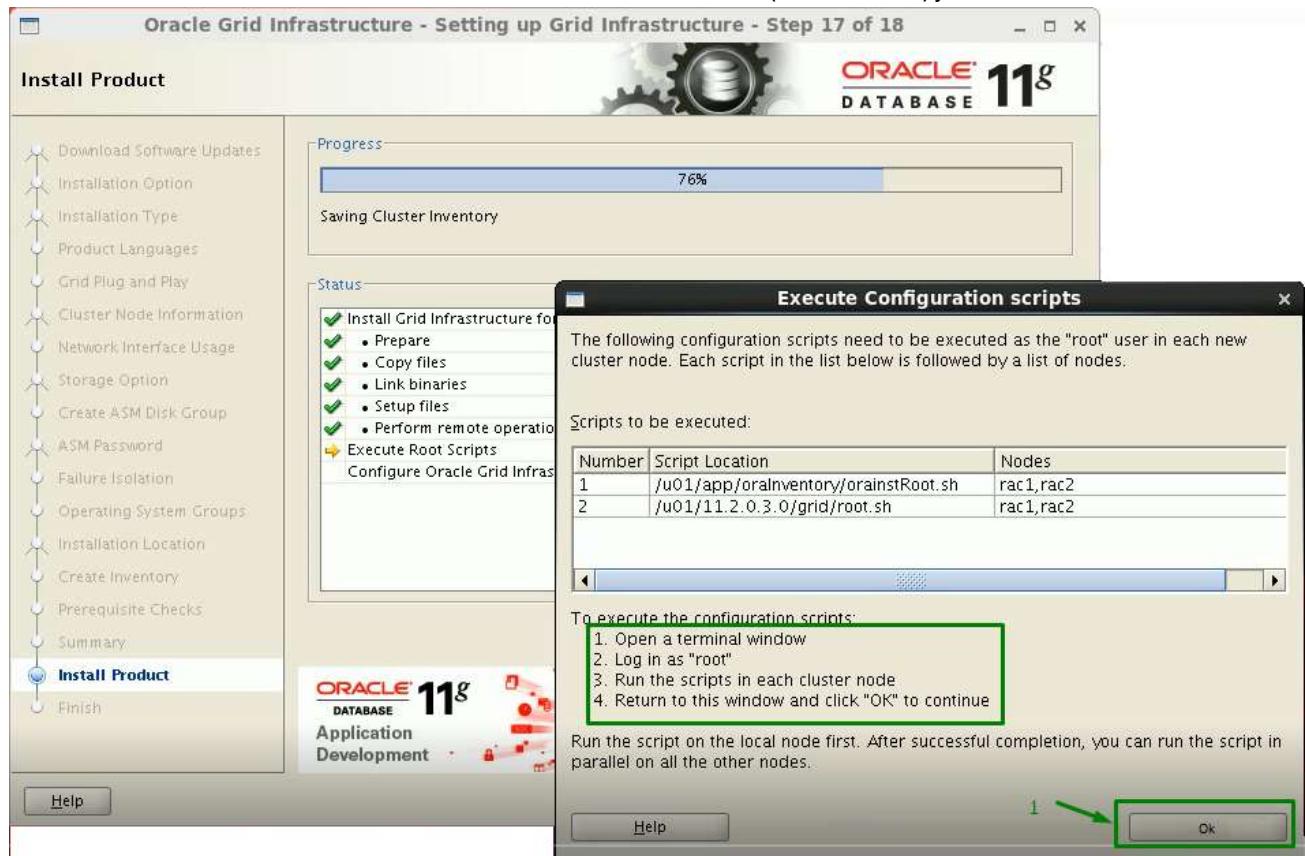
5.36. After successful completion of scripts let's verify the all nodes cluster status at RAC1

```
[root@rac1 bin]# ./crsctl check cluster -all  
/*  
*****  
rac1:  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*****  
rac2:  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*****  
*/
```

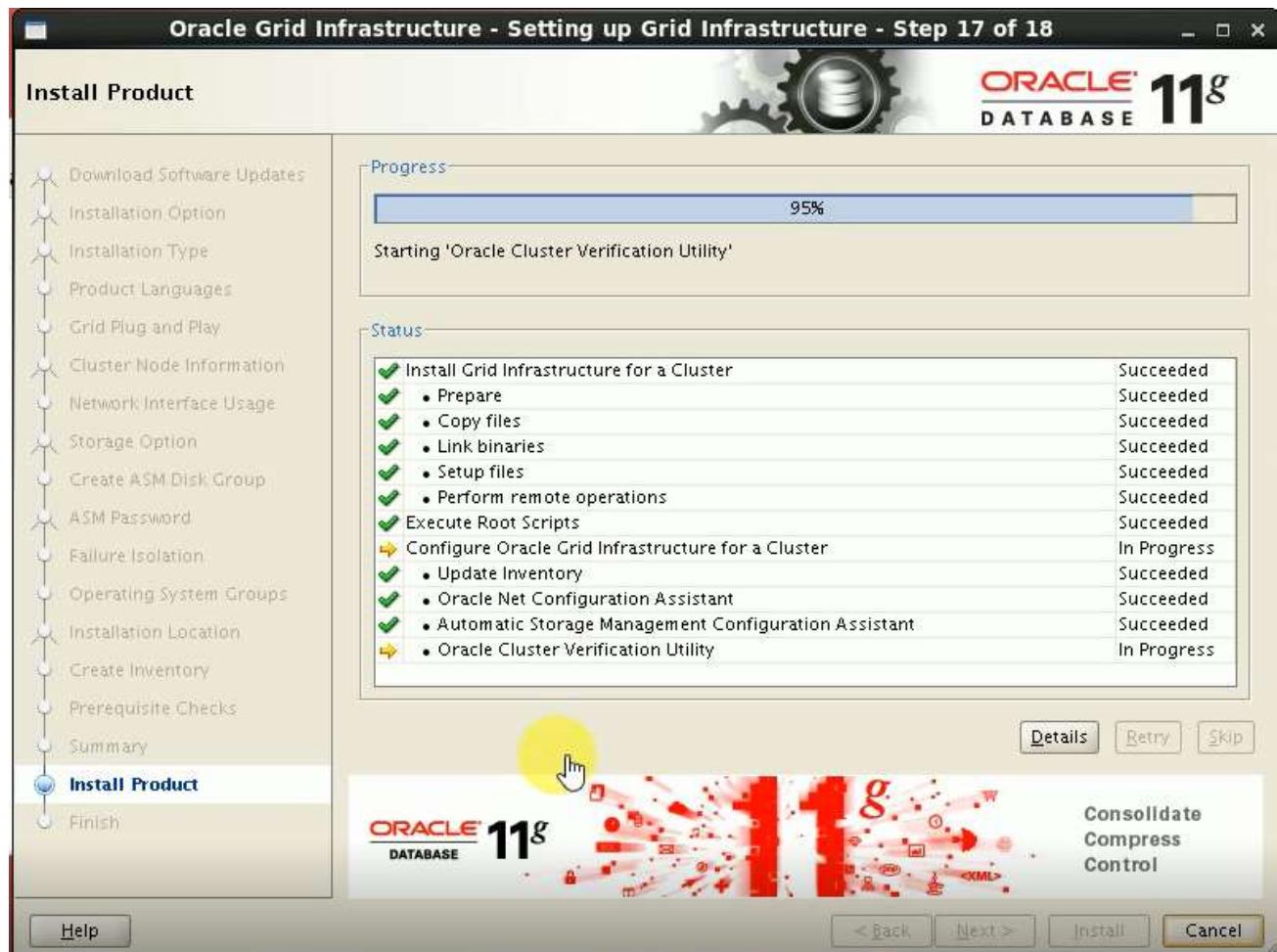
5.37. After successful completion of scripts let's verify the all nodes cluster status at RAC2

```
[root@rac2 bin]# ./crsctl check cluster -all  
/*  
*****  
rac1:  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*****  
rac2:  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*****  
*/
```

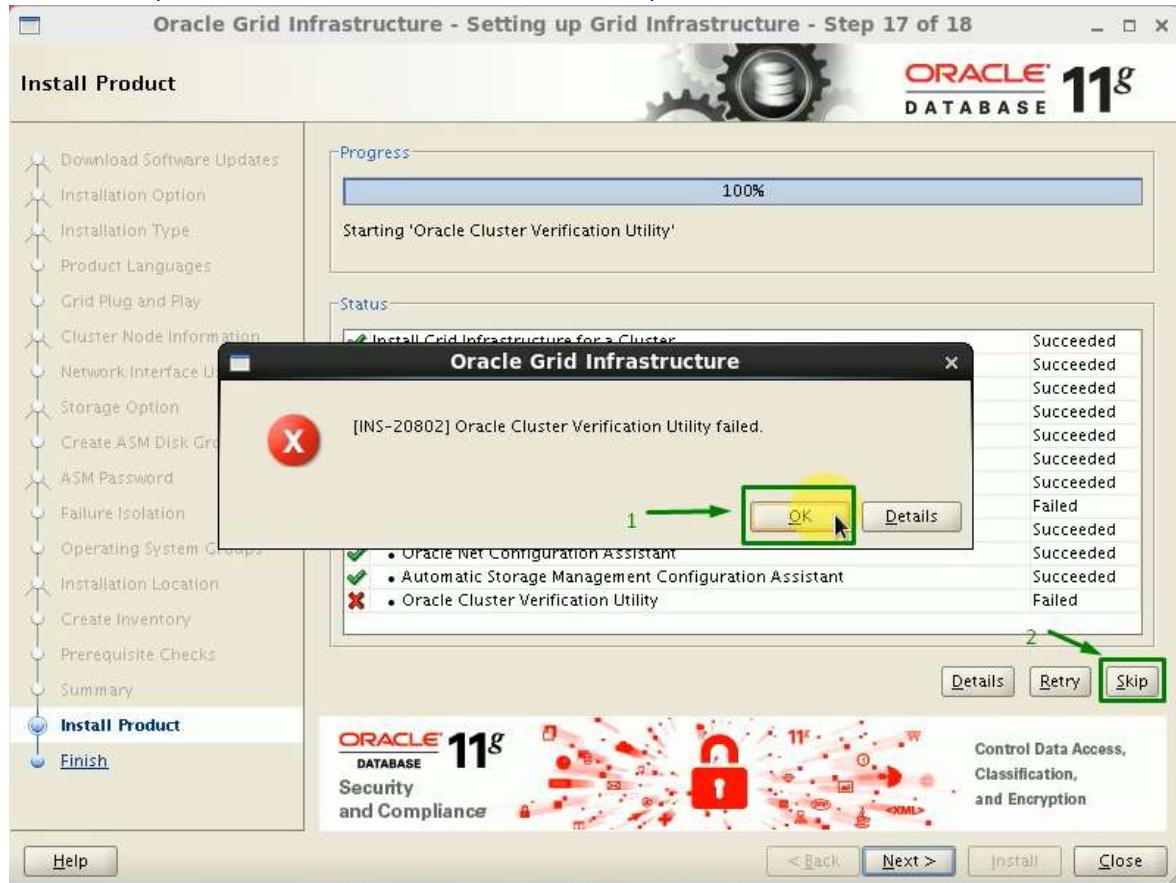
5.38. Now after successful verification of cluster status on both nodes (RAC1 & RAC2) just click on Ok button



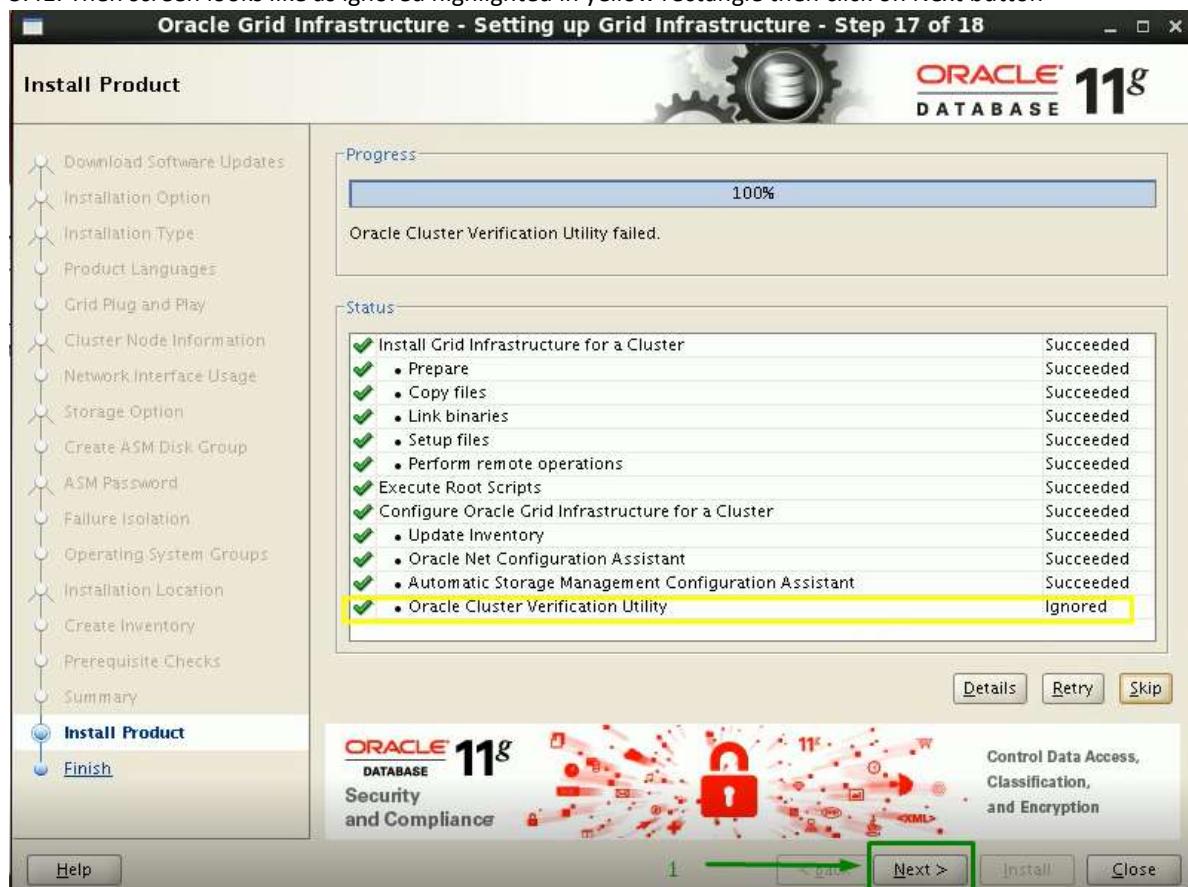
5.39. Now screen looks like



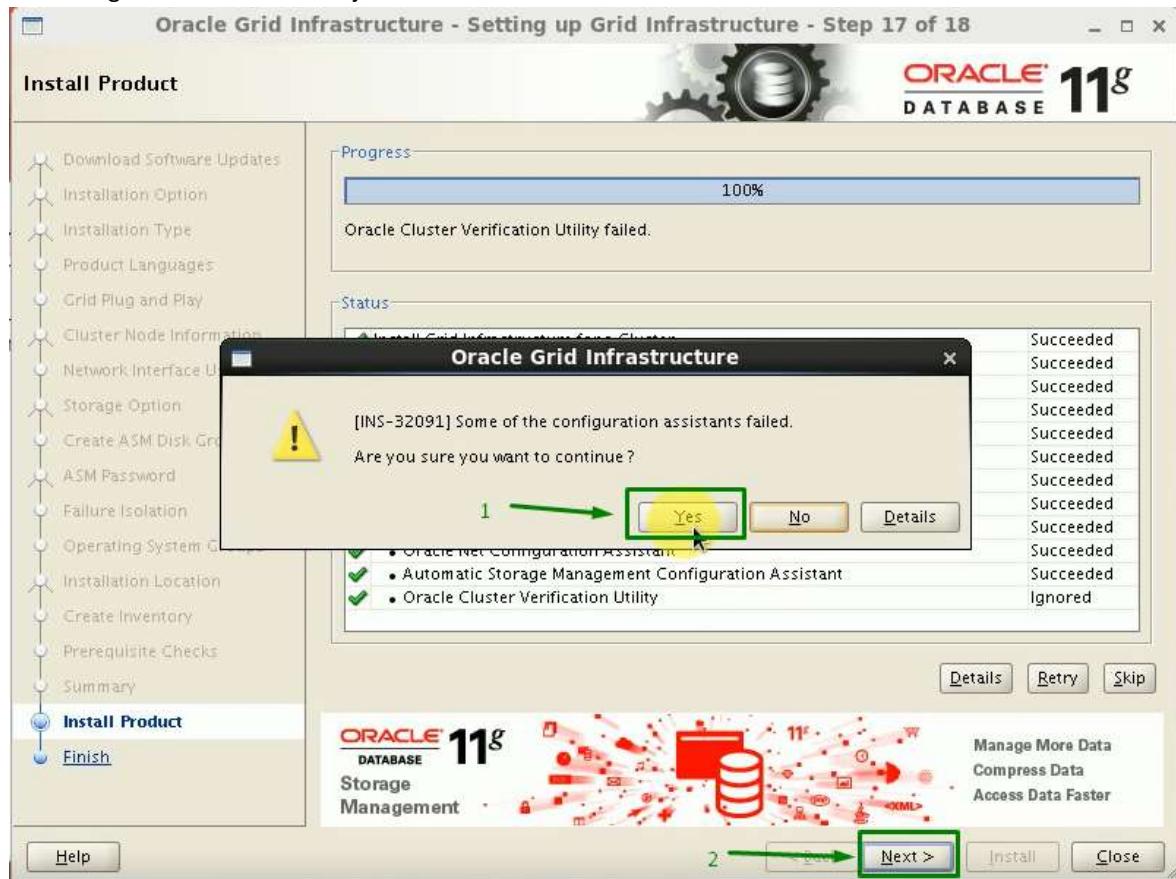
5.40. While we setup grid environment on our Laptop then there is issue during Cluster verification looks like shown screen but we no need to worry about this issue we just continue to completion of installation of Grid setup. So, Click on Ok button first then click on Skip button.



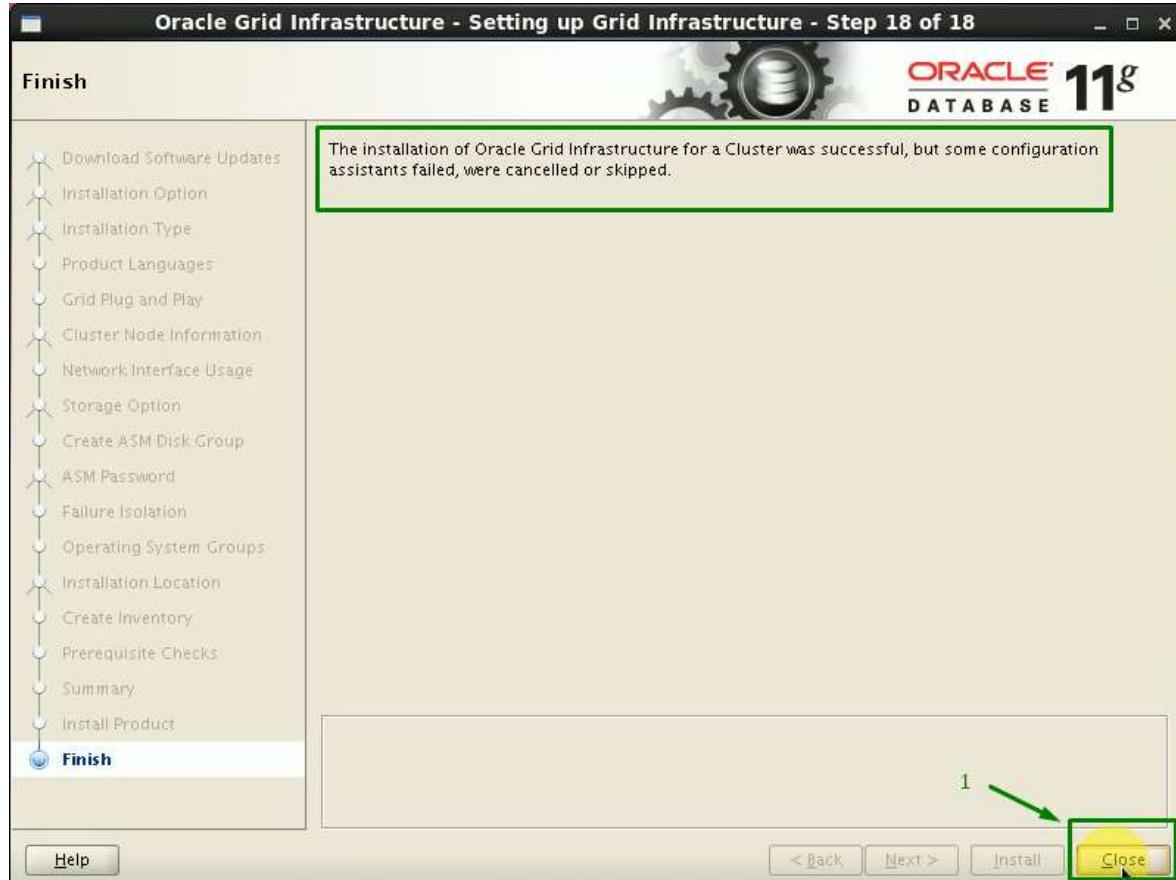
5.41. Then screen looks like as ignored highlighted in yellow rectangle then click on Next button



5.42. To ignore the failed check just click on Yes button and then click on Next button



5.43. Click on Close button to finish the installation of grid architecture



5.44. To fix the NTP service issue we just stop the cluster at RAC 1

```
[oracle@rac1 ~]$ su - root
/*
Password:
*/
[root@rac1 ~]# cd /u01/11.2.0.3.0/grid/bin/
[root@rac1 bin]# ./crsctl stop crs
/*
CRS-2791: Starting shutdown of Oracle High Availability Services-managed resources on 'rac1'
CRS-2673: Attempting to stop 'ora.crsd' on 'rac1'
CRS-2790: Starting shutdown of Cluster Ready Services-managed resources on 'rac1'
CRS-2673: Attempting to stop 'ora.LISTENER.lsnr' on 'rac1'
CRS-2673: Attempting to stop 'ora.LISTENER_SCAN1.lsnr' on 'rac1'
CRS-2673: Attempting to stop 'ora.OCR.dg' on 'rac1'
CRS-2673: Attempting to stop 'ora.racdb.db' on 'rac1'
CRS-2677: Stop of 'ora.LISTENER.lsnr' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.rac1.vip' on 'rac1'
CRS-2677: Stop of 'ora.LISTENER_SCAN1.lsnr' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.scan1.vip' on 'rac1'
CRS-2677: Stop of 'ora.rac1.vip' on 'rac1' succeeded
CRS-2672: Attempting to start 'ora.rac1.vip' on 'rac2'
CRS-2677: Stop of 'ora.scan1.vip' on 'rac1' succeeded
CRS-2672: Attempting to start 'ora.scan1.vip' on 'rac2'
CRS-2676: Start of 'ora.rac1.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.racdb.db' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.DATA.dg' on 'rac1'
CRS-2673: Attempting to stop 'ora.FRA.dg' on 'rac1'
CRS-2676: Start of 'ora.scan1.vip' on 'rac2' succeeded
CRS-2672: Attempting to start 'ora.LISTENER_SCAN1.lsnr' on 'rac2'
CRS-2677: Stop of 'ora.DATA.dg' on 'rac1' succeeded
CRS-2677: Stop of 'ora.FRA.dg' on 'rac1' succeeded
CRS-2676: Start of 'ora.LISTENER_SCAN1.lsnr' on 'rac2' succeeded
CRS-2677: Stop of 'ora.OCR.dg' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.asm' on 'rac1'
CRS-2677: Stop of 'ora.asm' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.ons' on 'rac1'
CRS-2677: Stop of 'ora.ons' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.net1.network' on 'rac1'
CRS-2677: Stop of 'ora.net1.network' on 'rac1' succeeded
CRS-2792: Shutdown of Cluster Ready Services-managed resources on 'rac1' has completed
CRS-2677: Stop of 'ora.crsd' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.crf' on 'rac1'
CRS-2673: Attempting to stop 'ora.ctssd' on 'rac1'
CRS-2673: Attempting to stop 'ora.evmd' on 'rac1'
CRS-2673: Attempting to stop 'ora.asm' on 'rac1'
CRS-2673: Attempting to stop 'ora.mdnscd' on 'rac1'
CRS-2677: Stop of 'ora.crf' on 'rac1' succeeded
CRS-2677: Stop of 'ora.mdnscd' on 'rac1' succeeded
CRS-2677: Stop of 'ora.evmd' on 'rac1' succeeded
CRS-2677: Stop of 'ora.asm' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.cluster_interconnect.haip' on 'rac1'
CRS-2677: Stop of 'ora.ctssd' on 'rac1' succeeded
CRS-2677: Stop of 'ora.cluster_interconnect.haip' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.cssd' on 'rac1'
CRS-2677: Stop of 'ora.cssd' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.gipcd' on 'rac1'
CRS-2677: Stop of 'ora.gipcd' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.gpnpd' on 'rac1'
CRS-2677: Stop of 'ora.gpnpd' on 'rac1' succeeded
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'rac1' has completed
CRS-4133: Oracle High Availability Services has been stopped.
*/

```

5.45. To fix the NTP service issue we just stop the cluster at RAC 2

```
[oracle@rac2 ~]$ su --root
/*
Password:
*/
[root@rac2 ~]# cd /u01/11.2.0.3.0/grid/bin/
[root@rac2 bin]# ./crsctl stop crs
/*
CRS-2791: Starting shutdown of Oracle High Availability Services-managed resources on 'rac2'
CRS-2673: Attempting to stop 'ora.crsd' on 'rac2'
CRS-2790: Starting shutdown of Cluster Ready Services-managed resources on 'rac2'
CRS-2673: Attempting to stop 'ora.cvud' on 'rac2'
CRS-2673: Attempting to stop 'ora.rac1.vip' on 'rac2'
CRS-2673: Attempting to stop 'ora.LISTENER.lsnr' on 'rac2'
CRS-2673: Attempting to stop 'ora.OCR.dg' on 'rac2'
CRS-2673: Attempting to stop 'ora.racdb.db' on 'rac2'
CRS-2673: Attempting to stop 'ora.LISTENER_SCAN2.lsnr' on 'rac2'
CRS-2673: Attempting to stop 'ora.LISTENER_SCAN1.lsnr' on 'rac2'
CRS-2673: Attempting to stop 'ora.oc4j' on 'rac2'
CRS-2677: Stop of 'ora.rac1.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.LISTENER_SCAN2.lsnr' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.scan2.vip' on 'rac2'
CRS-2677: Stop of 'ora.LISTENER.lsnr' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.rac2.vip' on 'rac2'
CRS-2677: Stop of 'ora.LISTENER_SCAN1.lsnr' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.scan1.vip' on 'rac2'
CRS-2677: Stop of 'ora.cvud' on 'rac2' succeeded
CRS-2677: Stop of 'ora.scan2.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.rac2.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.scan1.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.racdb.db' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.DATA.dg' on 'rac2'
CRS-2673: Attempting to stop 'ora.FRA.dg' on 'rac2'
CRS-2677: Stop of 'ora.DATA.dg' on 'rac2' succeeded
CRS-2677: Stop of 'ora.FRA.dg' on 'rac2' succeeded
CRS-2677: Stop of 'ora.oc4j' on 'rac2' succeeded
CRS-2677: Stop of 'ora.OCR.dg' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.asm' on 'rac2'
CRS-2677: Stop of 'ora.asm' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.ons' on 'rac2'
CRS-2677: Stop of 'ora.ons' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.net1.network' on 'rac2'
CRS-2677: Stop of 'ora.net1.network' on 'rac2' succeeded
CRS-2792: Shutdown of Cluster Ready Services-managed resources on 'rac2' has completed
CRS-2677: Stop of 'ora.crsd' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.crf' on 'rac2'
CRS-2673: Attempting to stop 'ora.ctssd' on 'rac2'
CRS-2673: Attempting to stop 'ora.evmd' on 'rac2'
CRS-2673: Attempting to stop 'ora.asm' on 'rac2'
CRS-2673: Attempting to stop 'ora.mdnsd' on 'rac2'
CRS-2677: Stop of 'ora.crf' on 'rac2' succeeded
CRS-2677: Stop of 'ora.evmd' on 'rac2' succeeded
CRS-2677: Stop of 'ora.mdnsd' on 'rac2' succeeded
CRS-2677: Stop of 'ora.asm' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.cluster_interconnect.haip' on 'rac2'
CRS-2677: Stop of 'ora.ctssd' on 'rac2' succeeded
CRS-2677: Stop of 'ora.cluster_interconnect.haip' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.cssd' on 'rac2'
CRS-2677: Stop of 'ora.cssd' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.gipcd' on 'rac2'
CRS-2677: Stop of 'ora.gipcd' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.gpnpd' on 'rac2'
CRS-2677: Stop of 'ora.gpnpd' on 'rac2' succeeded
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'rac2' has completed
CRS-4133: Oracle High Availability Services has been stopped.
*/
```

5.46. To fix the NTP service issue we just start the cluster at RAC 1

```
[root@rac1 bin]# ./crsctl start crs
/*
CRS-4123: Oracle High Availability Services has been started.
*/
```

5.47. To fix the NTP service issue we just start the cluster at RAC 2

```
[root@rac2 bin]# ./crsctl start crs
/*
CRS-4123: Oracle High Availability Services has been started.
*/
```

5.48. While starting process the cluster at RAC1 we found the “ora.ctssd” status as “OBSERVER” because the “/etc/ntp.conf” exists at node 1

```
[root@rac1 bin]# ./crsctl stat res -t --init
/*
-----
NAME.....TARGET....STATE.....SERVER.....STATE_DETAILS.....
-----
Cluster Resources
-----
ora.asm
....| 1.....ONLINE..ONLINE.....rac1.....Started.....
ora.cluster_interconnect.haip
....| 1.....ONLINE..ONLINE.....rac1......
ora.crf
....| 1.....ONLINE..ONLINE.....rac1......
ora.crsd
....| 1.....ONLINE..ONLINE.....rac1......
ora.cssd
....| 1.....ONLINE..ONLINE.....rac1......
ora.cssdmonitor
....| 1.....ONLINE..ONLINE.....rac1......
ora.ctssd
....| 1.....ONLINE..ONLINE.....rac1......
ora.diskmon
....| 1.....OFFLINE..OFFLINE......
ora.evmd
....| 1.....ONLINE..ONLINE.....rac1......
ora.gipcd
....| 1.....ONLINE..ONLINE.....rac1......
ora.gpnpd
....| 1.....ONLINE..ONLINE.....rac1......
ora.mdnsd
....| 1.....ONLINE..ONLINE.....rac1......
*/

```

The screenshot shows the output of the 'crsctl stat res -t --init' command on RAC1. It lists various cluster resources and their states. The 'ora.ctssd' resource is highlighted with a red arrow pointing to it from the left, and a red box labeled 'OBSERVER' is positioned to its right, indicating its status.

5.49. While starting process the cluster at RAC2 we found the “ora.ctssd” status as “OBSERVER” because the “/etc/ntp.conf” exists at node 2

```
[root@rac2 bin]# ./crsctl stat res -t -init
/*
-----
NAME.....TARGET....STATE..... SERVER..... STATE_DETAILS.....
-----
Cluster Resources
-----
ora.asm
....| 1..... ONLINE .. ONLINE ..... rac2..... Started.....
ora.cluster_interconnect.haip
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.crf
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.crsd
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.cssd
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.cssdmonitor
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.ctssd ←
....| 1..... ONLINE .. ONLINE ..... rac2..... ← OBSERVER..... .
ora.diskmon
....| 1..... OFFLINE .. OFFLINE..... .
ora.evmd
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.gipcd
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.gpnpd
....| 1..... ONLINE .. ONLINE ..... rac2..... .
ora.mdnsd
....| 1..... ONLINE .. ONLINE ..... rac2..... .
*/

```

5.50. So just remove the file “/etc/ntp.conf” from node 1 (RAC1)

```
[root@rac1 ~]# cd /etc
[root@rac1 etc]# rm -rf ntp.conf
```

5.51. So just remove the file “/etc/ntp.conf” from node 2 (RAC2)

```
[root@rac2 ~]# cd /etc
[root@rac2 etc]# rm -rf ntp.conf
```

5.52. Verify the current cluster status from node 1 (RAC1)

```
[root@rac1 bin]# ./crsctl check cluster -all
/*
*****
rac1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
*****
rac2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
*****
*/

```

5.53. Then again we have to stop the cluster at RAC 1

```
[oracle@rac1 ~]$ su - root
/*
Password:
*/
[root@rac1 ~]# cd /u01/11.2.0.3.0/grid/bin/
[root@rac1 bin]# ./crsctl stop crs
/*
CRS-2791: Starting shutdown of Oracle High Availability Services-managed resources on 'rac1'
CRS-2673: Attempting to stop 'ora.crsd' on 'rac1'
CRS-2790: Starting shutdown of Cluster Ready Services-managed resources on 'rac1'
CRS-2673: Attempting to stop 'ora.LISTENER.lsnr' on 'rac1'
CRS-2673: Attempting to stop 'ora.LISTENER_SCAN1.lsnr' on 'rac1'
CRS-2673: Attempting to stop 'ora.OCR.dg' on 'rac1'
CRS-2673: Attempting to stop 'ora.racdb.db' on 'rac1'
CRS-2677: Stop of 'ora.LISTENER.lsnr' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.rac1.vip' on 'rac1'
CRS-2677: Stop of 'ora.LISTENER_SCAN1.lsnr' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.scan1.vip' on 'rac1'
CRS-2677: Stop of 'ora.rac1.vip' on 'rac1' succeeded
CRS-2672: Attempting to start 'ora.rac1.vip' on 'rac2'
CRS-2677: Stop of 'ora.scan1.vip' on 'rac1' succeeded
CRS-2672: Attempting to start 'ora.scan1.vip' on 'rac2'
CRS-2676: Start of 'ora.rac1.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.racdb.db' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.DATA.dg' on 'rac1'
CRS-2673: Attempting to stop 'ora.FRA.dg' on 'rac1'
CRS-2676: Start of 'ora.scan1.vip' on 'rac2' succeeded
CRS-2672: Attempting to start 'ora.LISTENER_SCAN1.lsnr' on 'rac2'
CRS-2677: Stop of 'ora.DATA.dg' on 'rac1' succeeded
CRS-2677: Stop of 'ora.FRA.dg' on 'rac1' succeeded
CRS-2676: Start of 'ora.LISTENER_SCAN1.lsnr' on 'rac2' succeeded
CRS-2677: Stop of 'ora.OCR.dg' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.asm' on 'rac1'
CRS-2677: Stop of 'ora.asm' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.ons' on 'rac1'
CRS-2677: Stop of 'ora.ons' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.net1.network' on 'rac1'
CRS-2677: Stop of 'ora.net1.network' on 'rac1' succeeded
CRS-2792: Shutdown of Cluster Ready Services-managed resources on 'rac1' has completed
CRS-2677: Stop of 'ora.crsd' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.crf' on 'rac1'
CRS-2673: Attempting to stop 'ora.ctssd' on 'rac1'
CRS-2673: Attempting to stop 'ora.evmd' on 'rac1'
CRS-2673: Attempting to stop 'ora.asm' on 'rac1'
CRS-2673: Attempting to stop 'ora.mdnscd' on 'rac1'
CRS-2677: Stop of 'ora.crf' on 'rac1' succeeded
CRS-2677: Stop of 'ora.mdnscd' on 'rac1' succeeded
CRS-2677: Stop of 'ora.evmd' on 'rac1' succeeded
CRS-2677: Stop of 'ora.asm' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.cluster_interconnect.haip' on 'rac1'
CRS-2677: Stop of 'ora.ctssd' on 'rac1' succeeded
CRS-2677: Stop of 'ora.cluster_interconnect.haip' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.cssd' on 'rac1'
CRS-2677: Stop of 'ora.cssd' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.gipcd' on 'rac1'
CRS-2677: Stop of 'ora.gipcd' on 'rac1' succeeded
CRS-2673: Attempting to stop 'ora.gpnpd' on 'rac1'
CRS-2677: Stop of 'ora.gpnpd' on 'rac1' succeeded
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'rac1' has completed
CRS-4133: Oracle High Availability Services has been stopped.
*/

```

5.54. We also have to stop the cluster at RAC 2

```
[oracle@rac2 ~]$ su --root
/*
Password:
*/
[root@rac2 ~]# cd /u01/11.2.0.3.0/grid/bin/
[root@rac2 bin]# ./crsctl stop crs
/*
CRS-2791: Starting shutdown of Oracle High Availability Services-managed resources on 'rac2'
CRS-2673: Attempting to stop 'ora.crsd' on 'rac2'
CRS-2790: Starting shutdown of Cluster Ready Services-managed resources on 'rac2'
CRS-2673: Attempting to stop 'ora.cvu' on 'rac2'
CRS-2673: Attempting to stop 'ora.rac1.vip' on 'rac2'
CRS-2673: Attempting to stop 'ora.LISTENER.lsnr' on 'rac2'
CRS-2673: Attempting to stop 'ora.OCR.dg' on 'rac2'
CRS-2673: Attempting to stop 'ora.racdb.db' on 'rac2'
CRS-2673: Attempting to stop 'ora.LISTENER_SCAN2.lsnr' on 'rac2'
CRS-2673: Attempting to stop 'ora.LISTENER_SCAN1.lsnr' on 'rac2'
CRS-2673: Attempting to stop 'ora.oc4j' on 'rac2'
CRS-2677: Stop of 'ora.rac1.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.LISTENER_SCAN2.lsnr' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.scan2.vip' on 'rac2'
CRS-2677: Stop of 'ora.LISTENER.lsnr' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.rac2.vip' on 'rac2'
CRS-2677: Stop of 'ora.LISTENER_SCAN1.lsnr' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.scan1.vip' on 'rac2'
CRS-2677: Stop of 'ora.cvu' on 'rac2' succeeded
CRS-2677: Stop of 'ora.scan2.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.rac2.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.scan1.vip' on 'rac2' succeeded
CRS-2677: Stop of 'ora.racdb.db' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.DATA.dg' on 'rac2'
CRS-2673: Attempting to stop 'ora.FRA.dg' on 'rac2'
CRS-2677: Stop of 'ora.DATA.dg' on 'rac2' succeeded
CRS-2677: Stop of 'ora.FRA.dg' on 'rac2' succeeded
CRS-2677: Stop of 'ora.oc4j' on 'rac2' succeeded
CRS-2677: Stop of 'ora.OCR.dg' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.asm' on 'rac2'
CRS-2677: Stop of 'ora.asm' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.ons' on 'rac2'
CRS-2677: Stop of 'ora.ons' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.net1.network' on 'rac2'
CRS-2677: Stop of 'ora.net1.network' on 'rac2' succeeded
CRS-2792: Shutdown of Cluster Ready Services-managed resources on 'rac2' has completed
CRS-2677: Stop of 'ora.crsd' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.crf' on 'rac2'
CRS-2673: Attempting to stop 'ora.ctssd' on 'rac2'
CRS-2673: Attempting to stop 'ora.evmd' on 'rac2'
CRS-2673: Attempting to stop 'ora.asm' on 'rac2'
CRS-2673: Attempting to stop 'ora.mdnsd' on 'rac2'
CRS-2677: Stop of 'ora.crf' on 'rac2' succeeded
CRS-2677: Stop of 'ora.evmd' on 'rac2' succeeded
CRS-2677: Stop of 'ora.mdnsd' on 'rac2' succeeded
CRS-2677: Stop of 'ora.asm' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.cluster_interconnect.haip' on 'rac2'
CRS-2677: Stop of 'ora.ctssd' on 'rac2' succeeded
CRS-2677: Stop of 'ora.cluster_interconnect.haip' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.cssd' on 'rac2'
CRS-2677: Stop of 'ora.cssd' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.gipcd' on 'rac2'
CRS-2677: Stop of 'ora.gipcd' on 'rac2' succeeded
CRS-2673: Attempting to stop 'ora.gpnpd' on 'rac2'
CRS-2677: Stop of 'ora.gpnpd' on 'rac2' succeeded
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'rac2' has completed
CRS-4133: Oracle High Availability Services has been stopped.
*/
```

5.55. Then needs to start the cluster at RAC 1

```
[root@rac1 bin]# ./crsctl start crs
/*
CRS-4123: Oracle High Availability Services has been started.
*/
```

5.56. Then needs to start the cluster at RAC 1

```
[root@rac2 bin]# ./crsctl start crs
/*
CRS-4123: Oracle High Availability Services has been started.
*/
```

5.57. The cluster starting process 1 looks like at RAC 1

```
[root@rac1 bin]# ./crsctl stat res -t -init
]/*-----[

-----[NAME ..... TARGET .. STATE ..... SERVER..... STATE_DETAILS.....
-----[Cluster Resources
-----[ora.asm
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... Started.....
ora.cluster_interconnect.haip
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.crf
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.crsd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.cssd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.cssdmonitor
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
bra.ctssd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... ACTIVE:0.....
ora.diskmon
-----[| 1 ..... OFFLINE .. OFFLINE..... .
ora.evmd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.gipcd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.gpnpd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
ora.mdnsd
-----[| 1 ..... ONLINE .. ONLINE..... rac1..... .
]/*
```

5.58. The cluster starting process 2 looks like at RAC 1

```
root@rac1:~/bin]# ./crsctl stat res -t
/*
-----  

NAME.....TARGET..STATE.....SERVER.....STATE_DETAILS.....  

-----  

Local Resources  

-----  

ora.DATA.dg.....ONLINE..ONLINE.....rac1.....  

.....ONLINE..ONLINE.....rac2.....  

ora.FRA.dg.....ONLINE..ONLINE.....rac1.....  

.....ONLINE..ONLINE.....rac2.....  

ora.LISTENER.lsnr.....ONLINE..ONLINE.....rac1.....  

.....ONLINE..ONLINE.....rac2.....  

ora.OCR.dg.....ONLINE..ONLINE.....rac1.....  

.....ONLINE..ONLINE.....rac2.....  

ora.asm.....ONLINE..ONLINE.....rac1.....Started.....  

.....ONLINE..ONLINE.....rac2.....Started.....  

ora.gsd.....OFFLINE..OFFLINE.....rac1.....  

.....OFFLINE..OFFLINE.....rac2.....  

ora.net1.network.....ONLINE..ONLINE.....rac1.....  

.....ONLINE..ONLINE.....rac2.....  

ora.ons.....ONLINE..ONLINE.....rac1.....  

.....ONLINE..ONLINE.....rac2.....  

-----  

Cluster Resources  

-----  

ora.LISTENER_SCAN1.lsnr.....1.....ONLINE..ONLINE.....rac1.....  

ora.cvu.....1.....ONLINE..ONLINE.....rac1.....  

ora.oc4j.....1.....ONLINE..ONLINE.....rac1.....  

ora.rac1.vip.....1.....ONLINE..ONLINE.....rac1.....  

ora.rac2.vip.....1.....ONLINE..ONLINE.....rac2.....  

ora.scan1.vip.....1.....ONLINE..ONLINE.....rac1.....  

*/
```

5.59. The cluster starting process 1 looks like at RAC 2

```
[root@rac2 bin]# ./crsctl stat res -t -init
/*
-----
NAME.....TARGET..STATE.....SERVER.....STATE_DETAILS.....
-----
Cluster Resources
-----
ora.asm
....| 1.....ONLINE..ONLINE.....rac2.....Started.....
ora.cluster_interconnect.haip
....| 1.....ONLINE..ONLINE.....rac2......
ora.crf
....| 1.....ONLINE..ONLINE.....rac2......
ora.crsd
....| 1.....ONLINE..ONLINE.....rac2......
ora.cssd
....| 1.....ONLINE..ONLINE.....rac2......
ora.cssdmonitor
....| 1.....ONLINE..ONLINE.....rac2......
bra.ctssd
....| 1.....ONLINE..ONLINE.....rac2.....ACTIVE:0.....
ora.diskmon
....| 1.....OFFLINE..OFFLINE......
ora.evmd
....| 1.....ONLINE..ONLINE.....rac2......
ora.gipcd
....| 1.....ONLINE..ONLINE.....rac2......
ora.gpnpd
....| 1.....ONLINE..ONLINE.....rac2......
ora.mdnsd
....| 1.....ONLINE..ONLINE.....rac2......
*/

```

5.60. The cluster starting process 2 looks like at RAC 2

```
[root@rac2 bin]# ./crsctl stat res -t
/*
-----
NAME.....TARGET..STATE.....SERVER.....STATE_DETAILS.....
-----
Local Resources
-----
ora.DATA.dg
....| ..| ONLINE..ONLINE.....rac1......
....| ..| ONLINE..ONLINE.....rac2......
ora.FRA.dg
....| ..| ONLINE..ONLINE.....rac1......
....| ..| ONLINE..ONLINE.....rac2......
ora.LISTENER.lsnr
....| ..| ONLINE..ONLINE.....rac1......
....| ..| ONLINE..ONLINE.....rac2......
ora.OCR.dg
....| ..| ONLINE..ONLINE.....rac1......
....| ..| ONLINE..ONLINE.....rac2......
```

```

ora.asm
-----|---- ONLINE .. ONLINE ..... rac1 ..... Started
-----|---- ONLINE .. ONLINE ..... rac2 ..... Started
ora.gsd
-----|---- OFFLINE .. OFFLINE ..... rac1
-----|---- OFFLINE .. OFFLINE ..... rac2
ora.net1.network
-----|---- ONLINE .. ONLINE ..... rac1
-----|---- ONLINE .. ONLINE ..... rac2
ora.ons
-----|---- ONLINE .. ONLINE ..... rac1
-----|---- ONLINE .. ONLINE ..... rac2
-----
Cluster Resources
-----
ora.LISTENER_SCAN1.lsnr
-----|---- 1 ..... ONLINE .. ONLINE ..... rac1
ora.cvu
-----|---- 1 ..... ONLINE .. ONLINE ..... rac1
ora.oc4j
-----|---- 1 ..... ONLINE .. ONLINE ..... rac1
ora.rac1.vip
-----|---- 1 ..... ONLINE .. ONLINE ..... rac1
ora.rac2.vip
-----|---- 1 ..... ONLINE .. ONLINE ..... rac2
ora.scan1.vip
-----|---- 1 ..... ONLINE .. ONLINE ..... rac1
*/

```

5.61. To verify the all nodes cluster status at RAC 2

```

[root@rac2 bin]# ./crsctl check cluster -all
/*
*****
rac1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
*****
rac2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
*****
*/

```

6. Install Oracle Database software over Cluster ware (Grid) on RAC1 and RAC2

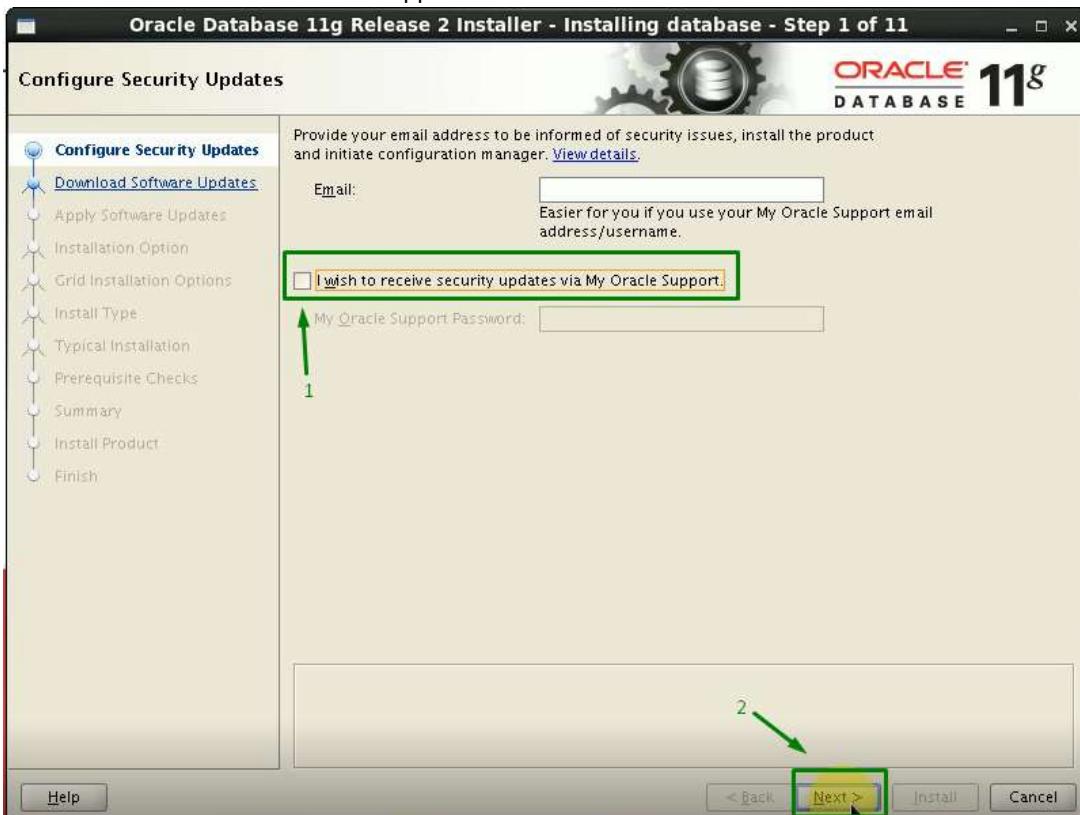
6.1. Login as oracle user and issue the following command from Terminal at RAC1

```
[oracle@rac1 Desktop]$ cd.  
[oracle@rac1 ~]$ hostname  
/*  
rac1.mydomain  
*/  
[oracle@rac1 ~]$ xhost + rac1.mydomain  
/*  
rac1.mydomain being added to access control list  
*/
```

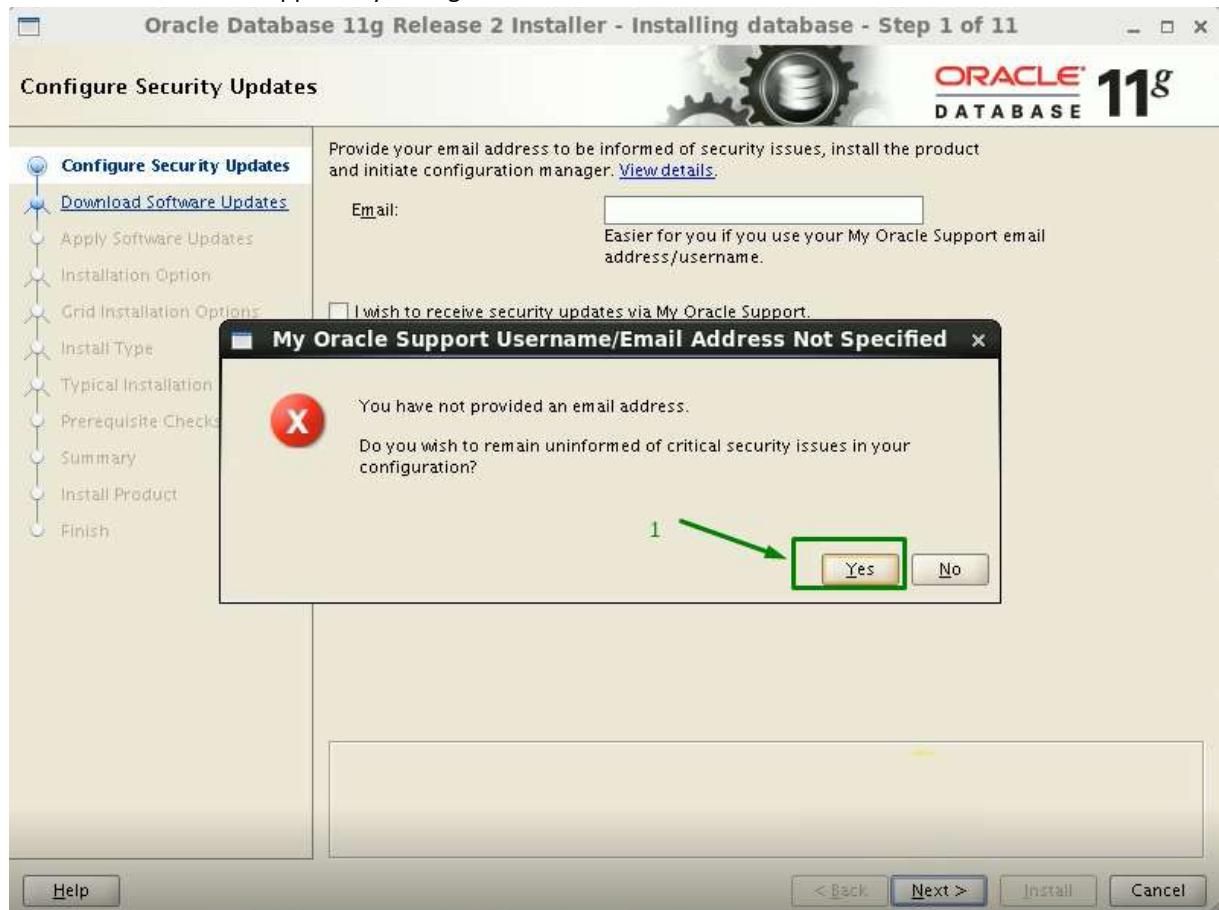
6.2. Installation of Oracle Database software start from screen at RAC1



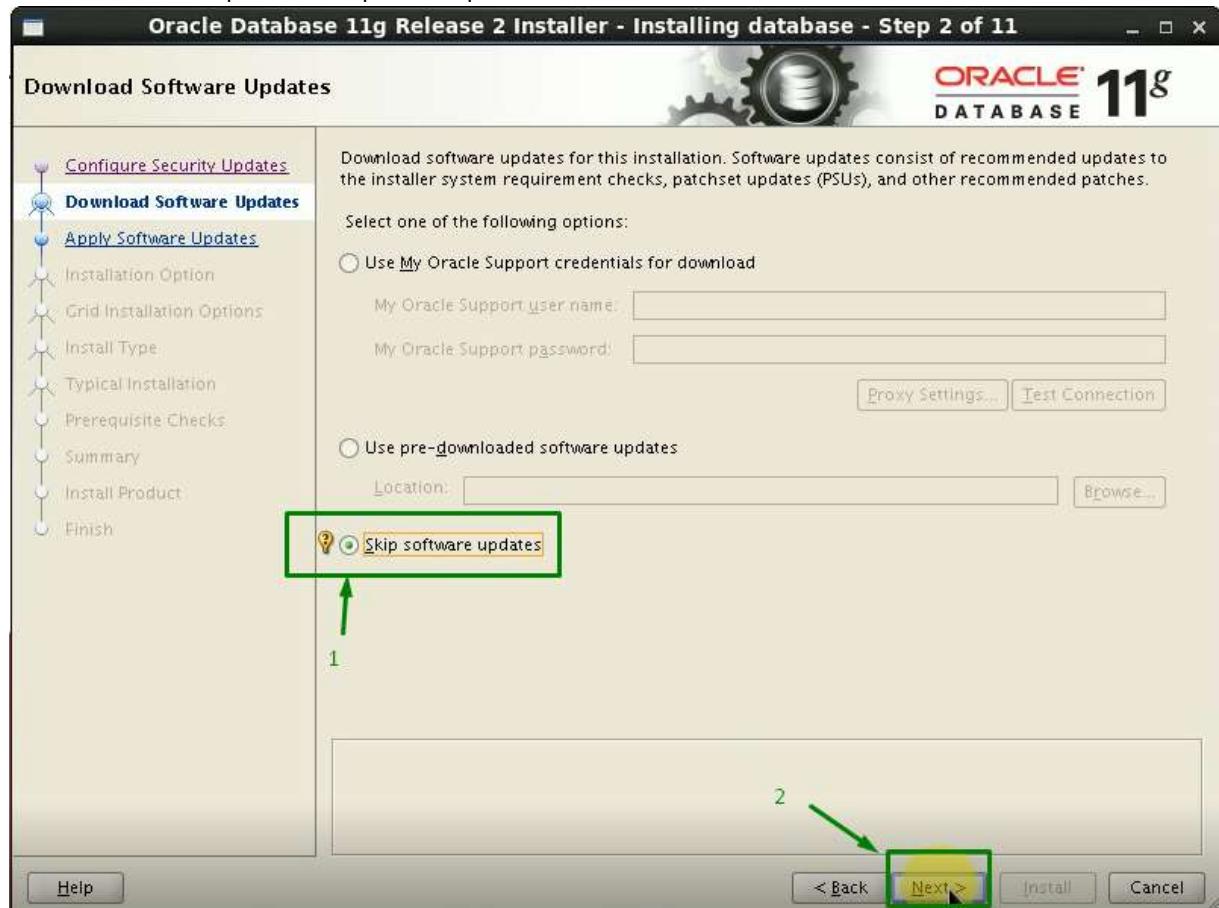
6.3. Uncheck the select of "Oracle Support" and then click on Next button



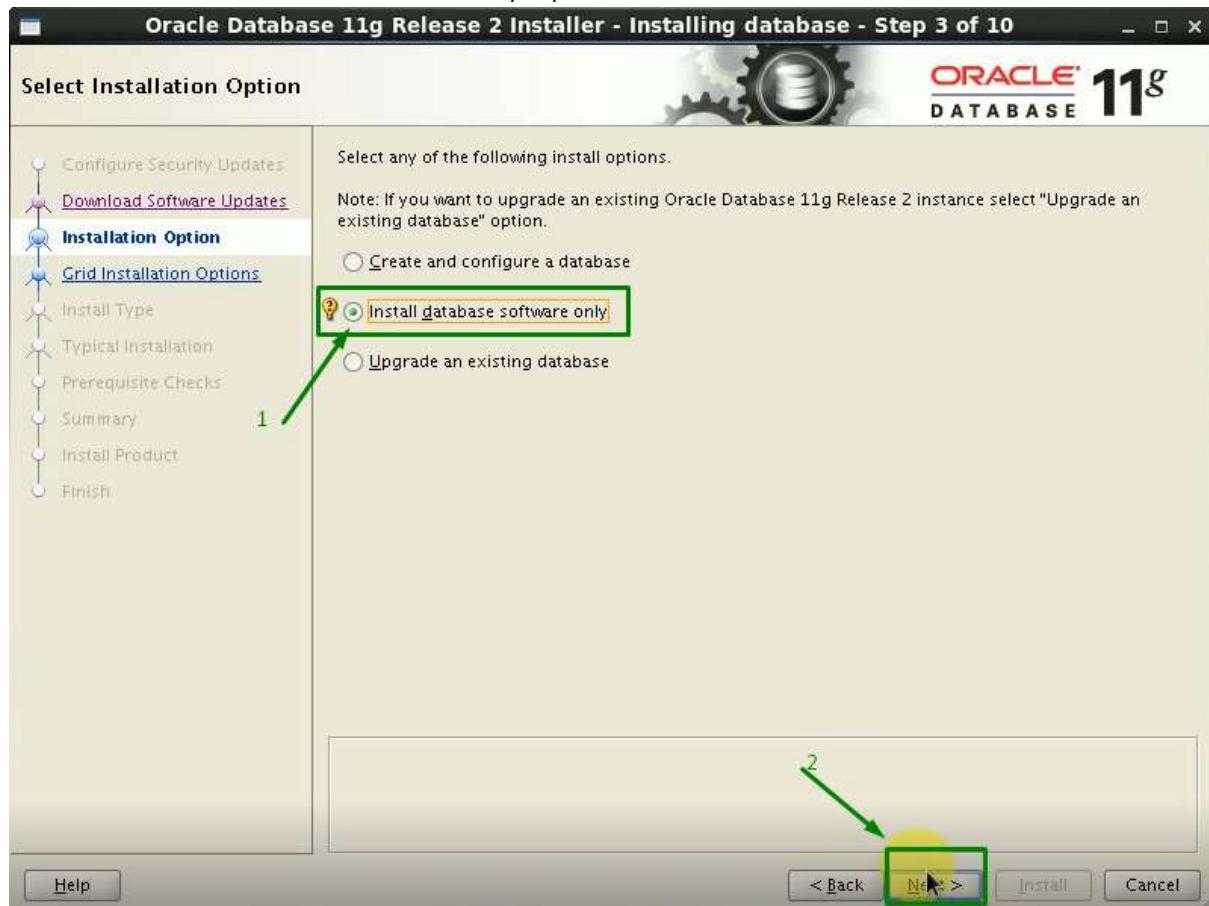
6.4. Avoid the “Oracle Support” by hitting Yes button



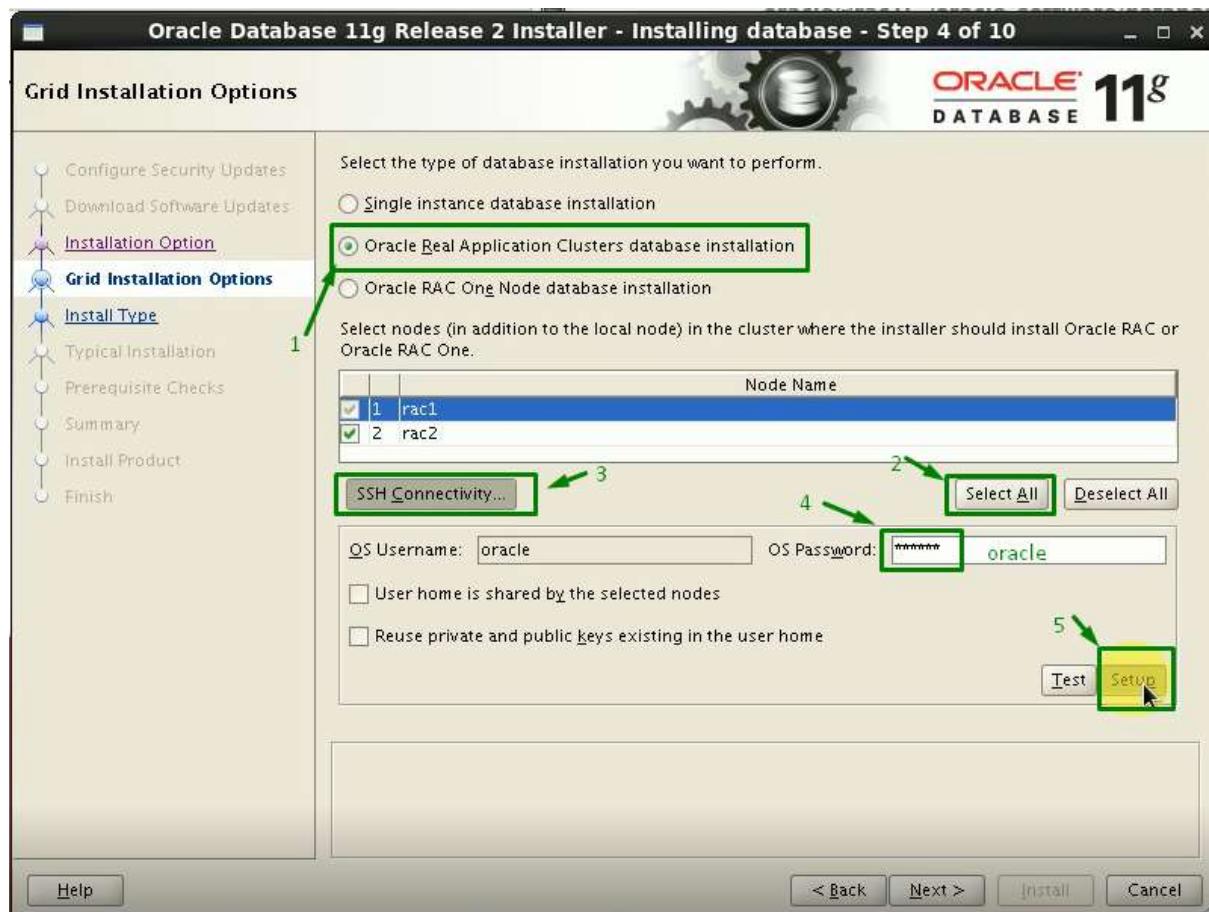
6.5. Choose the “Skip software updates” option then click on Next button



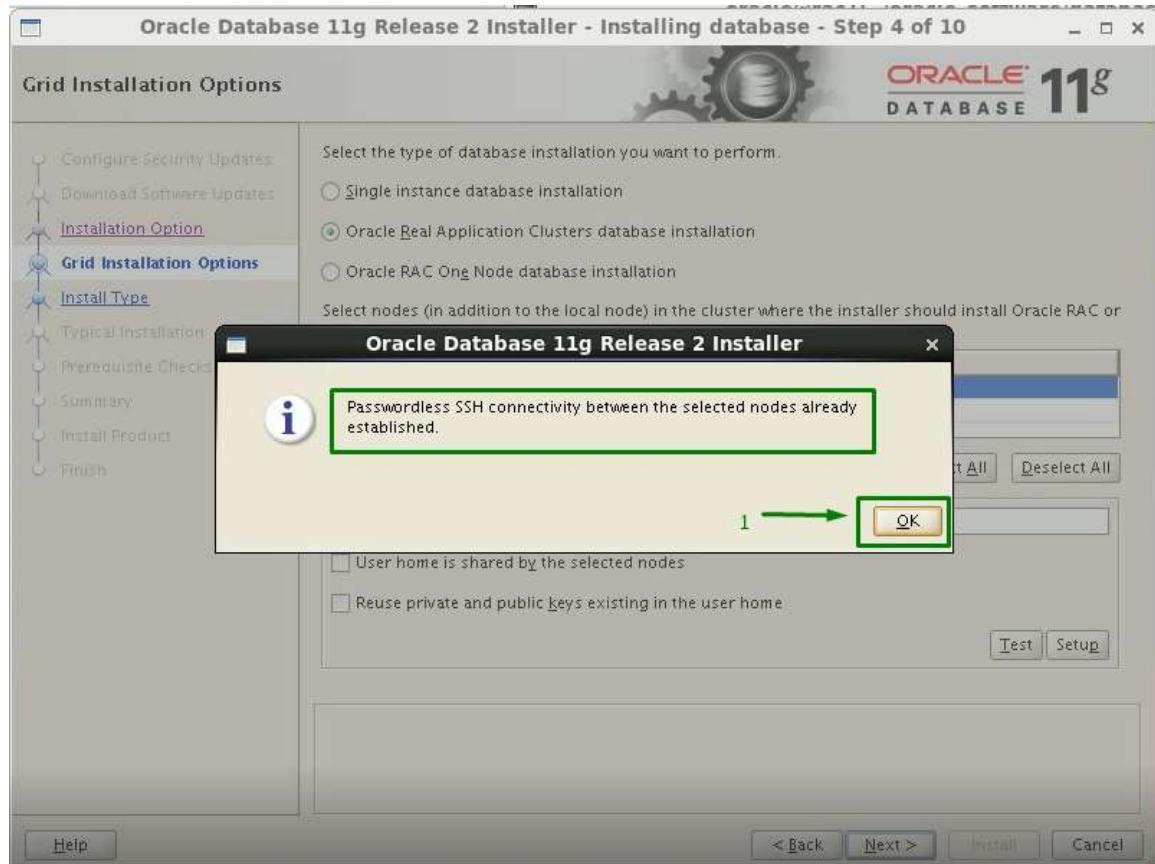
6.6. Choose the “Install database software only” option then click on Next button



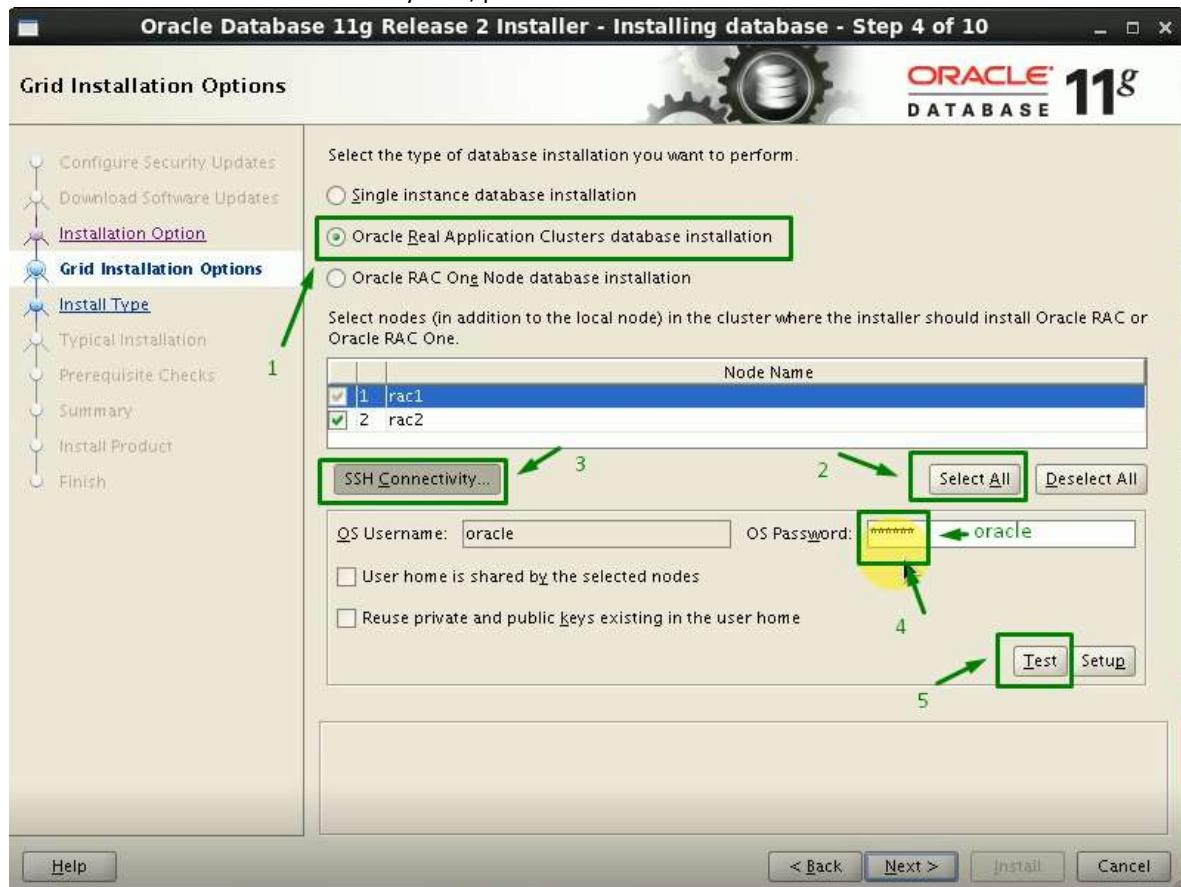
6.7. Choose the “Oracle Real Application Clusters database Installation” option then click on “Select All” tab to all nodes then click on “SSH Connectivity” tab, provide the OS Password for oracle user then click on Setup button



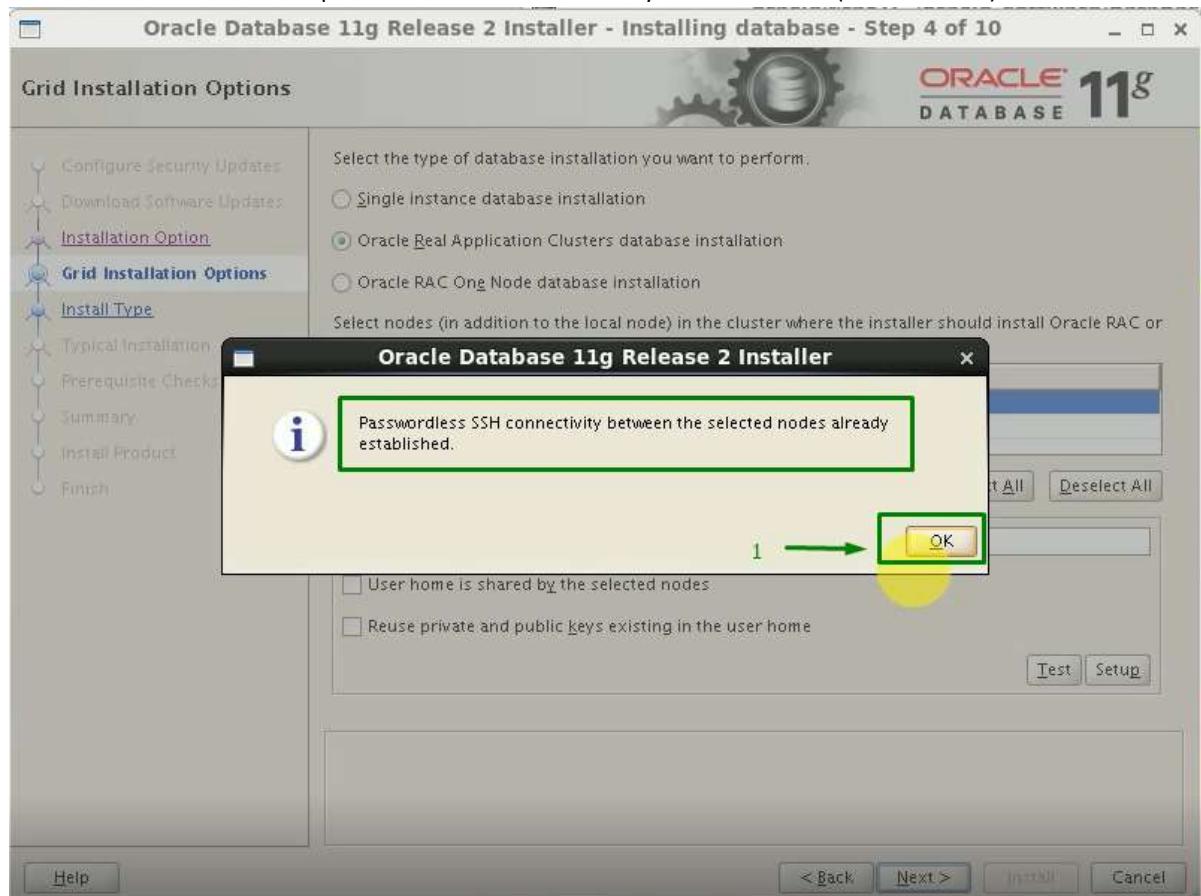
6.8. After successful password less SSH connectivity setup between nodes (RAC1 & RAC2) click on Ok button



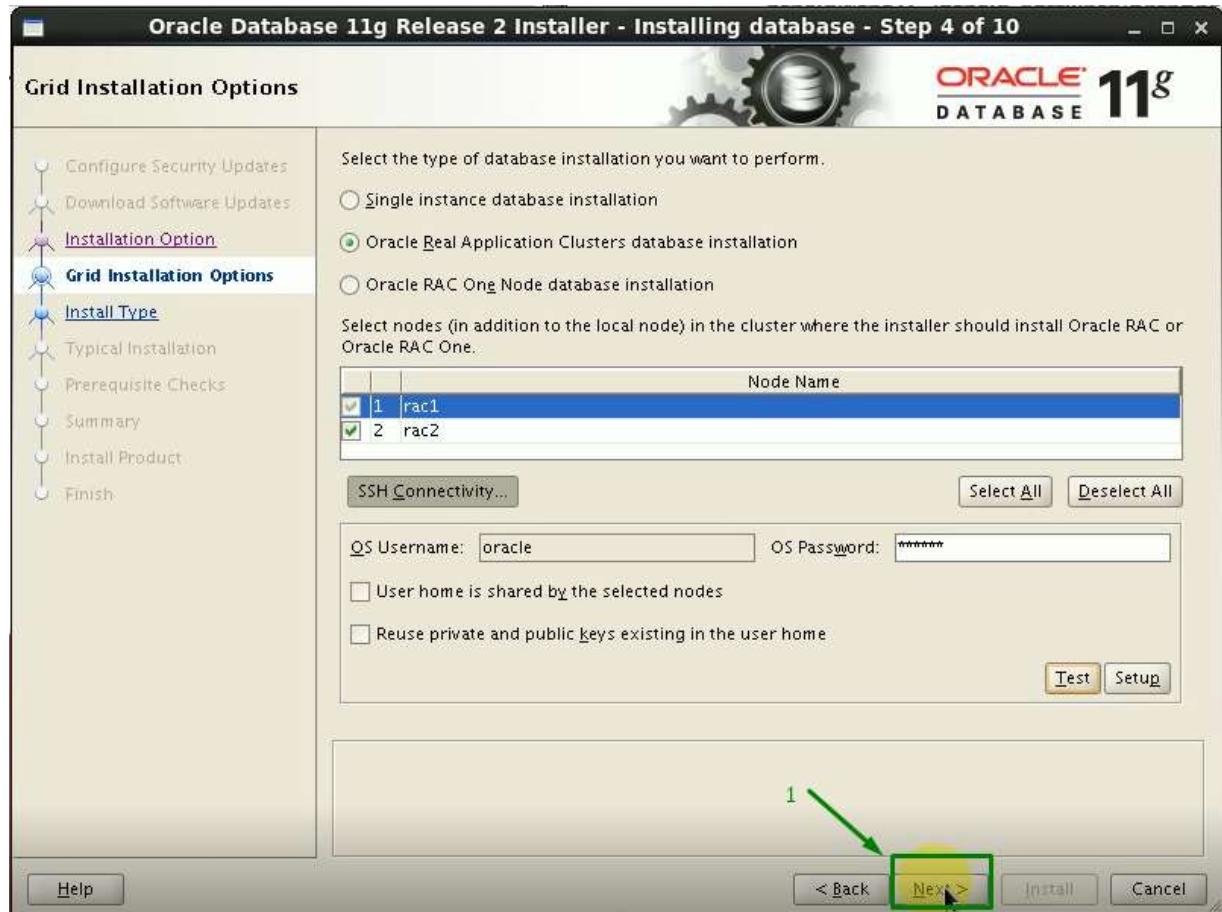
6.9. Choose the “Oracle Real Application Clusters database Installation” option then click on “Select All” tab to all nodes then click on “SSH Connectivity” tab, provide the OS Password for oracle user then click on Test button



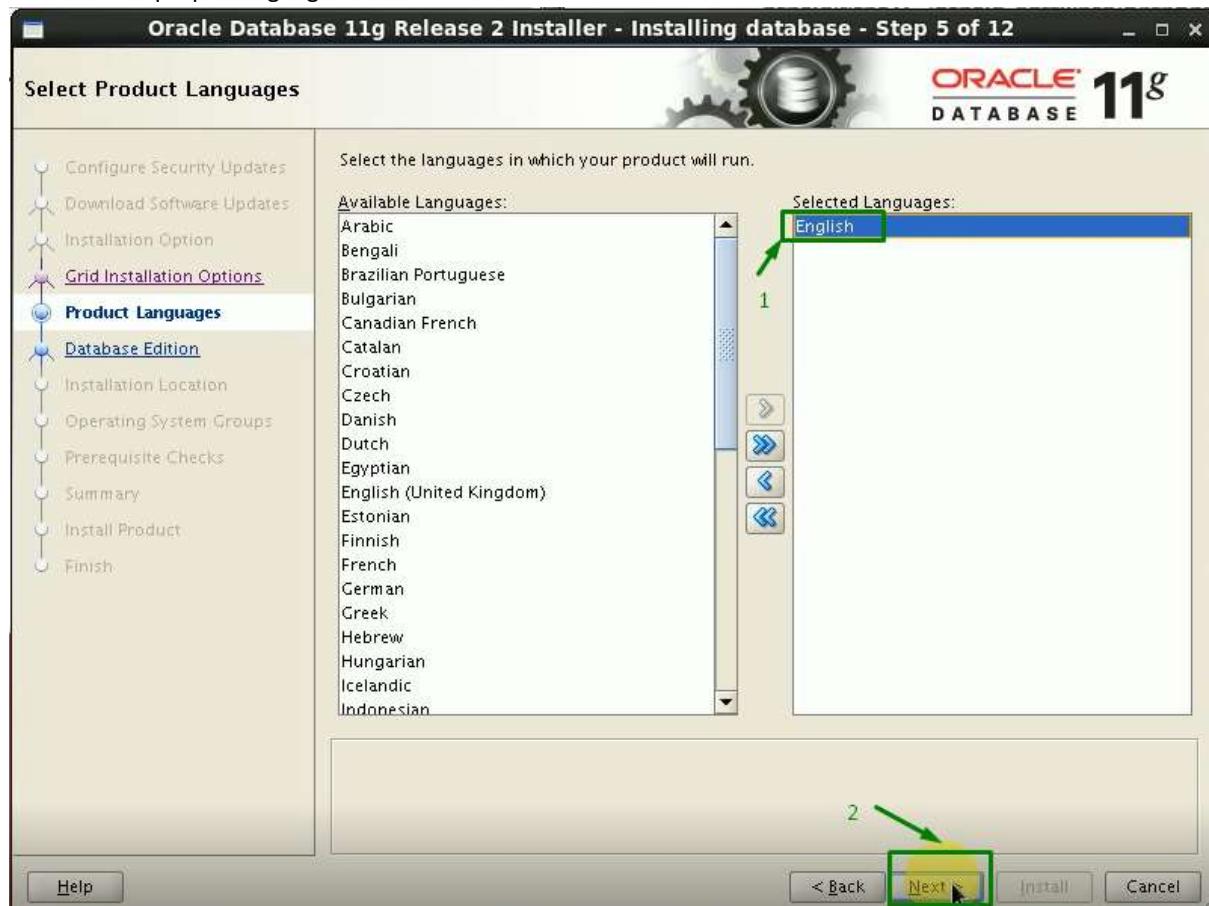
6.10. After test of successful password less SSH connectivity between nodes (RAC1 & RAC2) click on Ok button



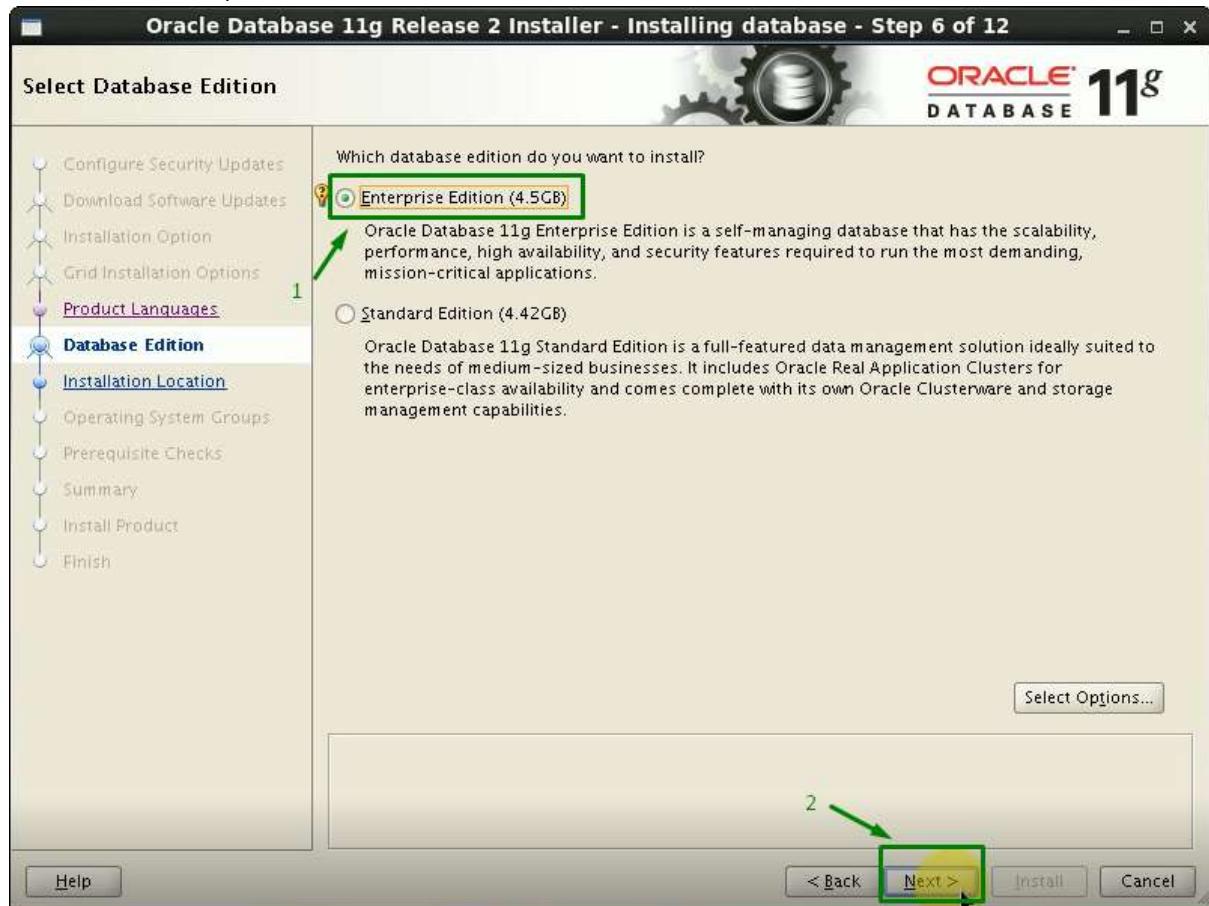
6.11. Click on Next button



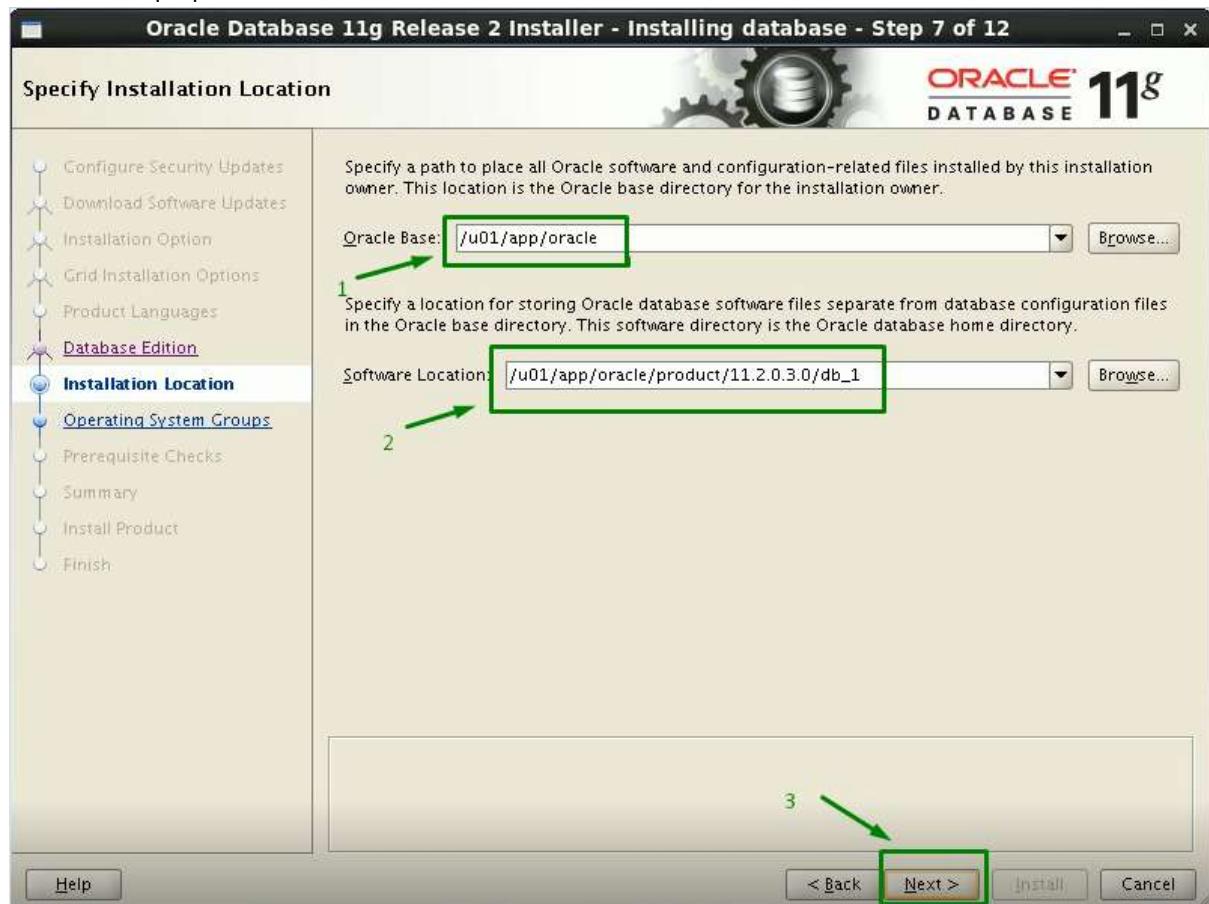
6.12. Choose proper language and then click on Next button



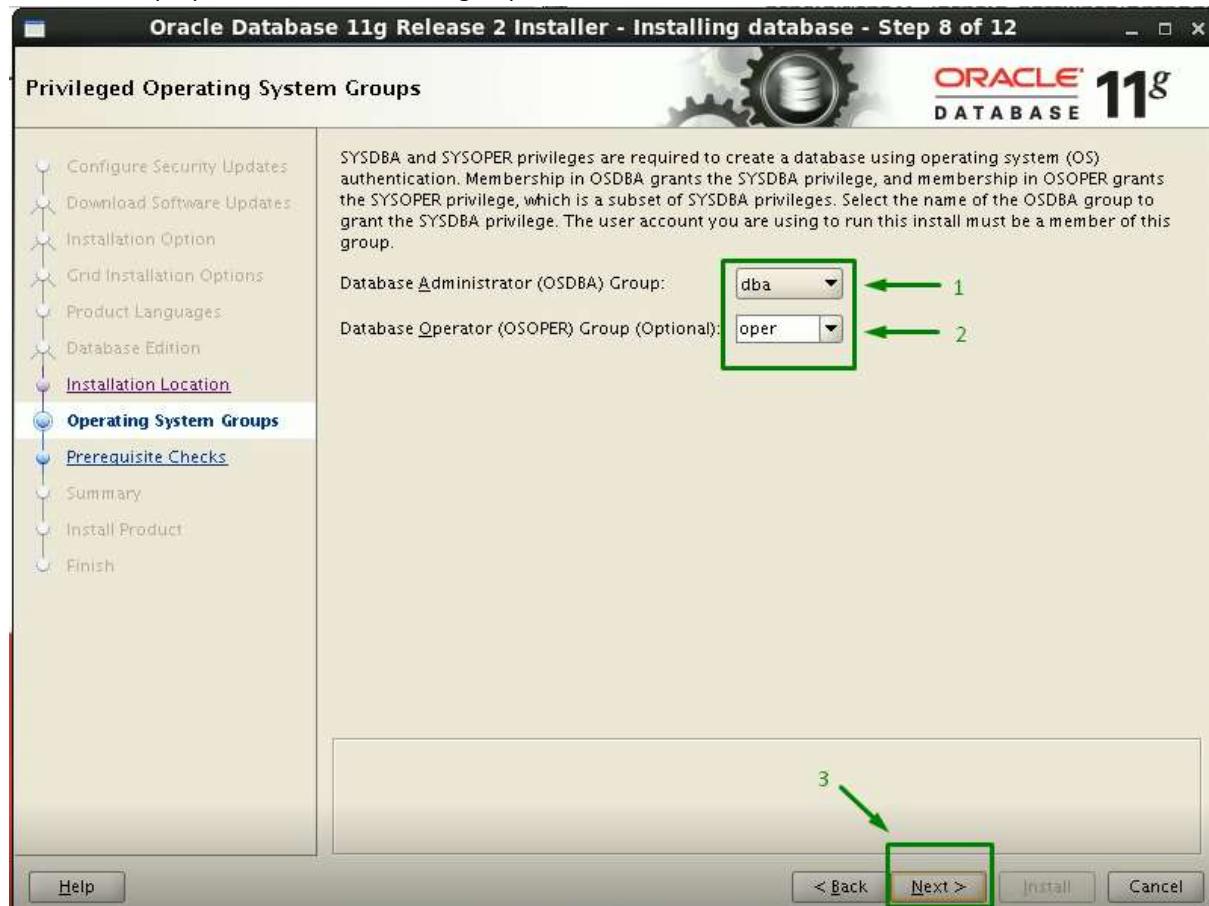
6.13. Choose "Enterprise Edition" then click on Next button



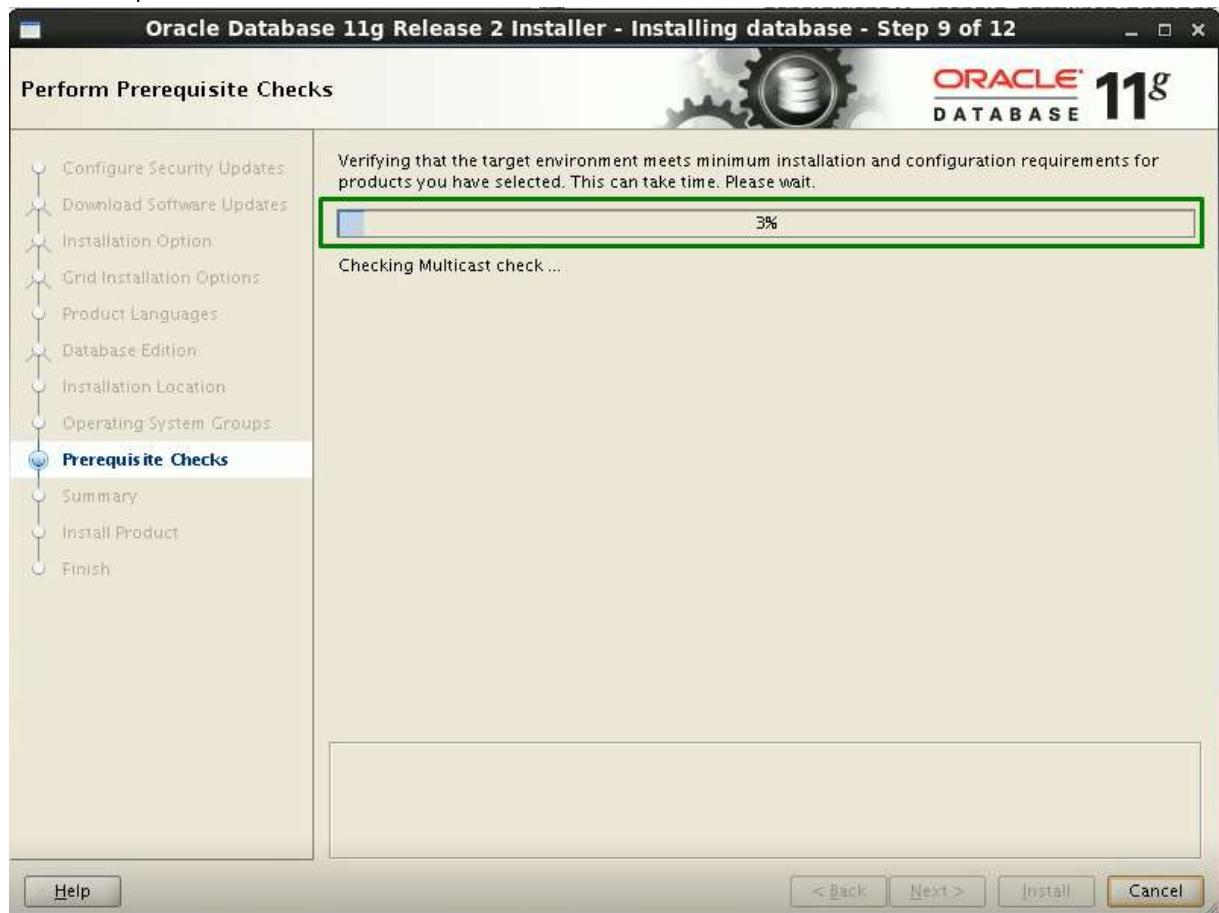
6.14. Choose proper “Oracle Base & Software Location” then click on Next button



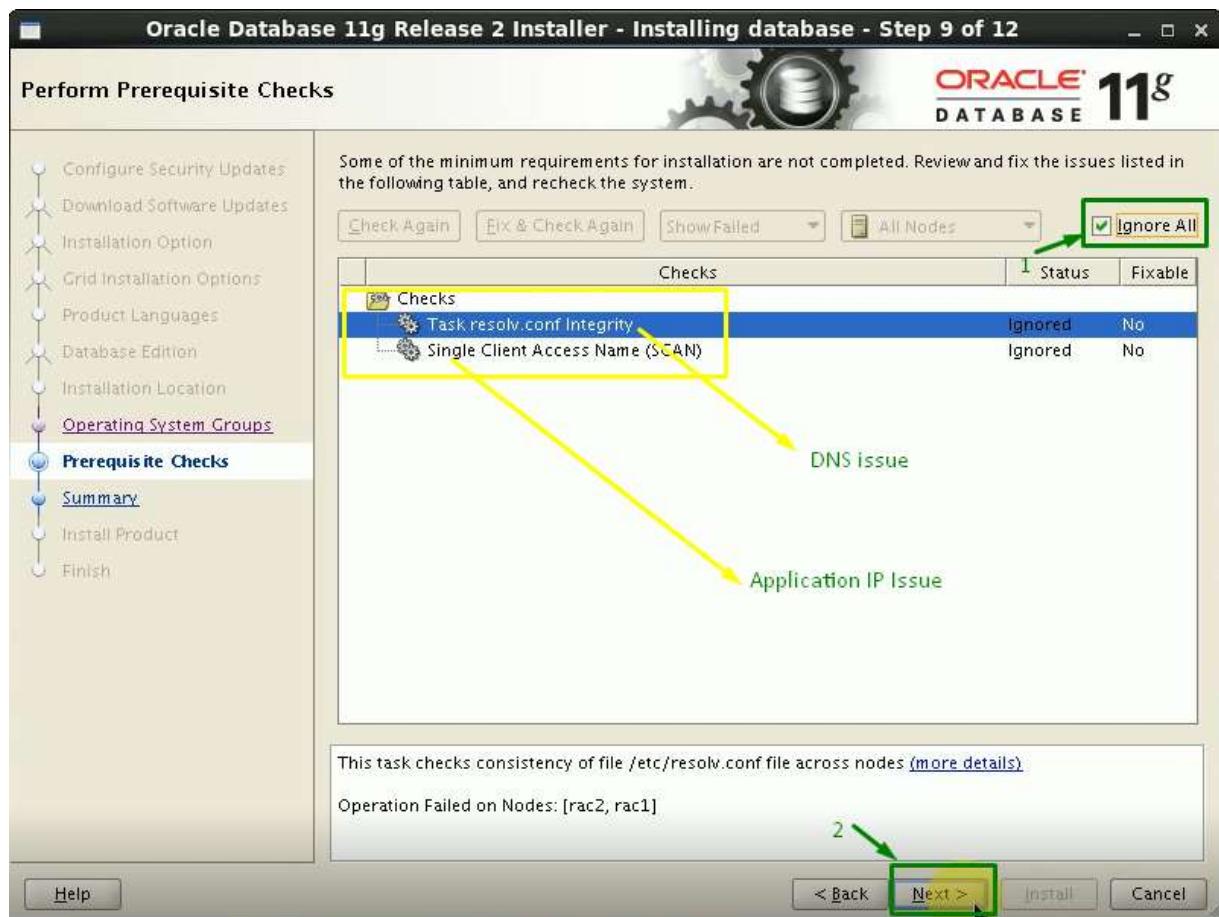
6.15. Choose proper “OSDBA & OSOPER” groups then click on Next button



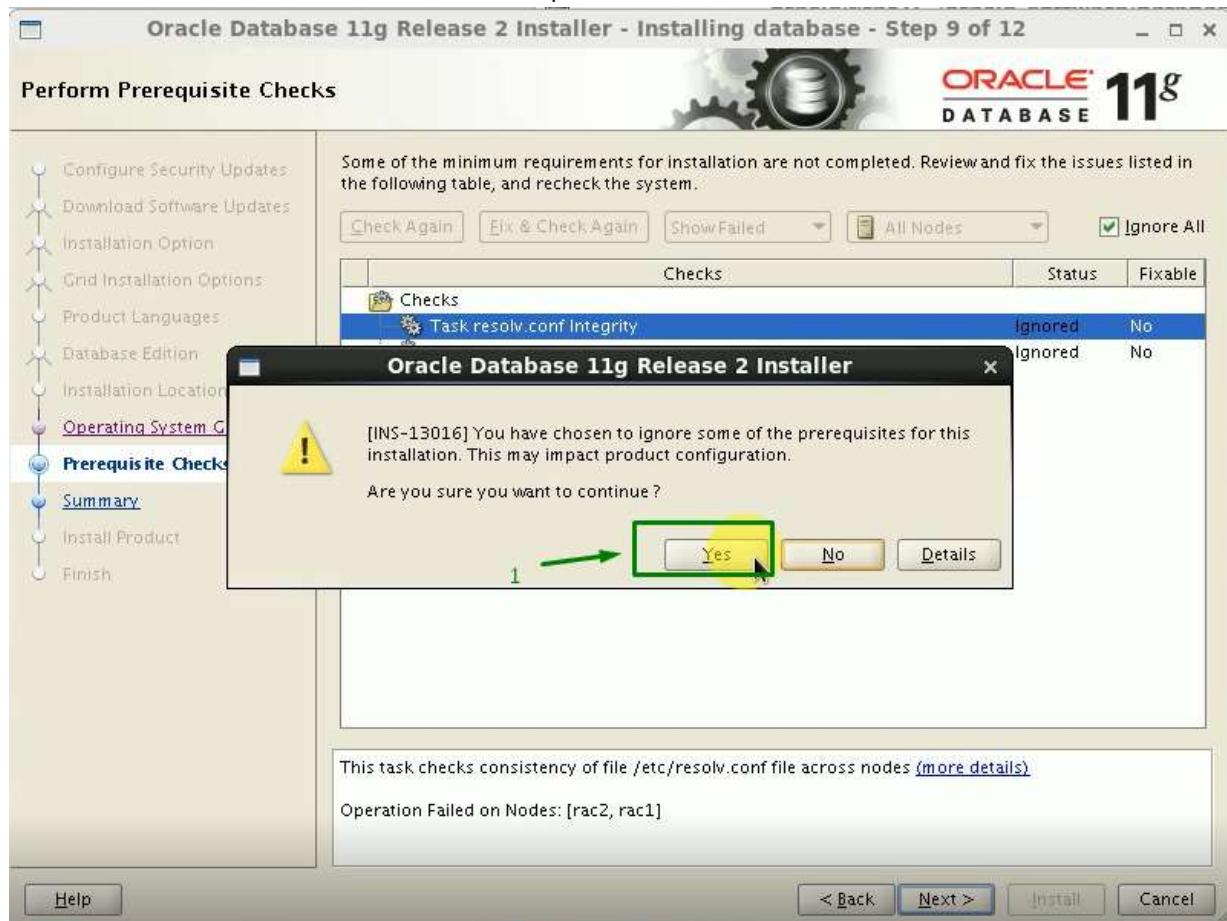
6.16. Prerequisites check screen looks like



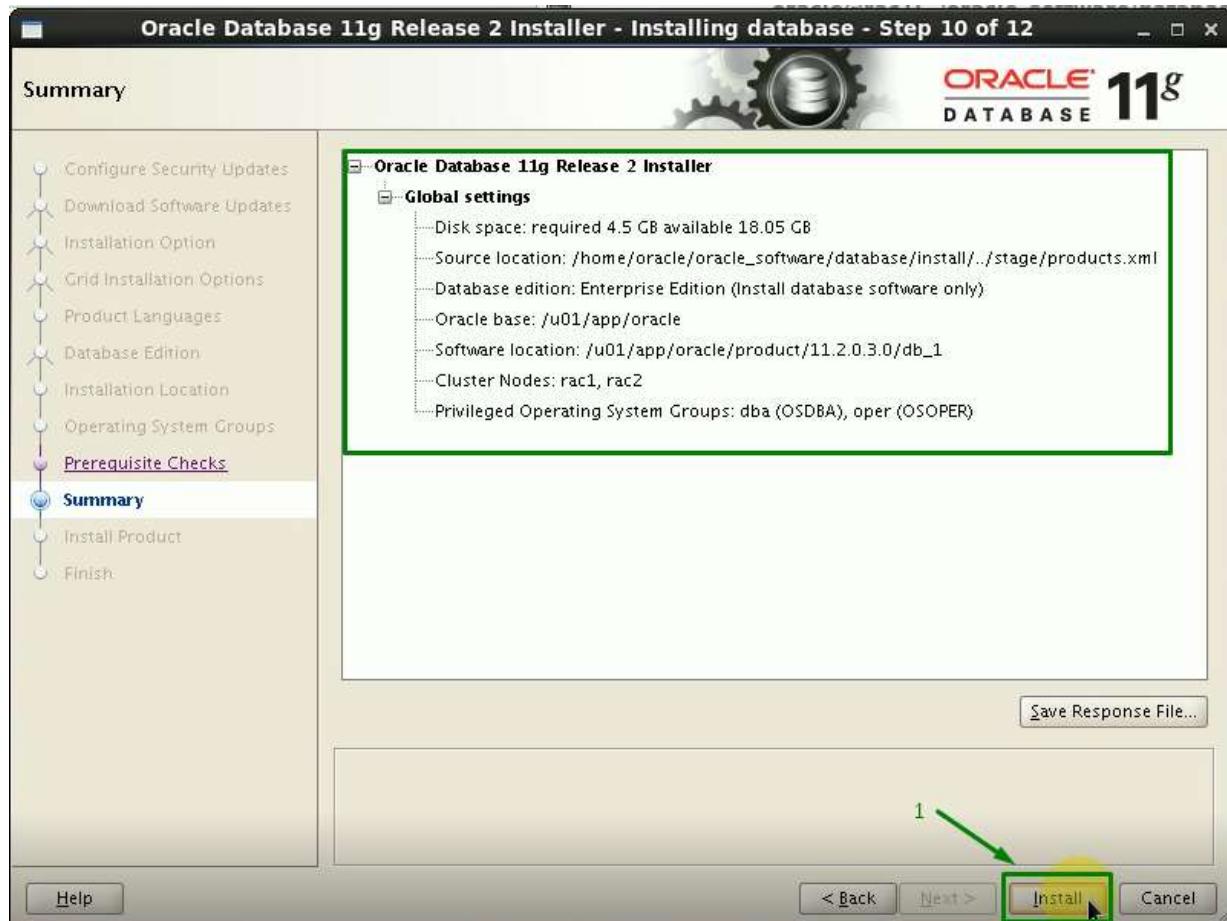
6.17. DNS & SCAN has been Ignored because we don't have Application server so check on "ignore All" option then click on Next button



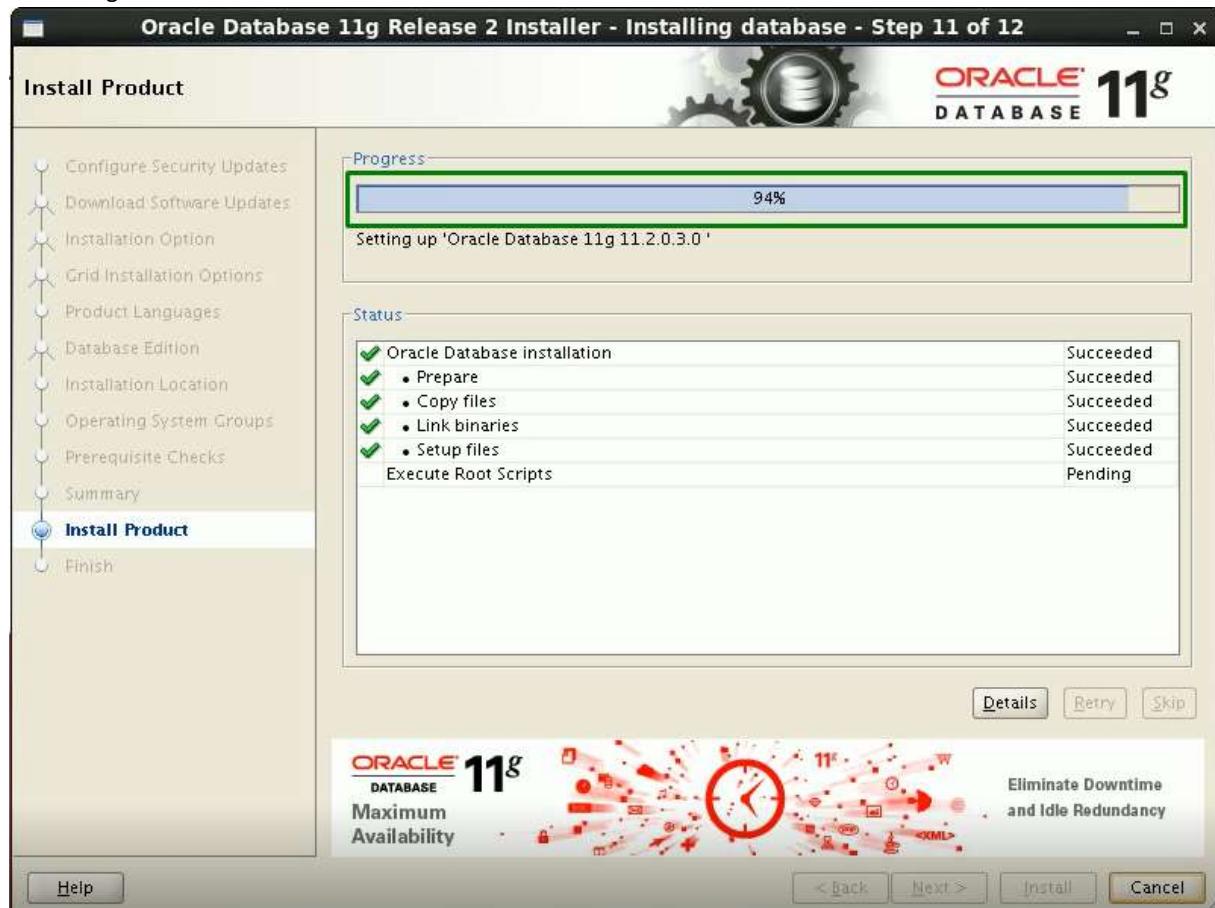
6.18. To continue the Oracle software installation process click on Yes button



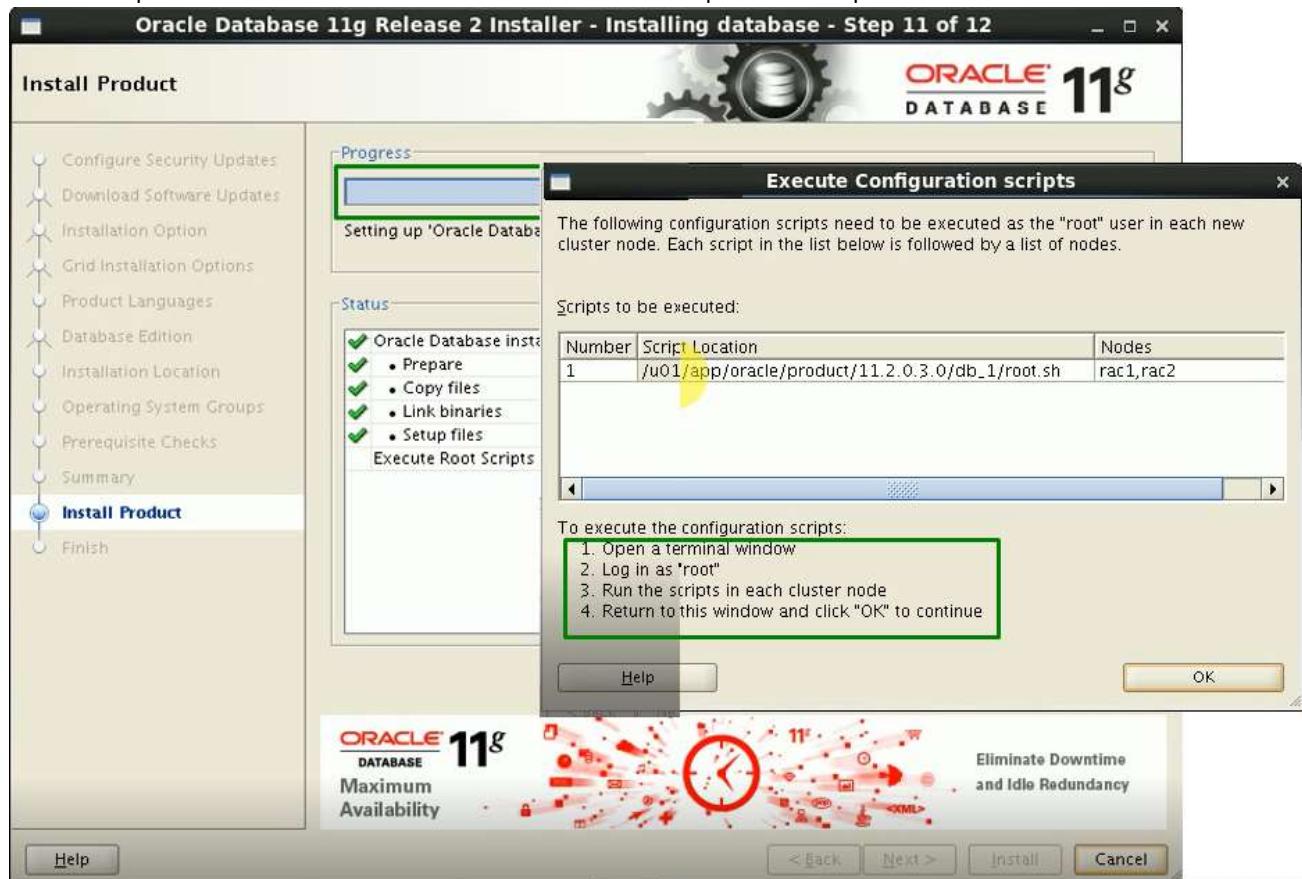
6.19. Verify the Disk size & Location and then click on "Install" button



6.20. Progress looks like



6.21. Now we have to run the specified scripts on both nodes (RAC1 & RAC2). So just open a terminal to run the script at nodes. Now we have to wait for successful completion of scripts.



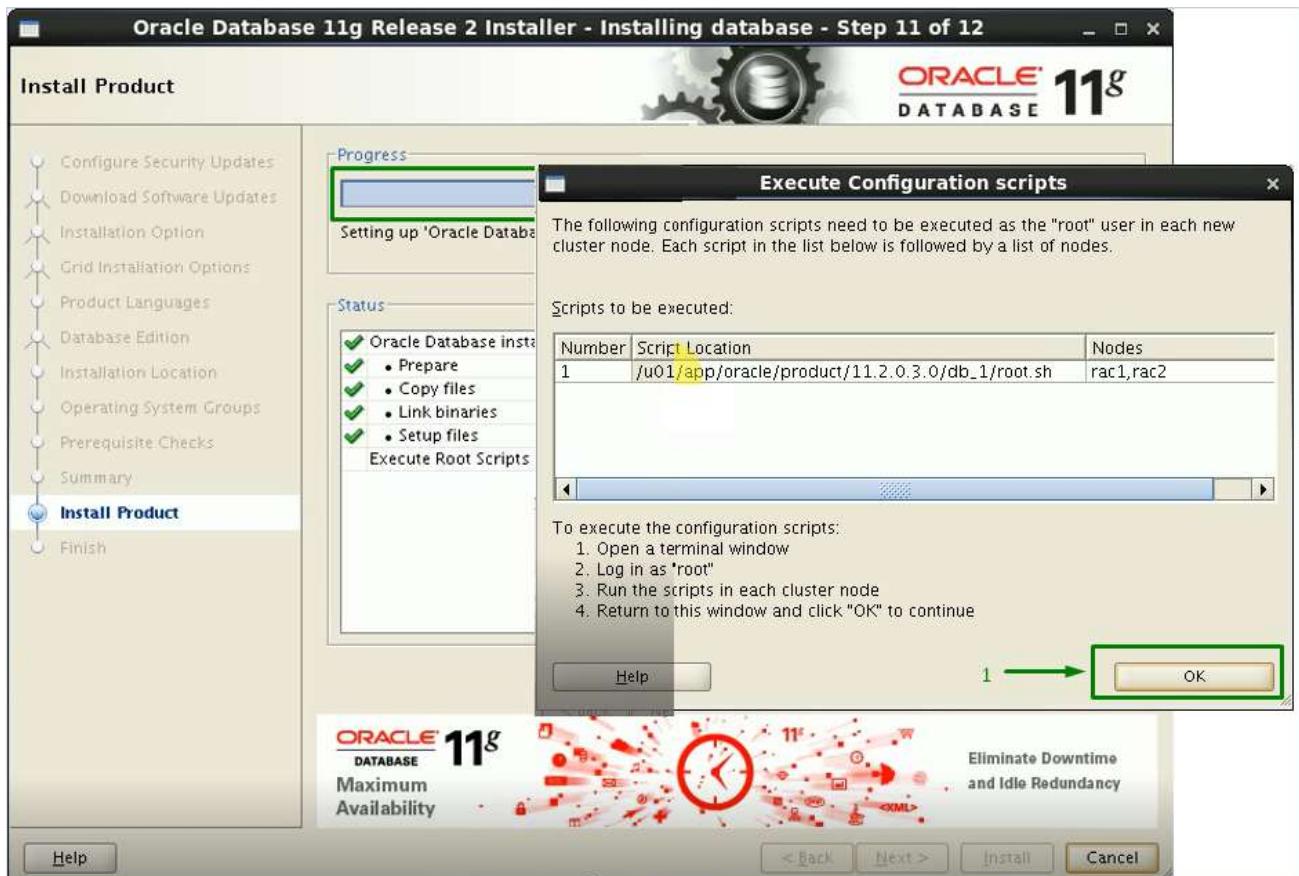
6.22. Run from root user to finalized the setup at RAC1

```
-- Run the script On Node 1
[root@rac1 ~]# ./u01/app/oracle/product/11.2.0.3.0/db_1/root.sh
```

6.23. Run from root user to finalized the setup at RAC2

```
-- Run the script On Node 2
[root@rac2 ~]# ./u01/app/oracle/product/11.2.0.3.0/db_1/root.sh
```

6.24. After successful completion of script on both nodes (RAC1 & RAC2). We just click on Ok button



6.25. After successful installation of Oracle Database software we just click on Close button to finish the setup



7. Create ASM storage for DATA & FRA

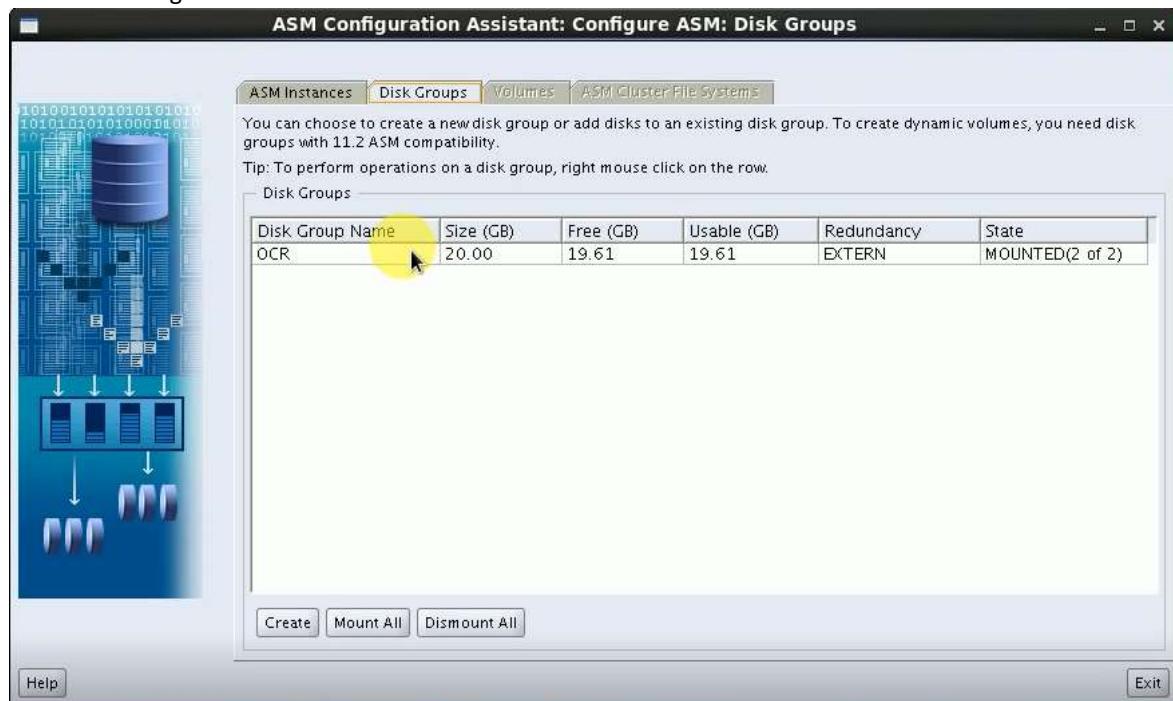
7.1. Login as grid user and issue the following command from Terminal at RAC1

```
[oracle@rac1 ~]# su --grid
/*
Password: grid
*/
[grid@rac1 ~]# hostname
/*
rac1.mydomain
*/
[grid@rac1 ~]# xhost +.rac1.mydomain
/*
rac1.mydomain being added to access control list
*/
```

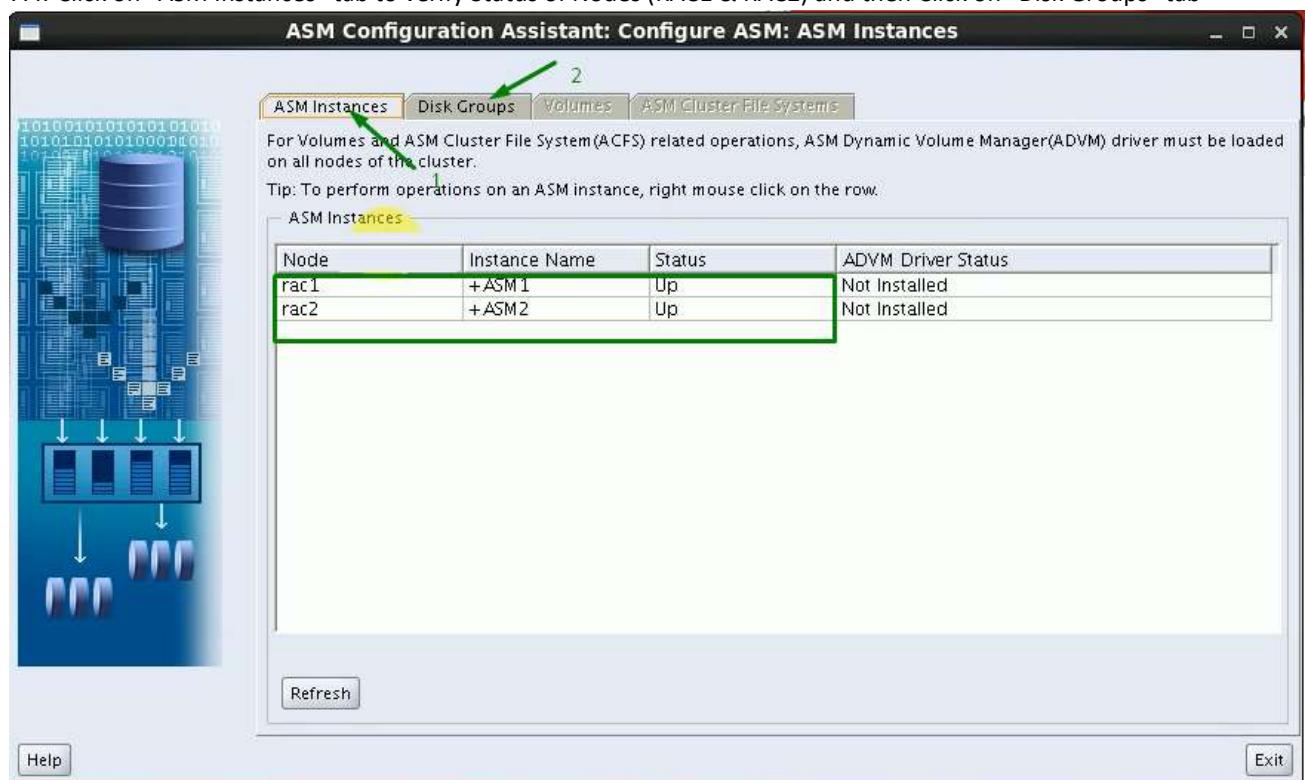
7.2. Login as grid user and issue the following command from new Terminal at RAC1

```
[oracle@rac1 ~]# su --grid
]/*  
Password: grid
.*/
[grid@rac1 ~]# cd /u01/11.2.0.3.0/grid/bin
[grid@rac1 bin]# ./asmca
```

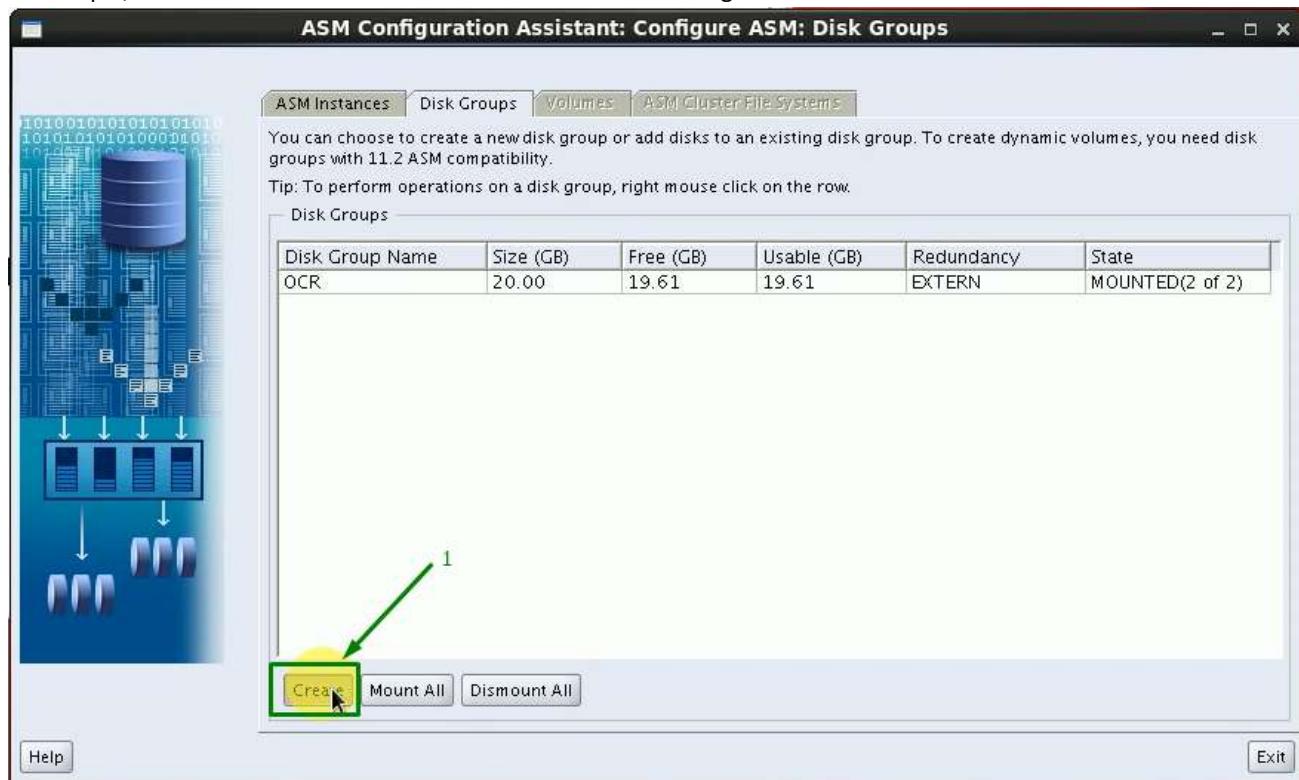
7.3. ASM Configuration Assistant looks like



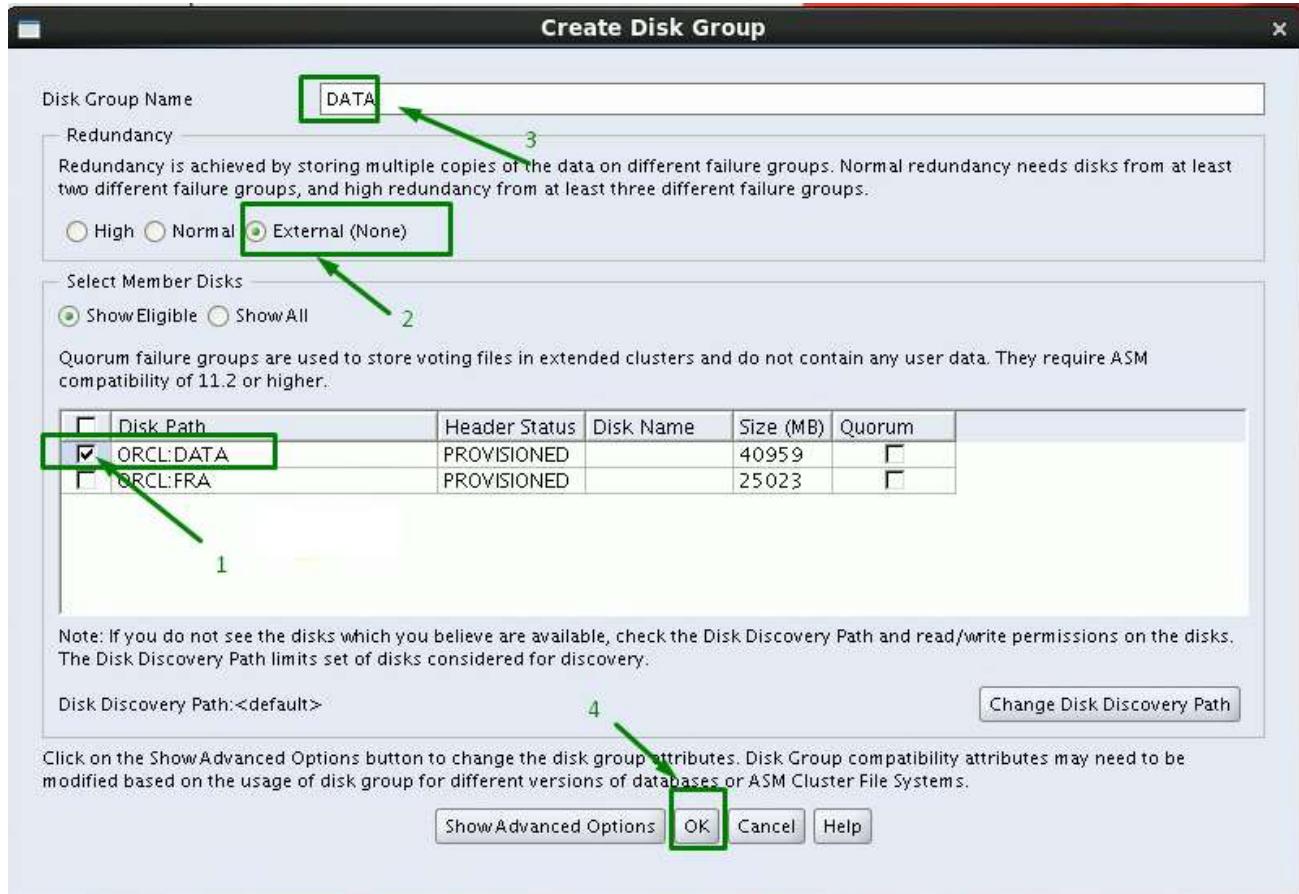
7.4. Click on "ASM Instances" tab to verify Status of Nodes (RAC1 & RAC2) and then Click on "Disk Groups" tab



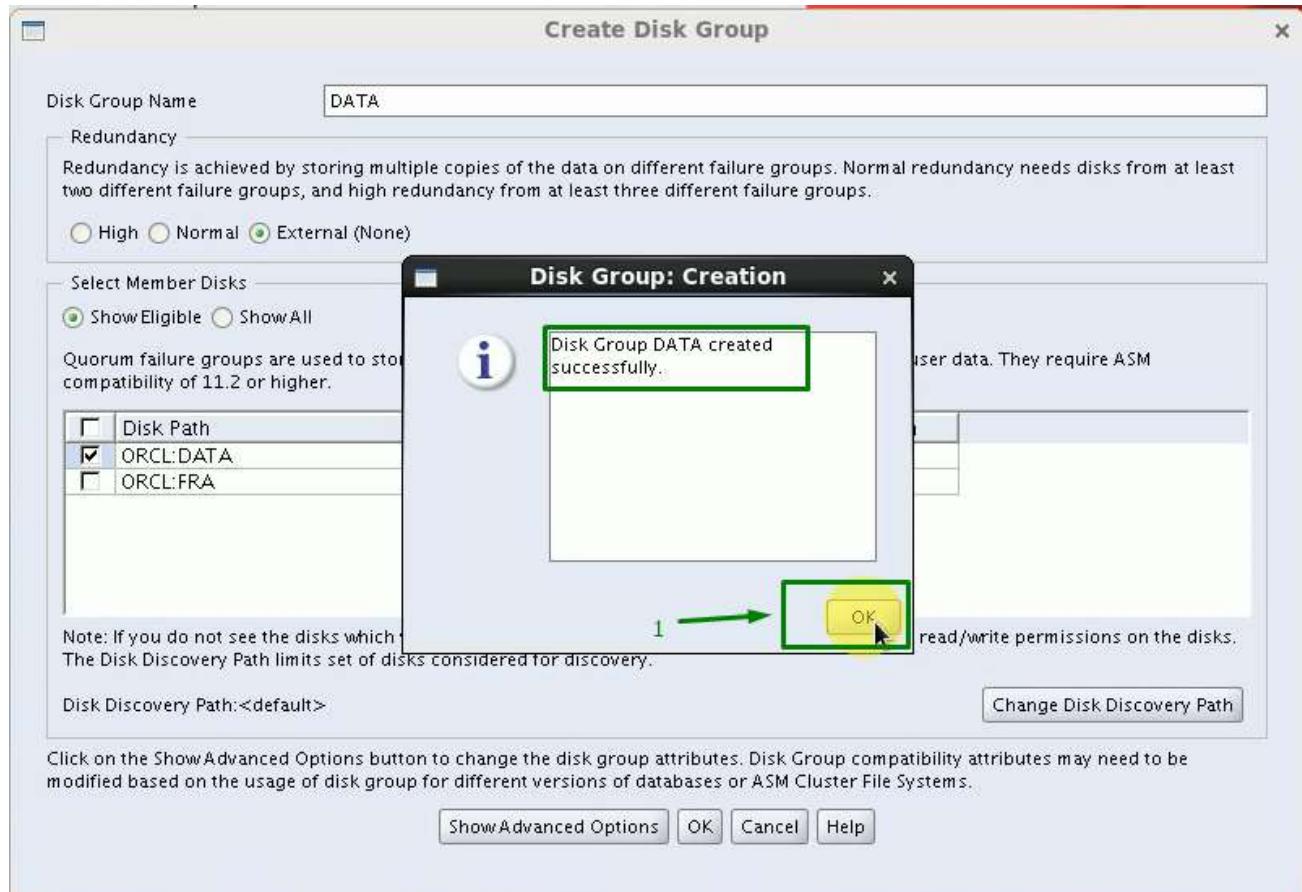
7.5. Step 1, Click on “Create” button to create an ASM DATA storage



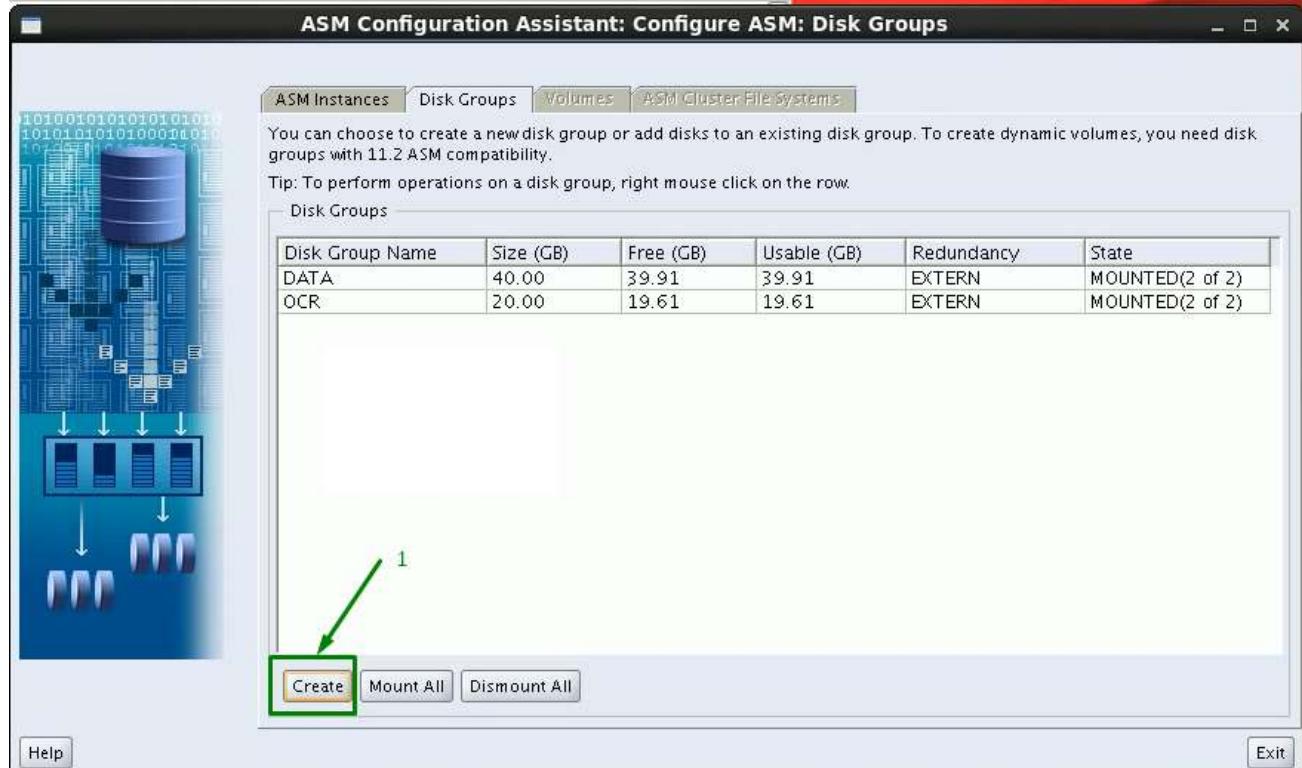
7.6. Step 2, Select the proper storage for DATA (“ORCL:DATA”) and choose option as “External (None)” then provide the proper Disk Group Name as “DATA” then click on “Ok” button



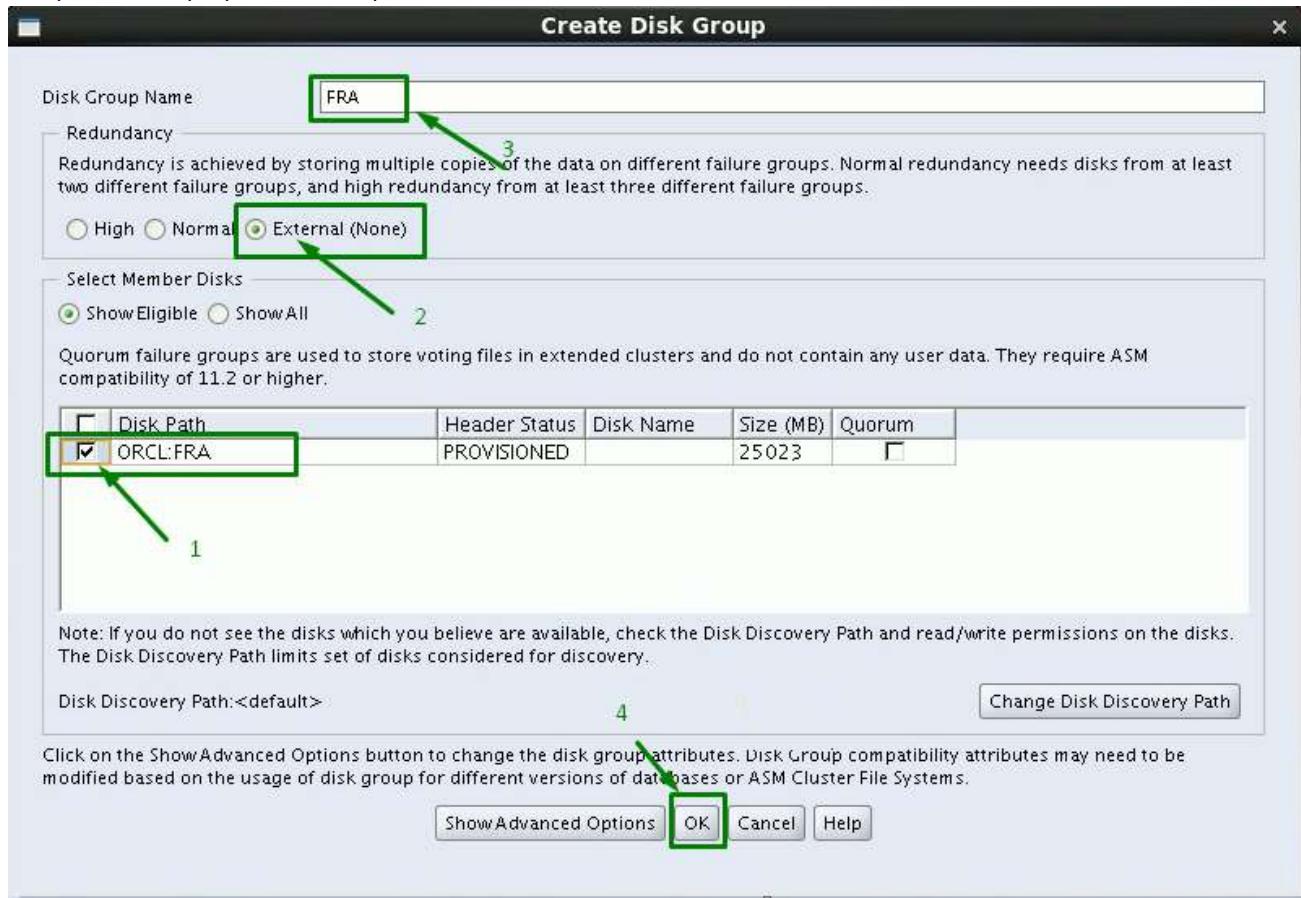
7.7. Step 3, Click on "Ok" button to create an ASM DATA storage



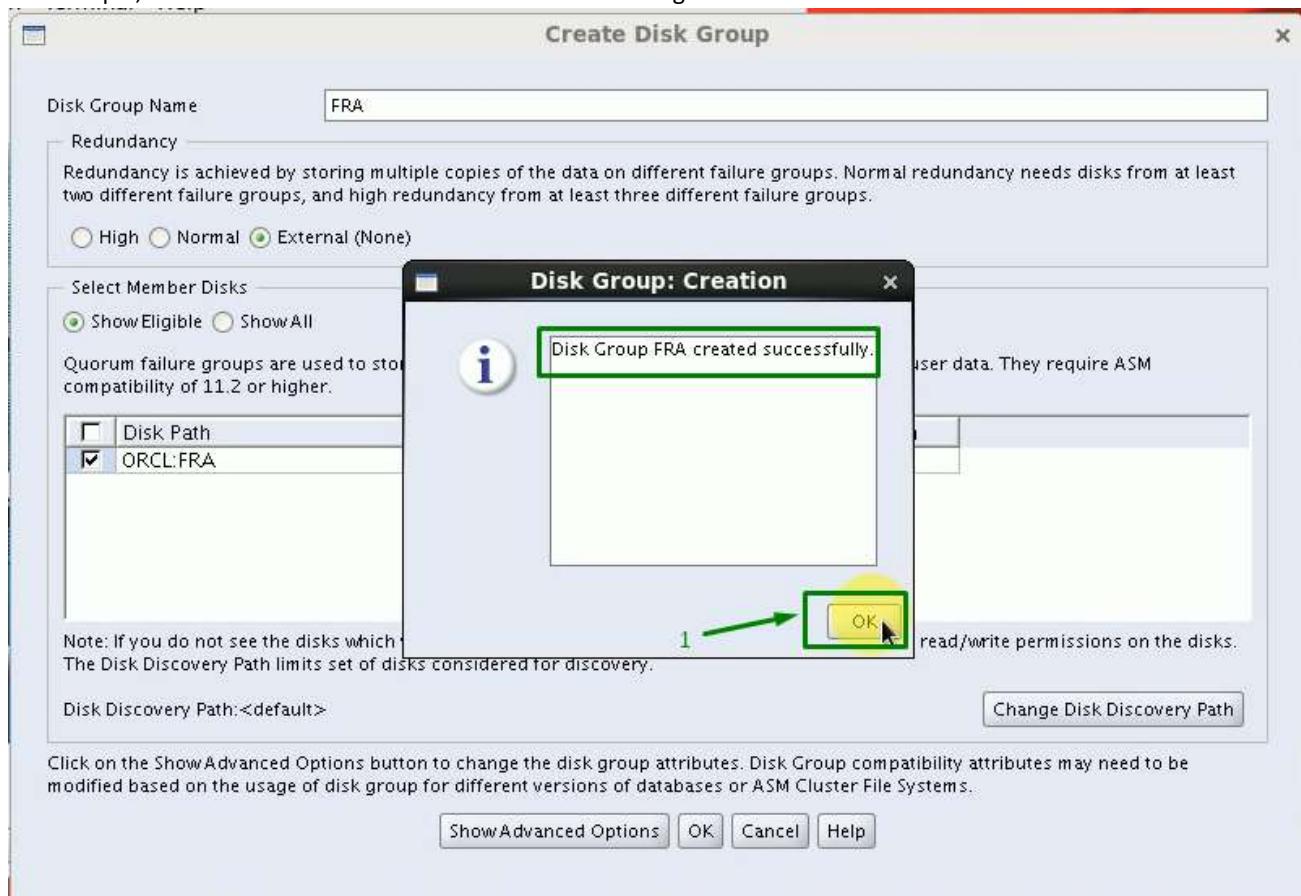
7.8. Step 1, Click on "Ok" button to create an ASM FRA storage



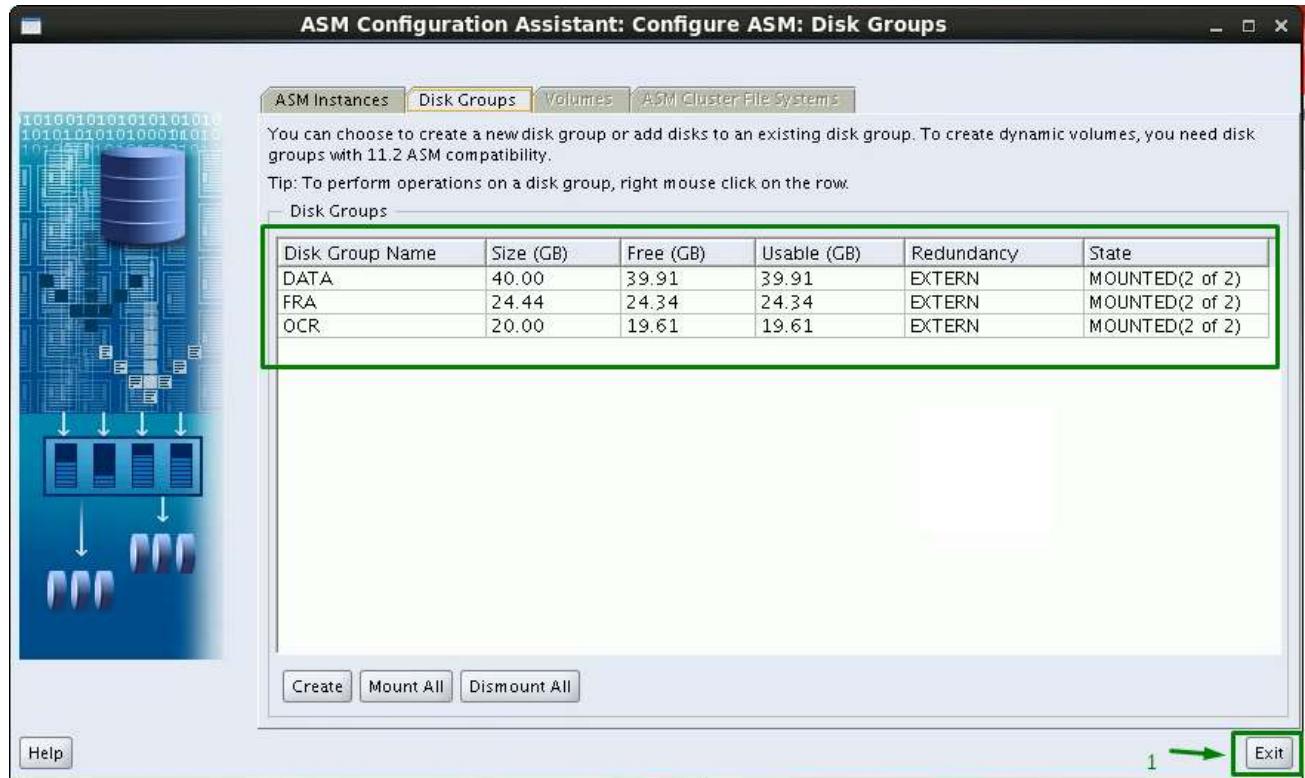
7.9. Step 2, Select the proper storage for FRA ("ORCL:FRA") and choose option as "External (None)" then provide the proper Disk Group Name as "FRA" then click on "Ok" button



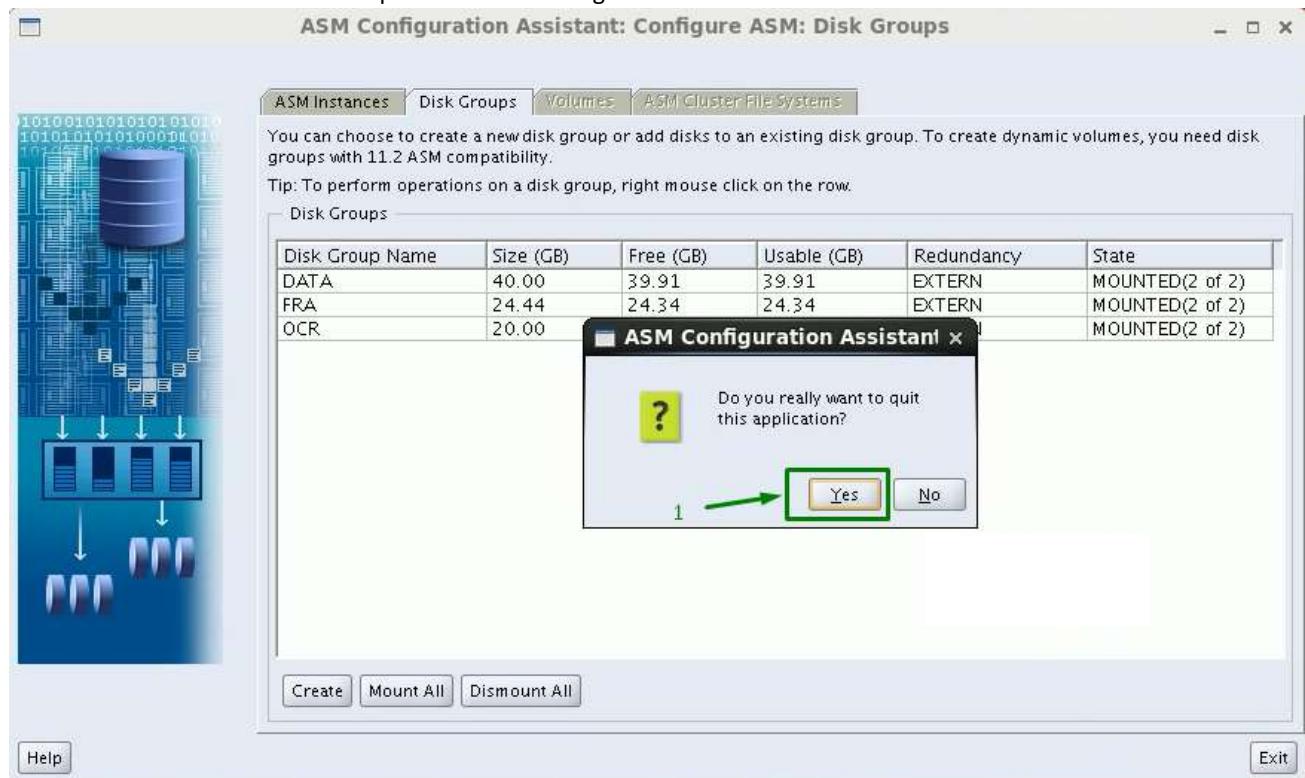
7.10. Step 3, Click on "Ok" button to create an ASM FRA storage



7.11. After the verification of ASM storage configuration for (OCR, DATA & FRA) then click on "Exit" button



7.12. Click on "Yes" button to complete the ASM configuration



8. Create Oracle Database

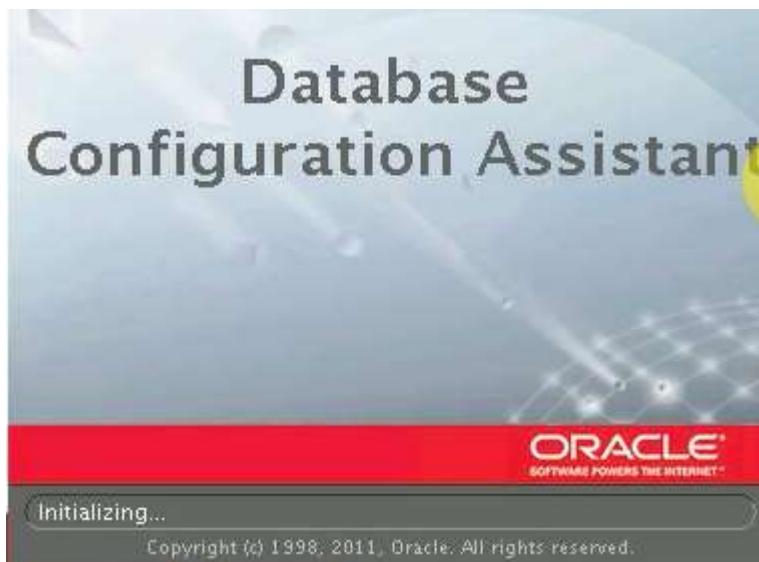
8.1. Login as oracle user and issue the following command from Terminal at RAC1

```
[grid@rac1 ~]# su - oracle
/*
Password: ← oracle
*/
[oracle@rac1 ~]$ hostname
/*
rac1.mydomain
*/
[oracle@rac1 ~]$ xhost + rac1.mydomain
/*
rac1.mydomain being added to access control list
*/
```

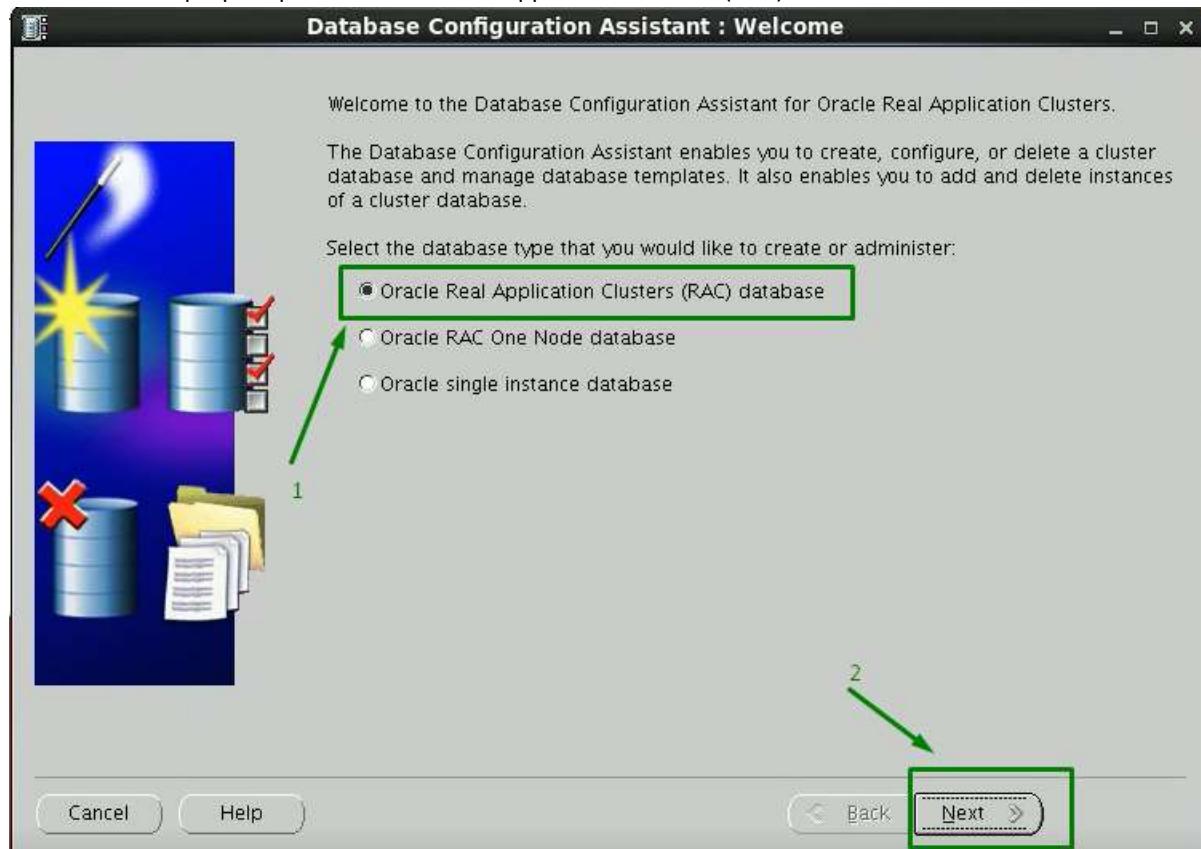
8.2. Login as oracle user and issue the following command from new Terminal at RAC1

```
[grid@rac1 ~]# su - oracle
/*
Password: ← oracle
*/
[oracle@rac1 ~]$ cd /u01/app/oracle/product/11.2.0.3.0/db_1/bin
[oracle@rac1 bin]# ./dbca
```

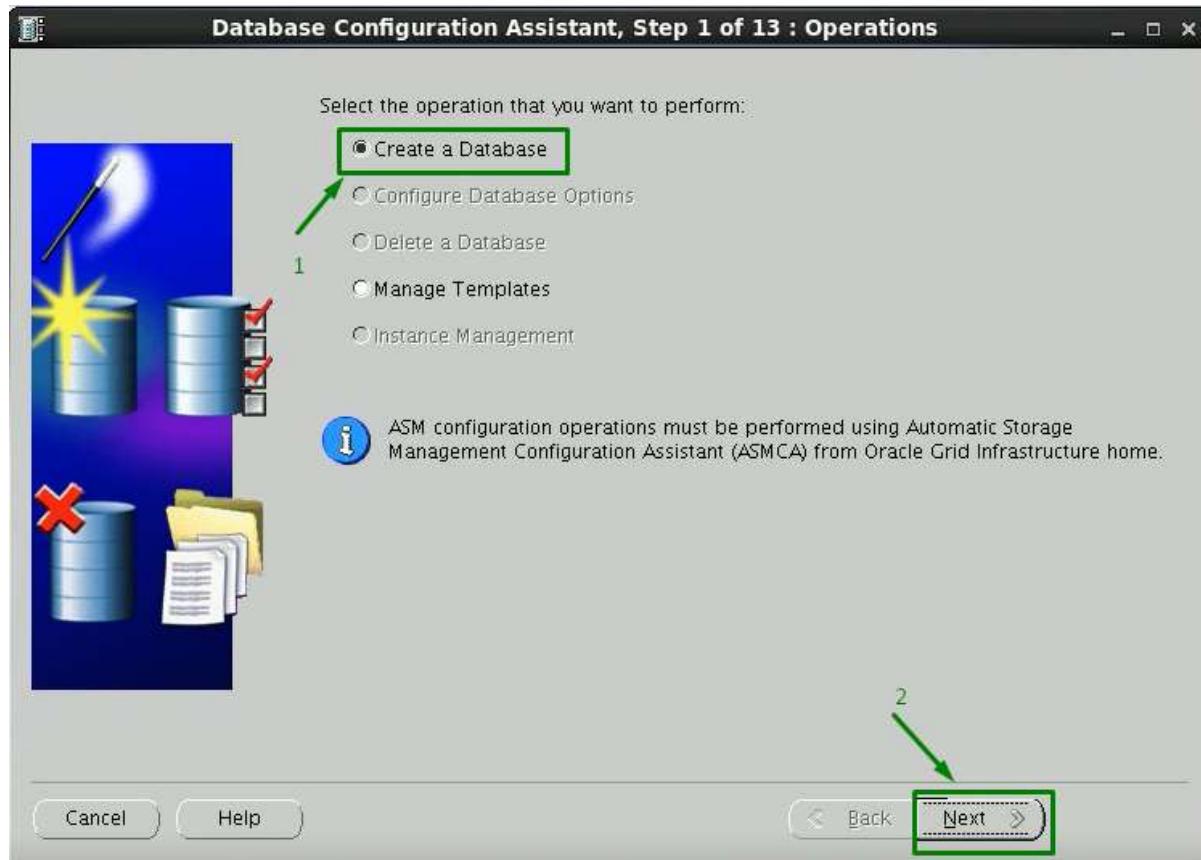
8.3. Now the Database Configuration Assistant (dbca) looks like



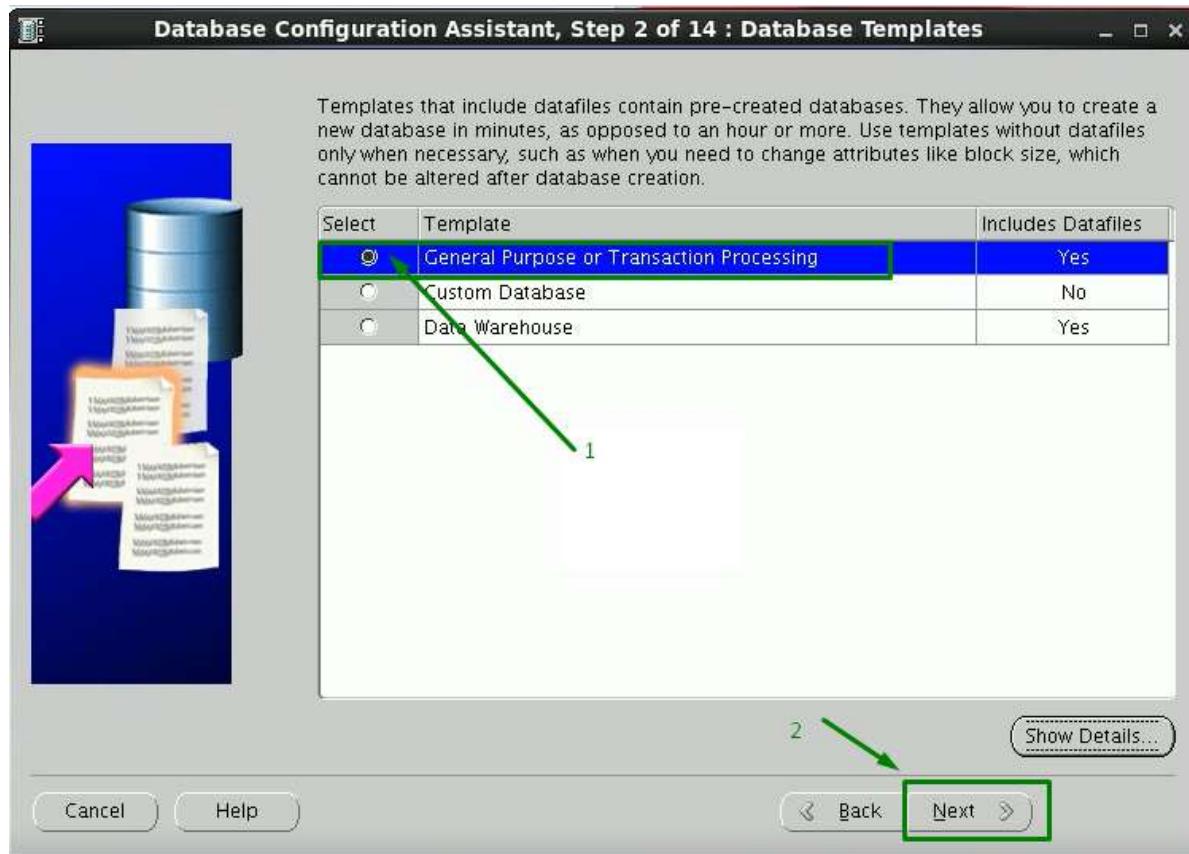
8.4. Choose the proper option as “oracle real Application Clusters (RAC) database” then click on “Next” button



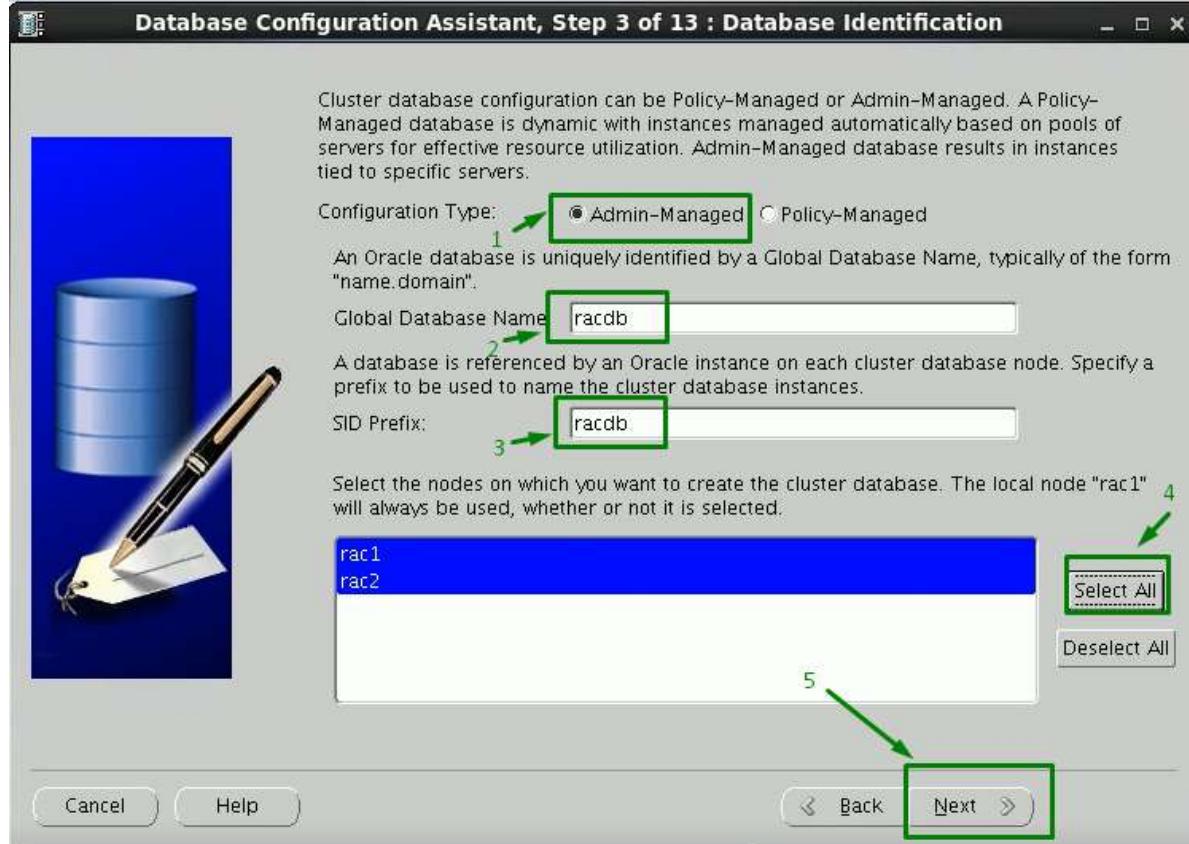
8.5. Choose the proper option as “Create a Database” then click on “Next” button



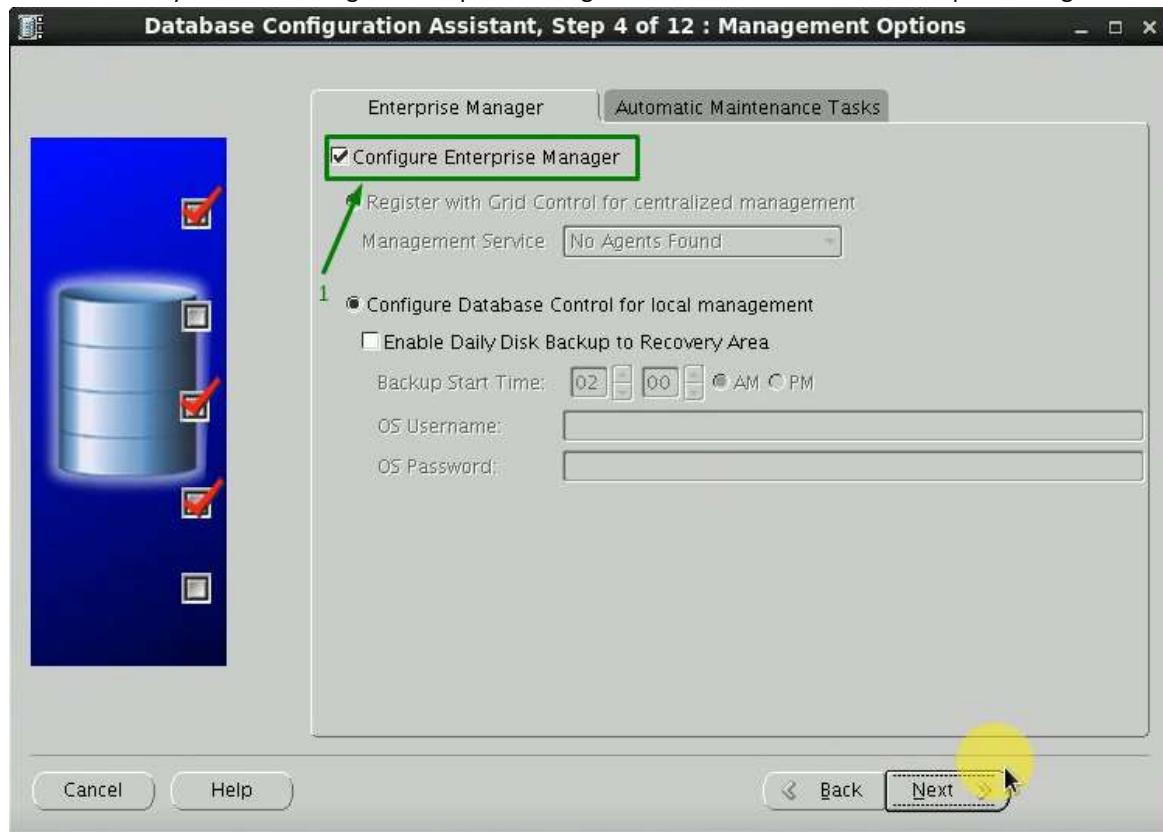
8.6. Choose the proper option as “General Purpose or Transaction Processing” then click on “Next” button



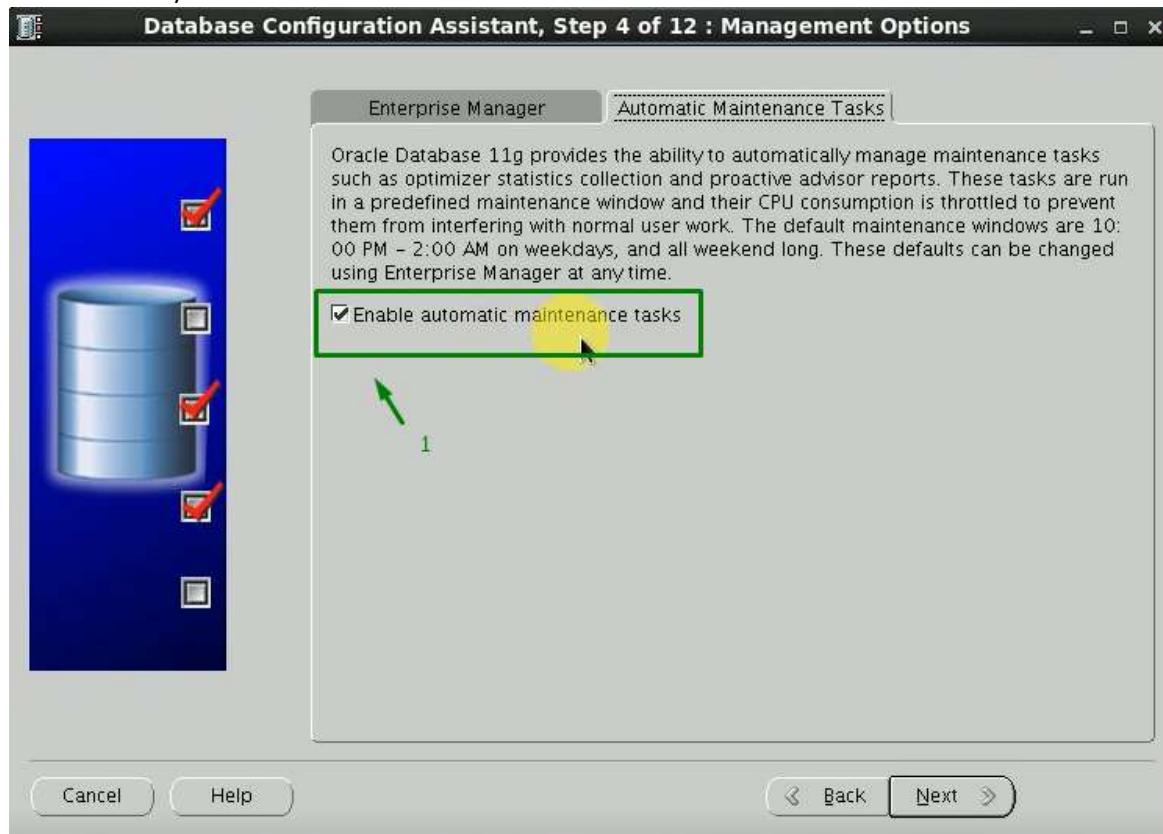
8.7. Choose Configuration Type “Admin-Managed”, Global Database Name & SID Prefix “racdb (mentioned as in .bash_profiler)” and Click on “Select All” button then click on “Next” button



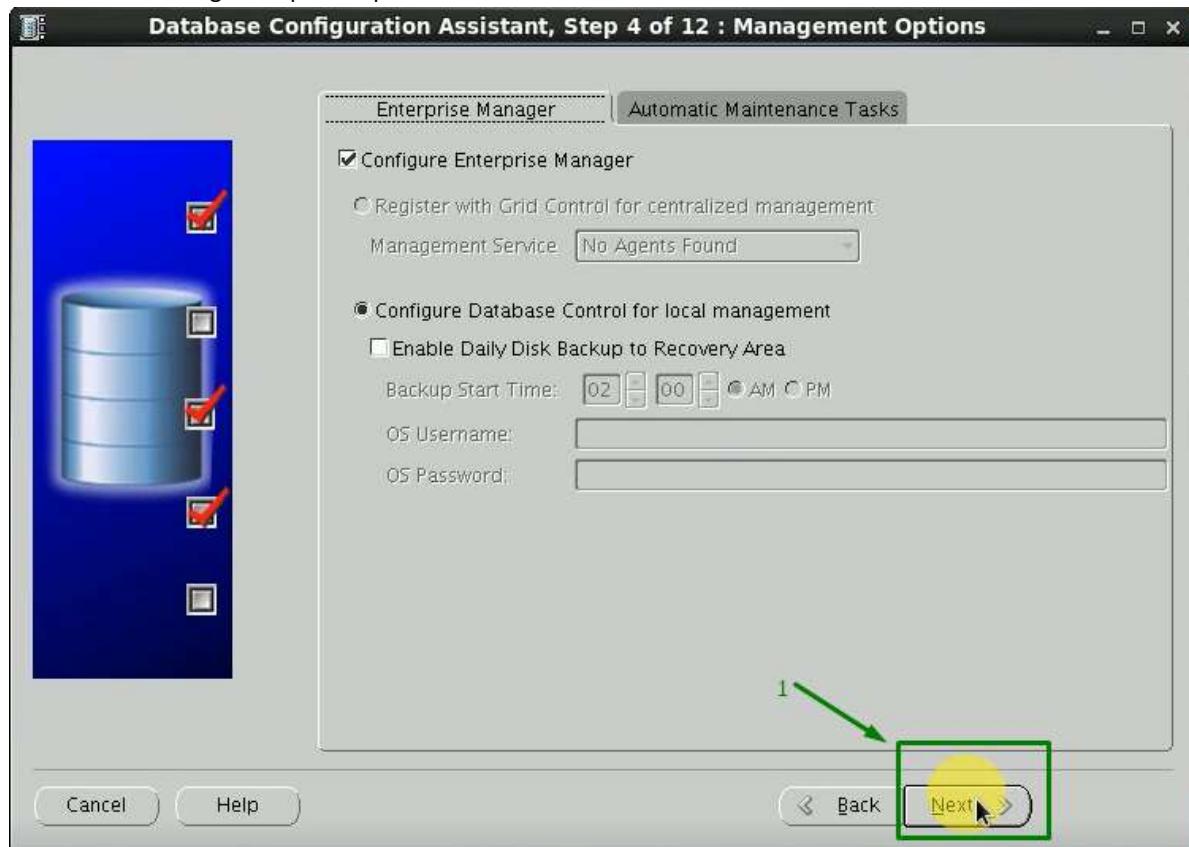
8.8. Choose as you want “Configure Enterprise Manager” to enable em from tab “Enterprise Manger”



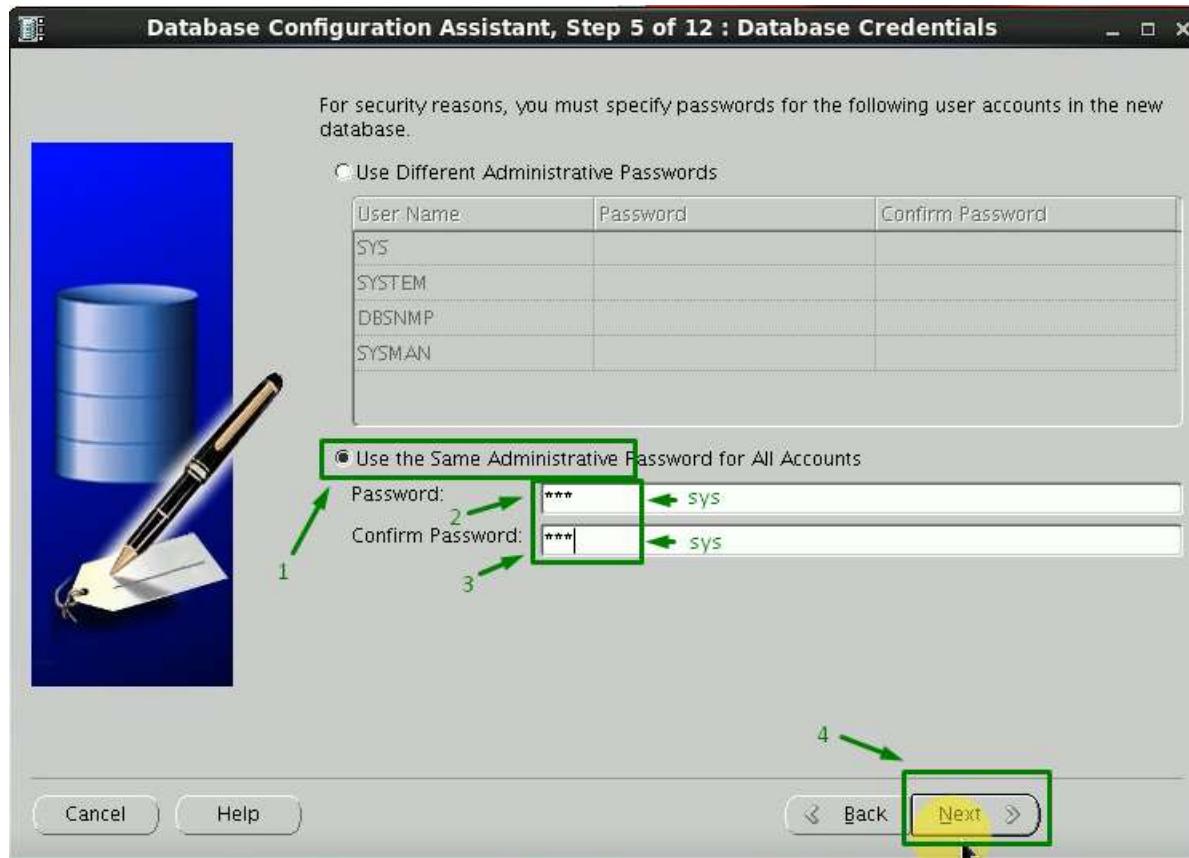
8.9. Choose as you want “Enable automatic maintenance tasks” from tab “Automatic Maintenance tasks ”



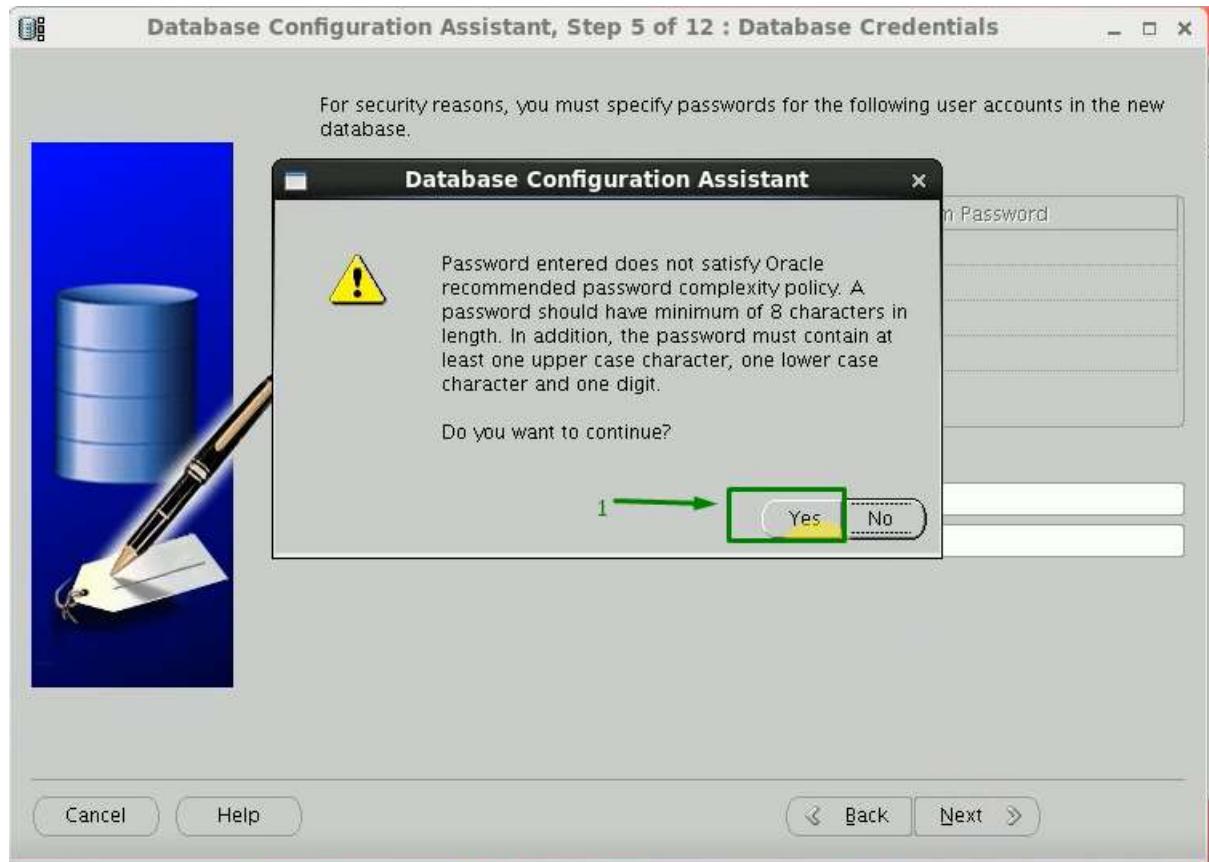
8.10. After enabling all required options click on “Next” button



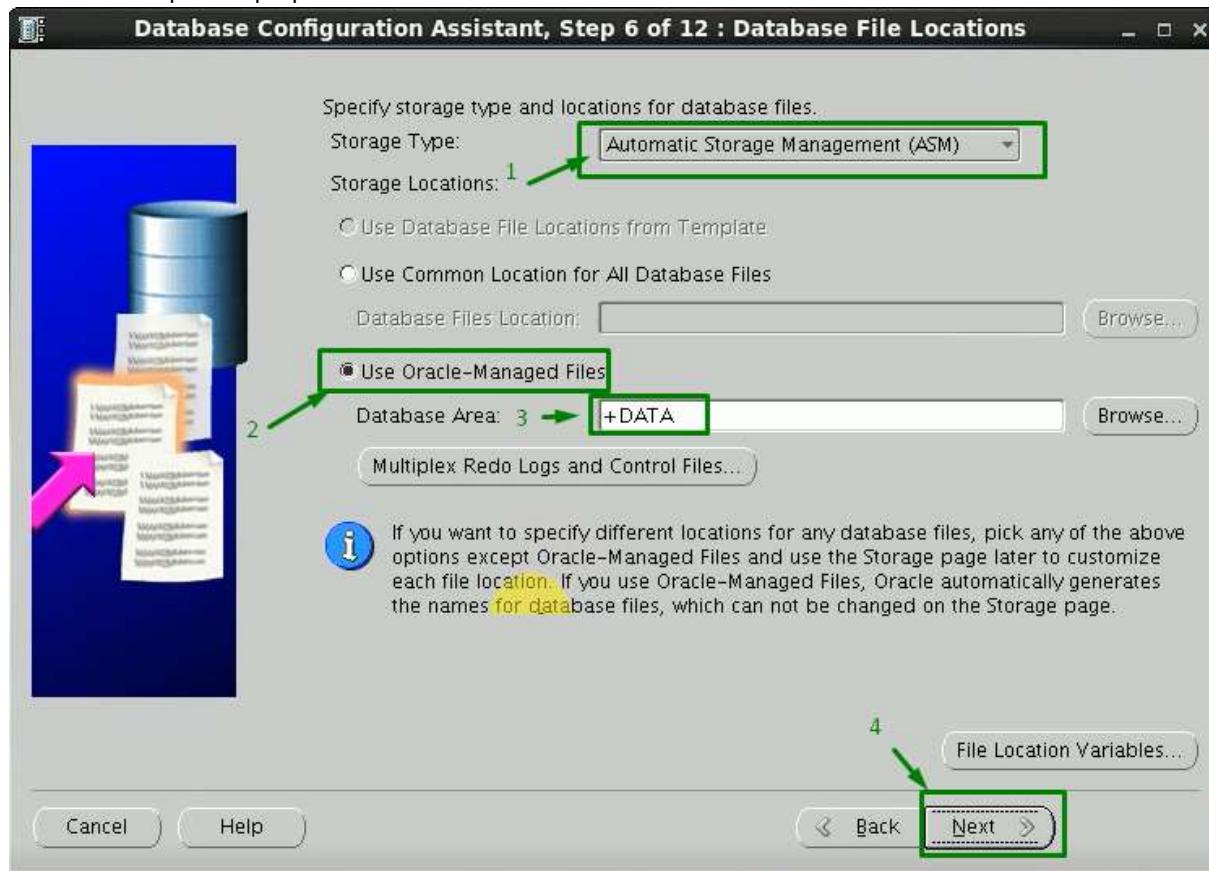
8.11. Set same password for Administrative accounts then click on “Next” button



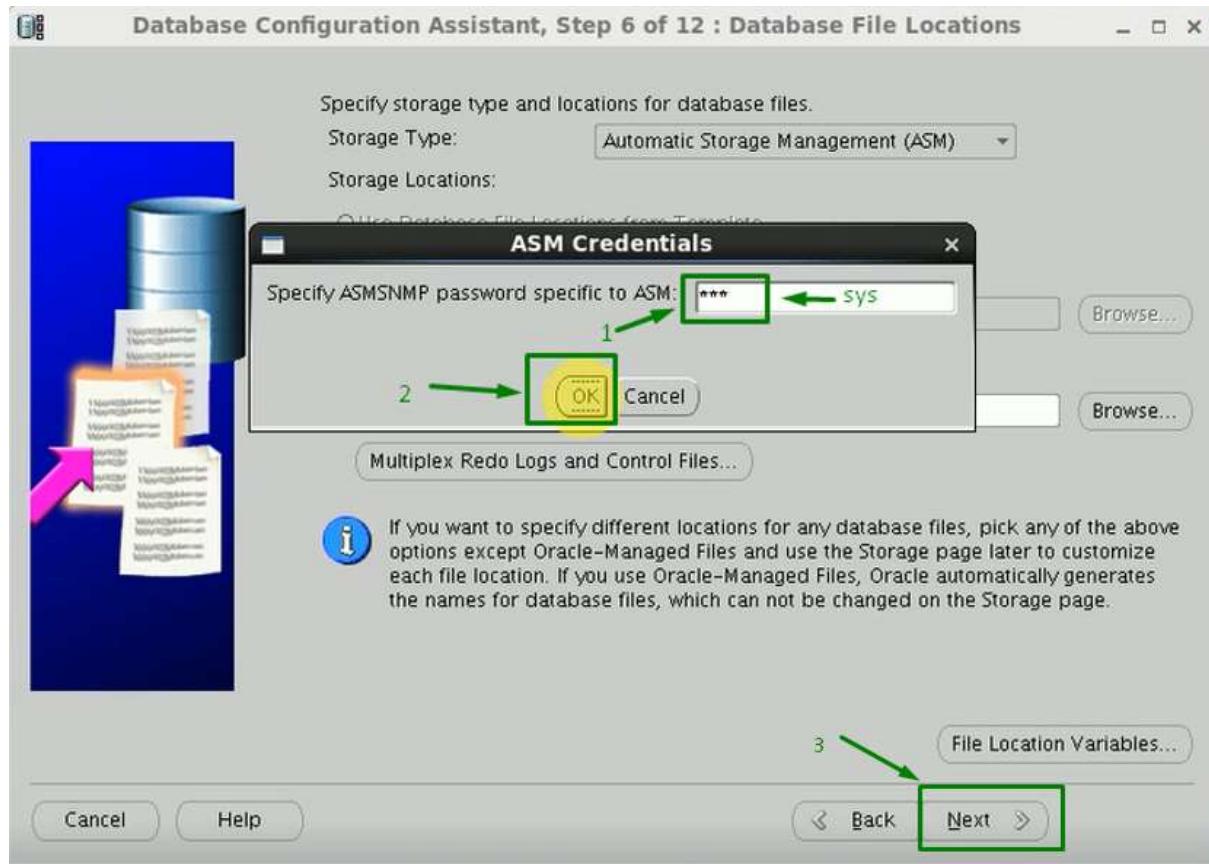
8.12. Avoid the password restriction for Administrative accounts click on “Yes” button



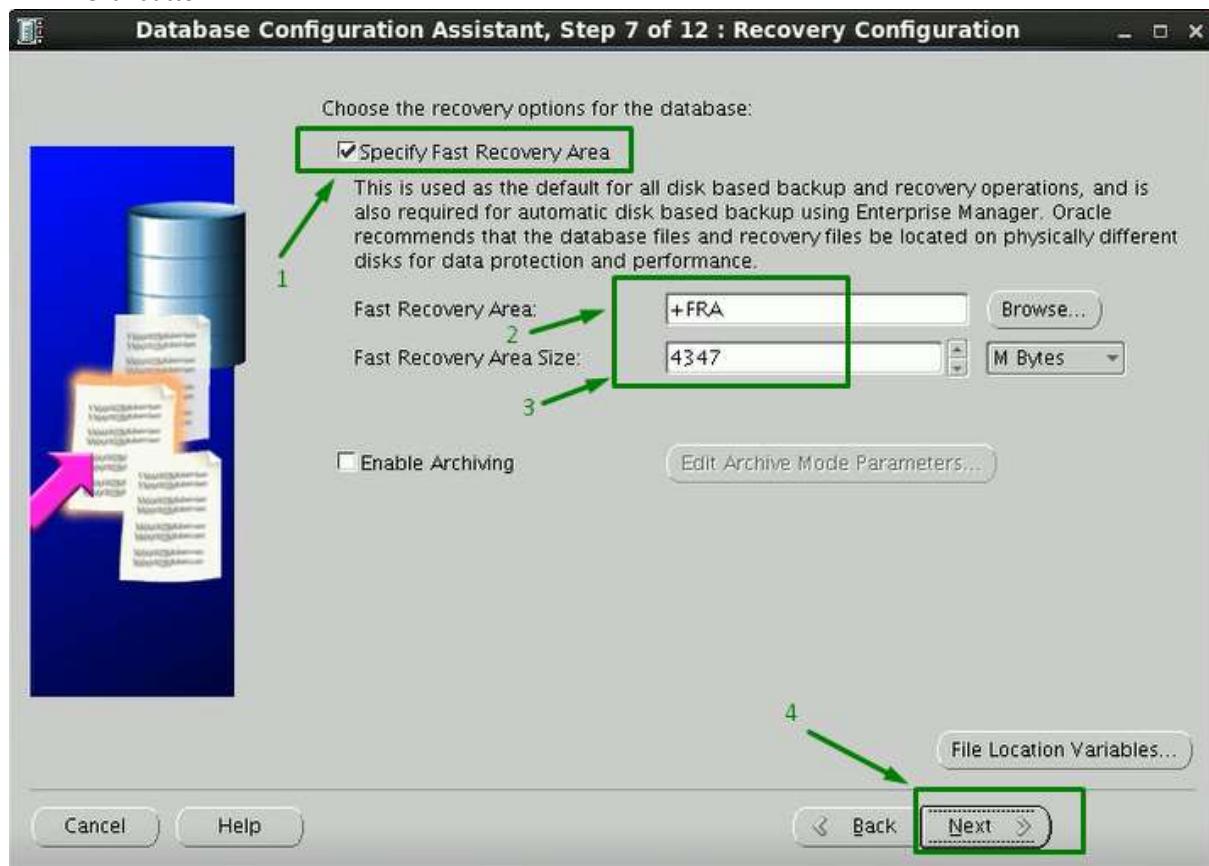
8.13. Choose proper Storage Type “Automatic Storage Management (ASM)”, click on “Use Oracle-Managed Files” and put the proper location for Database Area as “+DATA” then click on “Next” button



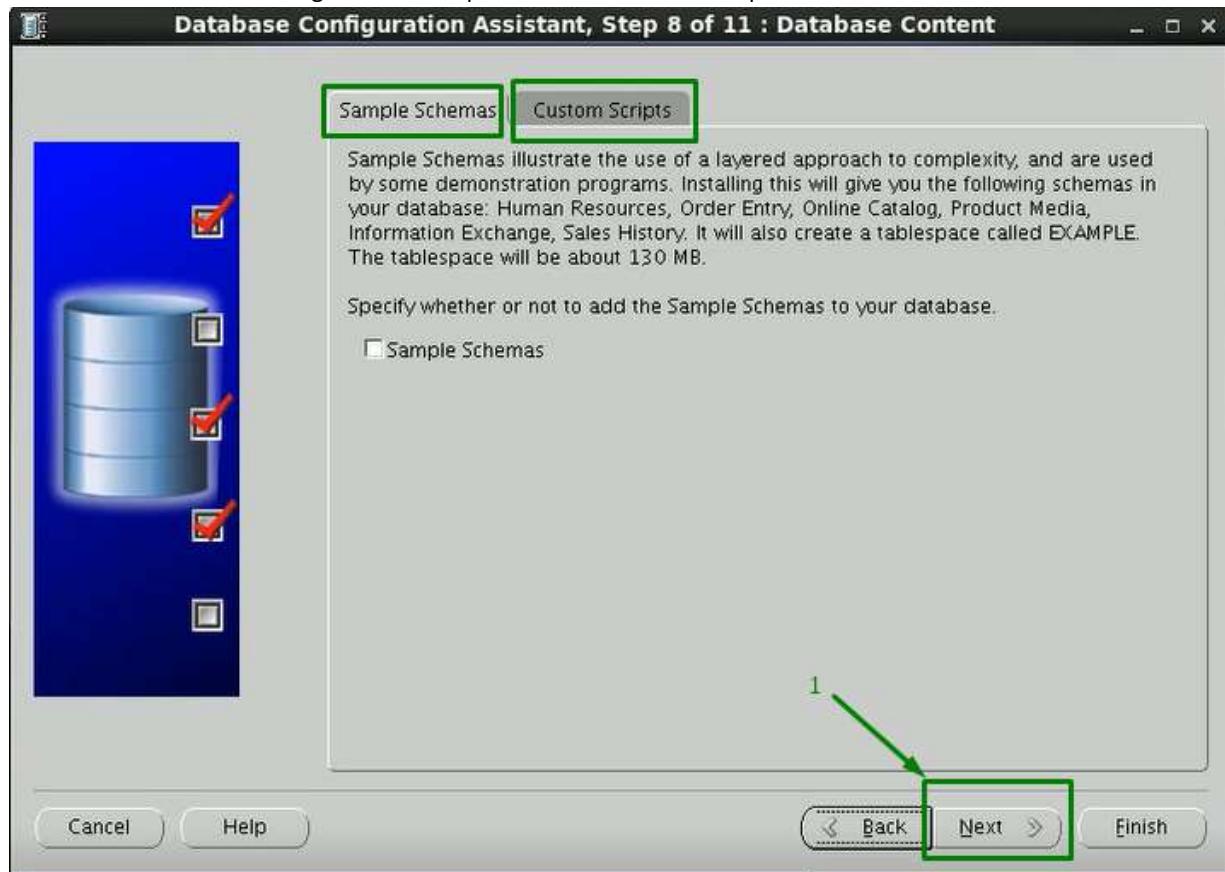
8.14. Provide the password from “Specify ASMSNMP password specific to ASM” as sys and click on “Ok” button



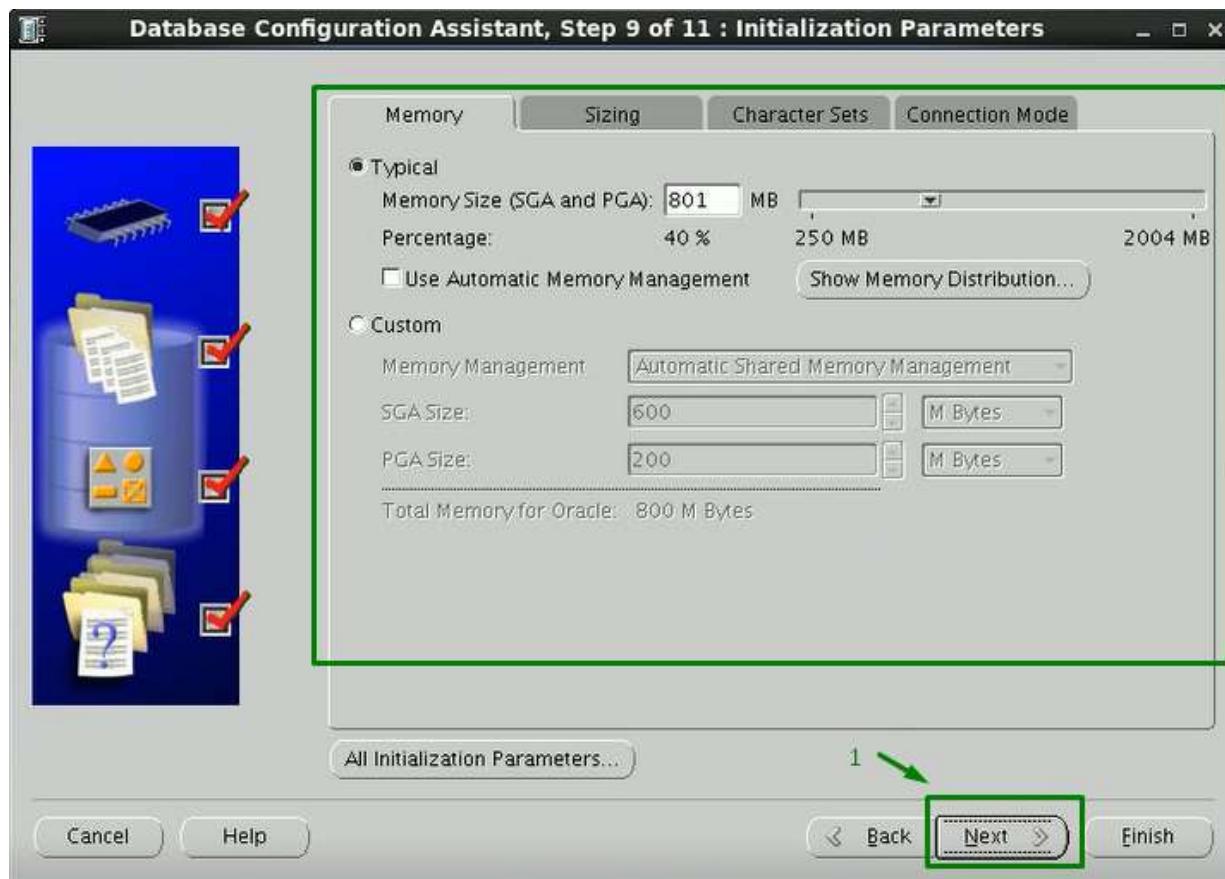
8.15. Select the “Specify Fast Recovery Area” option, then provide FRA location with proper size then click on “Next” button



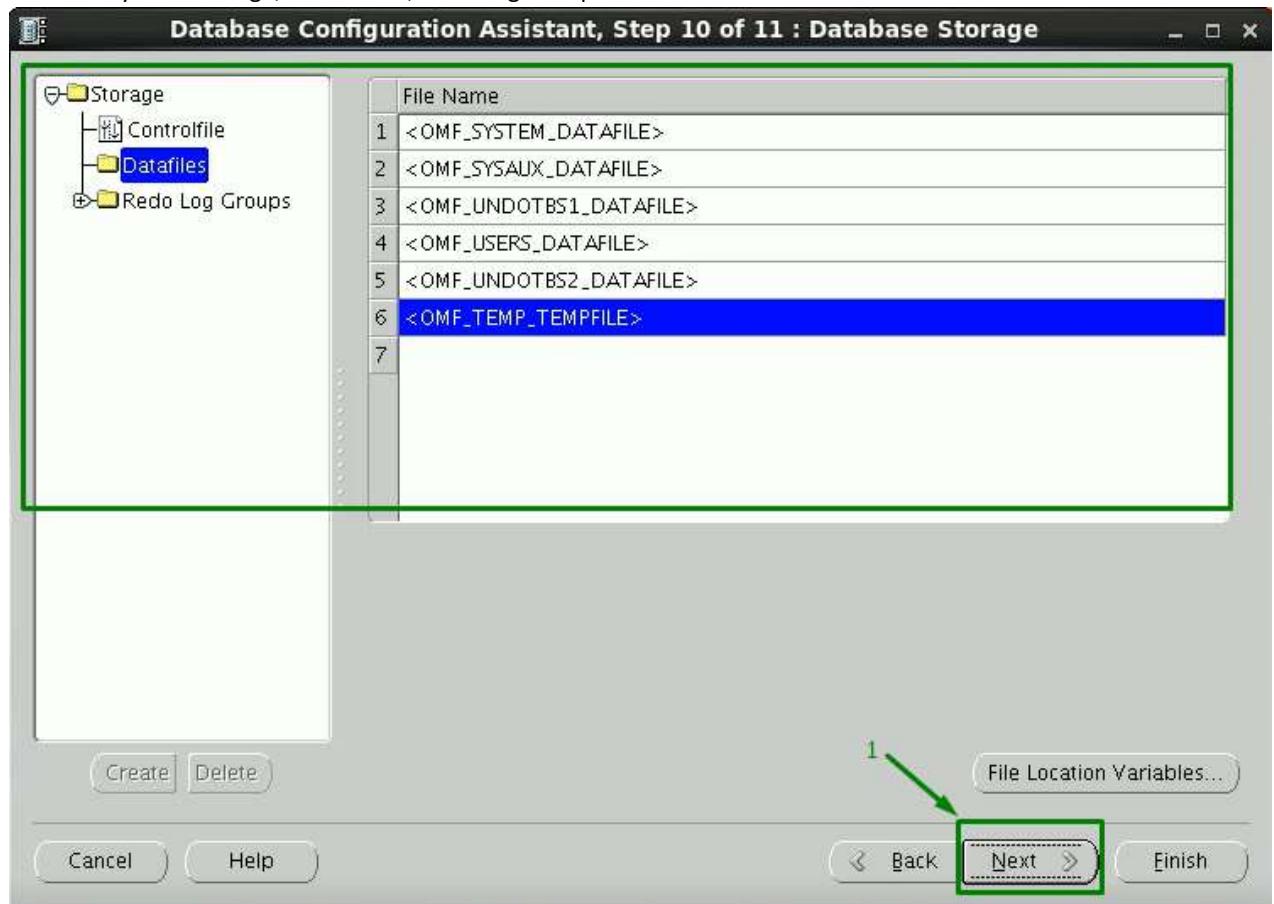
8.16. Leave as default setting for tab “Sample Schema & Custom Scripts” then click on “Next” button



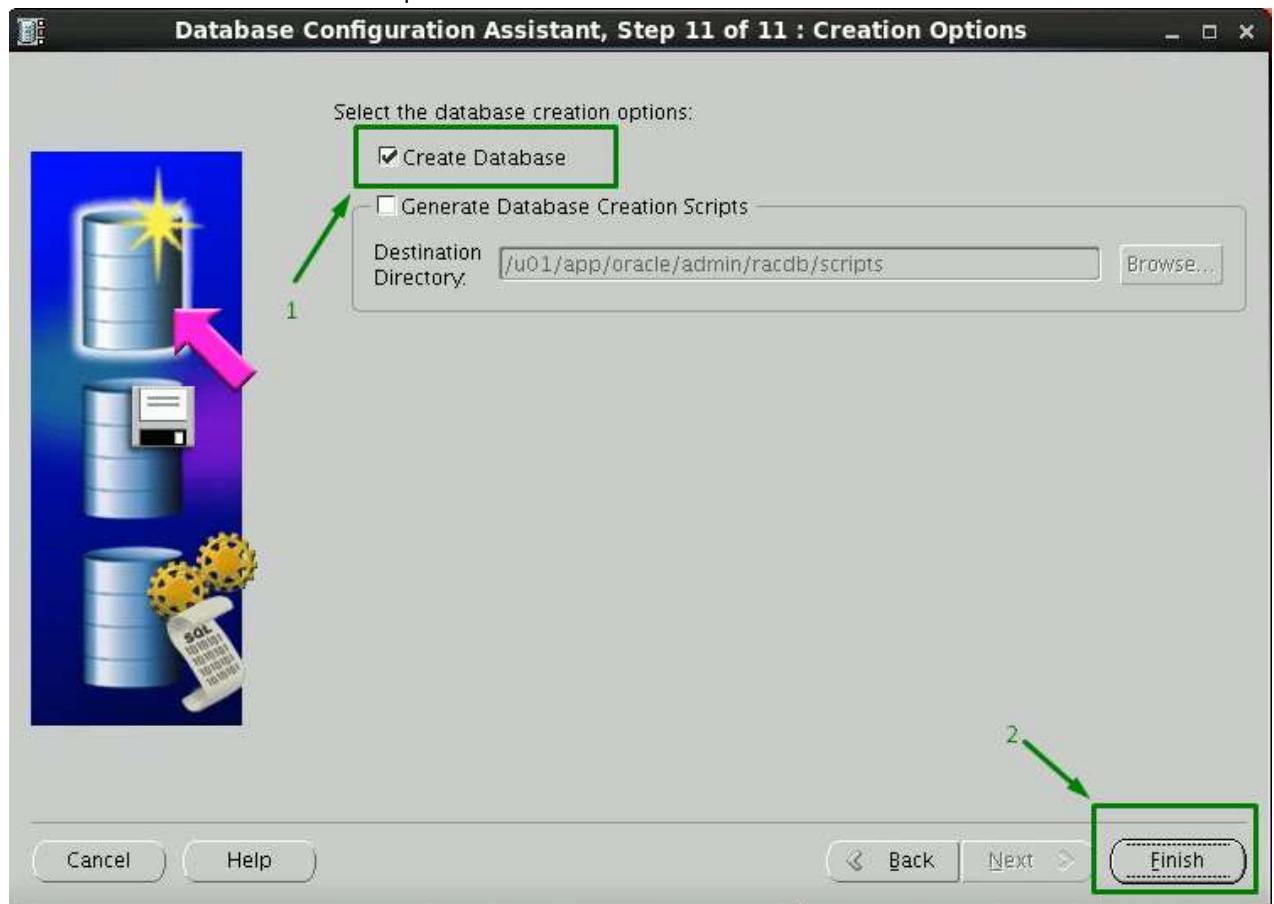
8.17. Leave as default setting for tab “Memory, Sizing, Character Sets & Connection Mode” then click on “Next” button



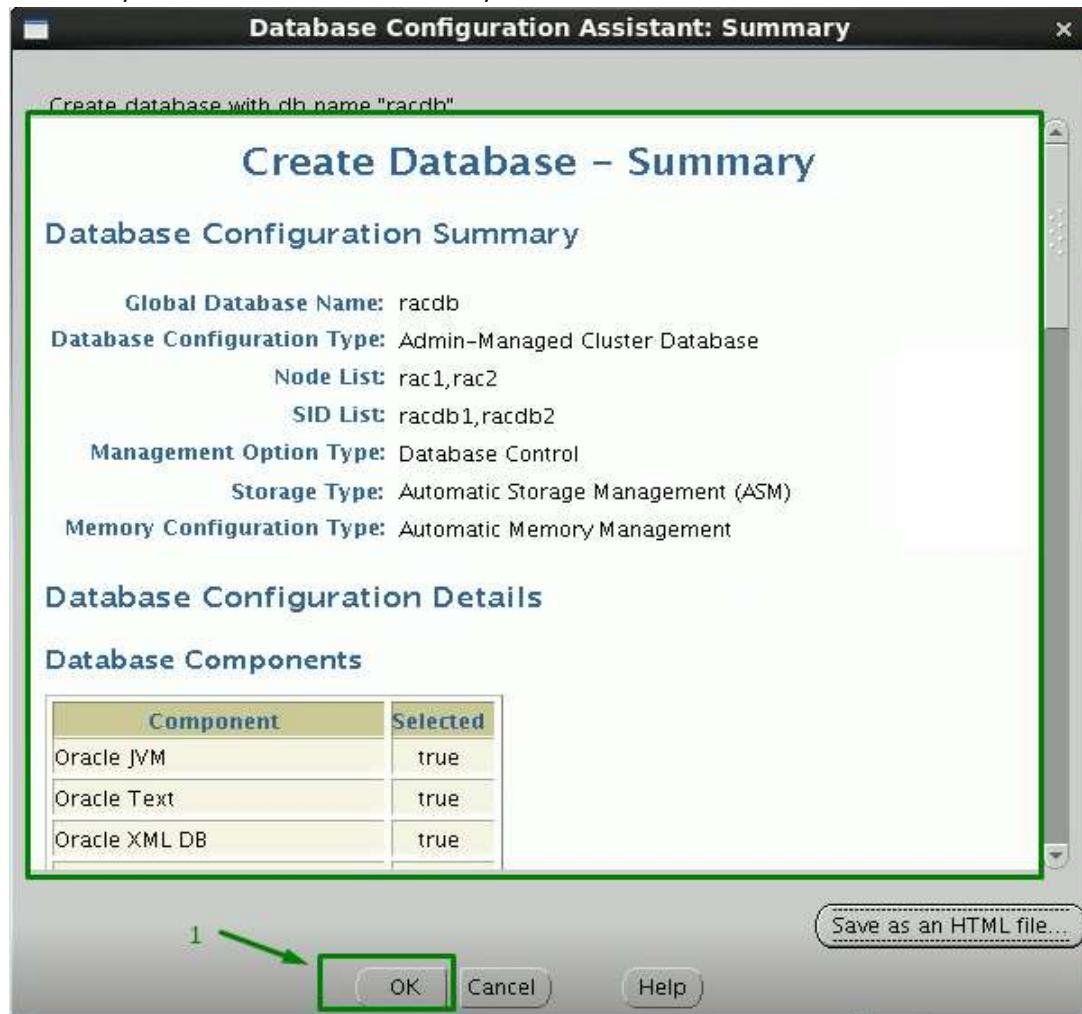
8.18. Verify the "Storage, Control file, Redo Log Groups" and then click on "Next" button



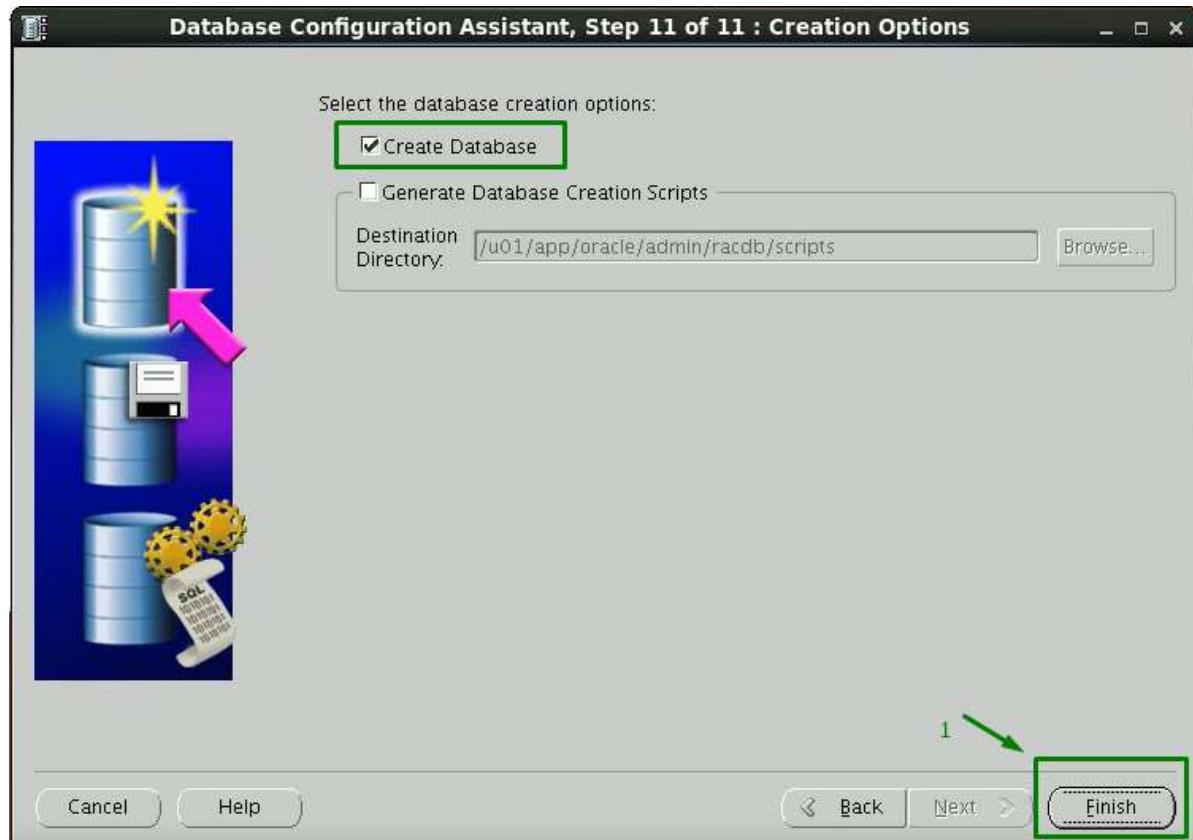
8.19. Select the "Create Database" option and then click on "Finish" button



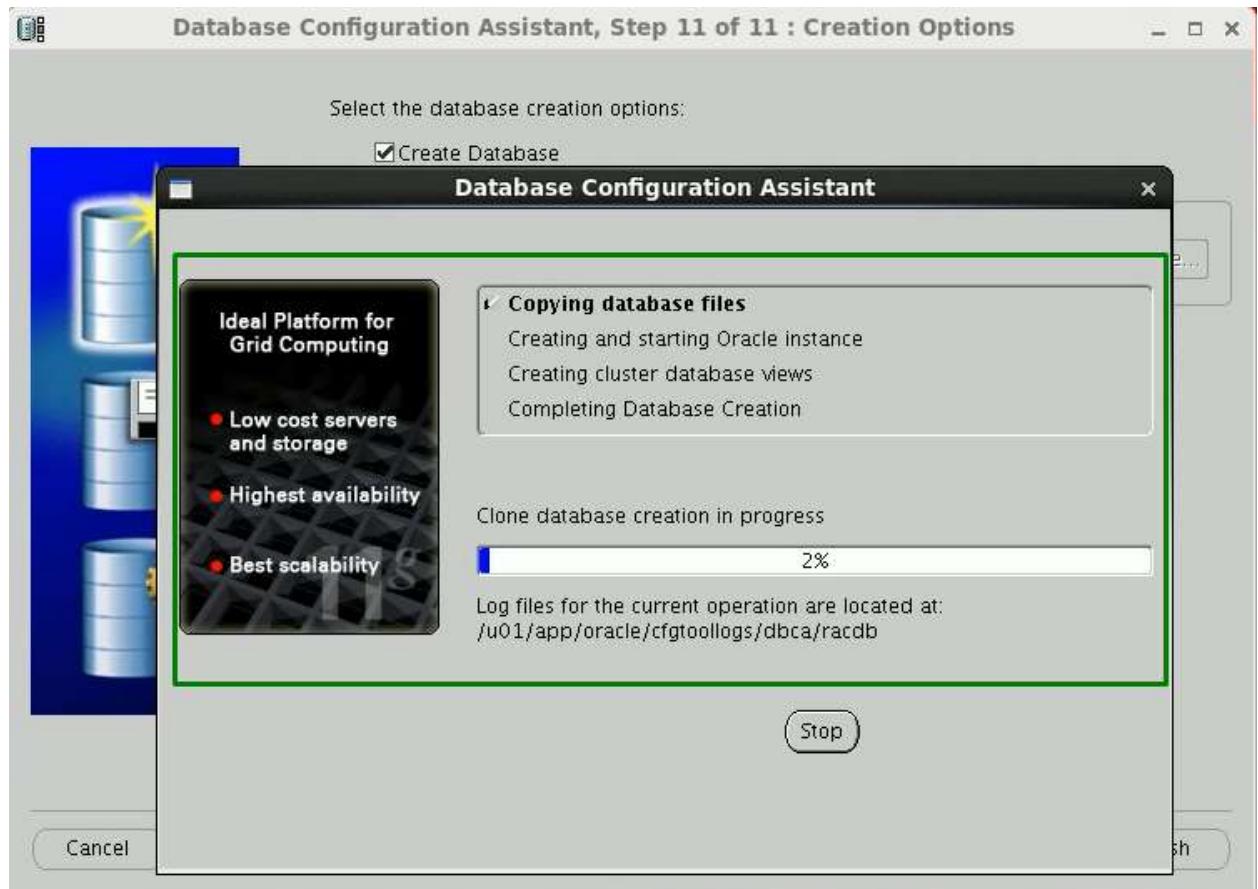
8.20. Verify the "Create Database - Summary" windows and then click on "Ok" button



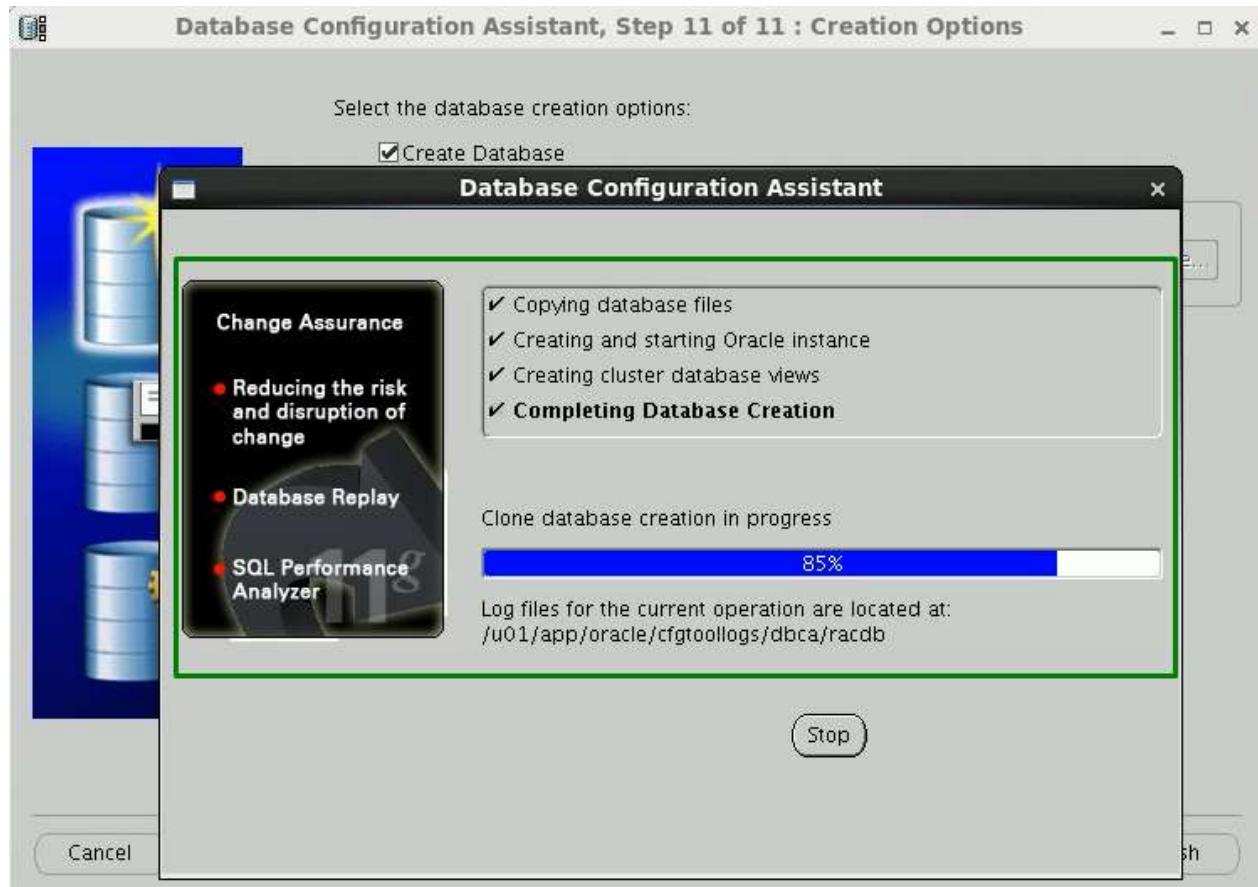
8.21. Click on "Finish" button



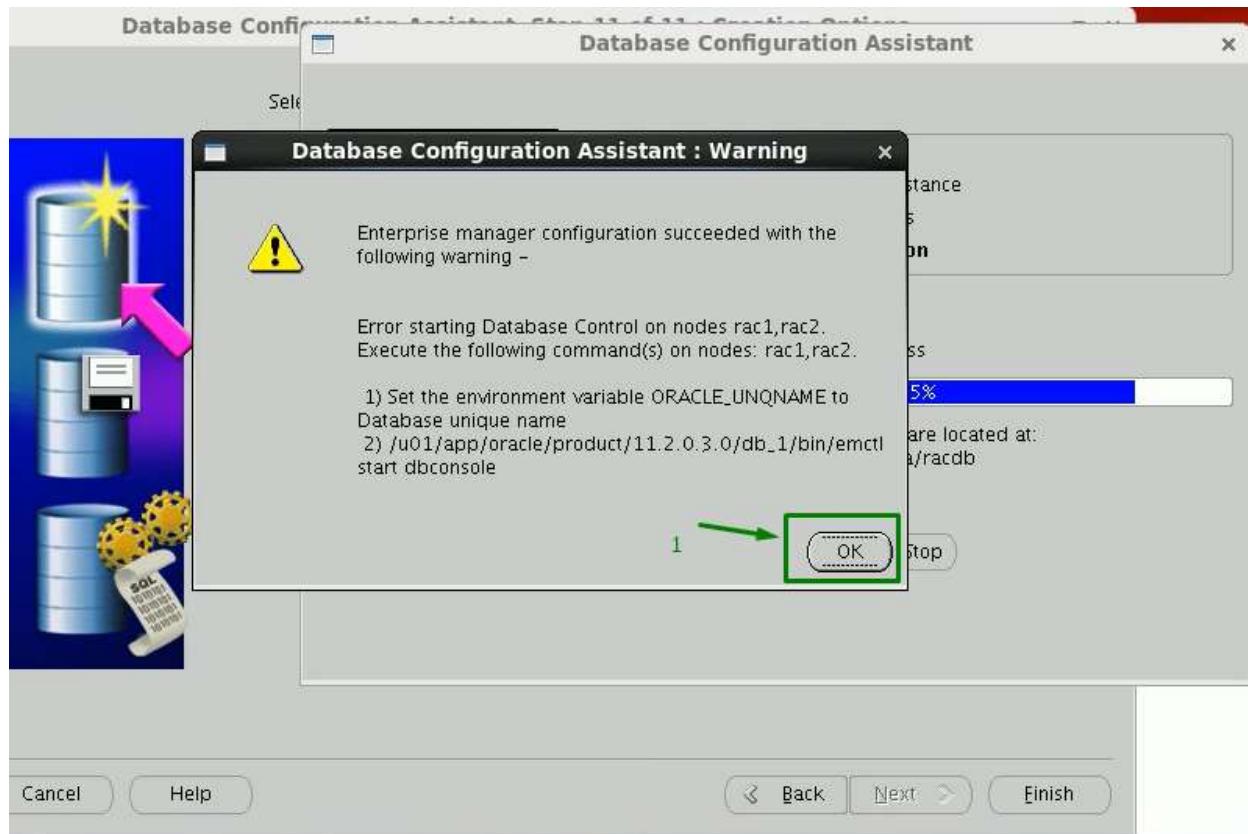
8.22. Then screen looks like



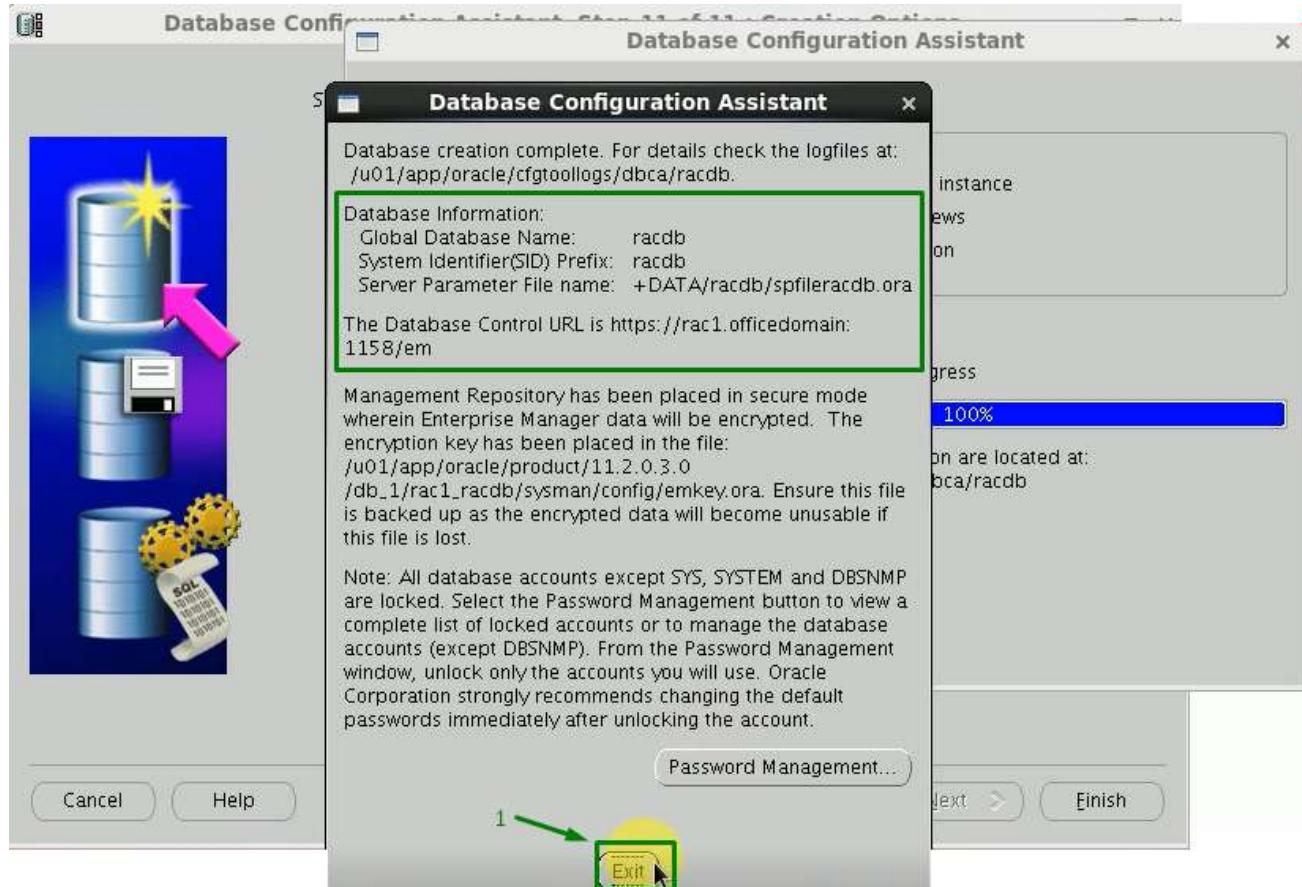
8.23. Then screen looks like



8.24. Click on “Ok” button to continue the installation



8.25. Click on “Exit” button to continue the installation, we will change the user account status later



8.26. After successful execution of “./dbca”, we have to make changes in “/etc/oratab” using “root” user at RAC1

```
[root@rac1 ~]# vi /etc/oratab
/*
+ASM1:/u01/11.2.0.3.0/grid:N.....#$ line added by Agent
racdb1:/u01/app/oracle/product/11.2.0.3.0/db_1:N.....#$ line added by Agent
*/
```

8.27. After successful execution of “./dbca”, we have to make changes in “/etc/oratab” using “root” user at RAC2

```
[root@rac2 ~]# vi /etc/oratab
/*
+ASM2:/u01/11.2.0.3.0/grid:N.....#$ line added by Agent
racdb2:/u01/app/oracle/product/11.2.0.3.0/db_1:N.....#$ line added by Agent
*/
```

8.28. Now we have to verify the listener status at RAC1, using “oracle” user

```
[oracle@rac1 ~]$ lsnrctl status
}/*
LSNRCTL for Linux: Version 11.2.0.3.0 - Production on 17-SEP-2019 11:54:08

Copyright (c) 1991, 2011, Oracle... All rights reserved.

Connecting to (ADDRESS=(PROTOCOL=tcp) (HOST=) (PORT=1521))
STATUS of the LISTENER
-----
Alias.....LISTENER
Version.....TNSLSNR for Linux: Version 11.2.0.3.0 - Production
Start Date.....17-SEP-2019 10:48:21
Uptime.....0 days 1 hr. 5 min. 46 sec
Trace Level.....off
Security.....ON: Local OS Authentication
SNMP.....OFF
Listener Parameter File ..../u01/11.2.0.3.0/grid/network/admin/listener.ora
Listener Log File ..../u01/app/oracle/diag/tnslsnr/rac1/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc) (KEY=LISTENER)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=192.168.129.105) (PORT=1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=192.168.129.107) (PORT=1521)))
Services Summary...
Service "+ASM" has 1 instance(s).
  Instance "+ASM1", status READY, has 1 handler(s) for this service...
Service "racdb" has 1 instance(s).
  Instance "racdb1", status READY, has 1 handler(s) for this service...
Service "racdbXDB" has 1 instance(s).
  Instance "racdb1", status READY, has 1 handler(s) for this service...
The command completed successfully
*/
```

8.29. Now we have to connect as sysdba at RAC1, using “oracle” user

```
[oracle@rac1 ~]$ sqlplus sys/sys as sysdba
/*
SQL*Plus: Release 11.2.0.3.0 - Production on Tue Sep 17 12:27:22 2019

Copyright (c) 1982, 2011, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, Real Application Clusters, Automatic Storage Management, OLAP,
Data Mining and Real Application Testing options

SQL> select instance_name,status from gv$instance;

INSTANCE_NAME      STATUS
-----
racedb1           OPEN
racedb2           OPEN

SQL> exit
*/
```

8.30. Now we have to verify the listener status at RAC2, using “oracle” user

```
[oracle@rac2 ~]$ lsnrctl status
/*
LSNRCTL for Linux: Version 11.2.0.3.0 - Production on 17-SEP-2019 11:53:36

Copyright (c) 1991, 2011, Oracle. All rights reserved.

Connecting to (ADDRESS=(PROTOCOL=tcp) (HOST=) (PORT=1521))
STATUS of the LISTENER
-----
Alias          LISTENER
Version        TNSLSNR for Linux: Version 11.2.0.3.0 - Production
Start Date    17-SEP-2019 10:48:44
Uptime         0 days 1 hr. 4 min. 51 sec
Trace Level   off
Security       ON: Local OS Authentication
SNMP           OFF
Listener Parameter File /u01/11.2.0.3.0/grid/network/admin/listener.ora
Listener Log File /u01/app/oracle/diag/tnslsnr/rac2/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc) (KEY=LISTENER)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=192.168.129.106) (PORT=1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=192.168.129.108) (PORT=1521)))
Services Summary...
Service "+ASM" has 1 instance(s).
  Instance "+ASM2", status READY, has 1 handler(s) for this service...
Service "racdb" has 1 instance(s).
  Instance "racdb2", status READY, has 1 handler(s) for this service...
Service "racdbXDB" has 1 instance(s).
  Instance "racdb2", status READY, has 1 handler(s) for this service...
The command completed successfully
*/
```

8.31. Now we have to connect as sysdba at RAC2, using “oracle” user

```
[oracle@rac2 ~]$ sqlplus sys/sys as sysdba
/*
SQL*Plus: Release 11.2.0.3.0 Production on Tue Sep 17 11:59:50 2019

Copyright (c) 1982, 2011, Oracle... All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, Real Application Clusters, Automatic Storage Management, OLAP,
Data Mining and Real Application Testing options

SQL> select instance_name,status from gv$instance;

INSTANCE_NAME.....STATUS
-----
racdb2.....OPEN
racdb1.....OPEN

SQL> exit
*/
```

8.32. Now we have to verify the cluster status at RAC1, using “root/grid” user

```
[root@rac1 ~]# cd /u01/11.2.0.3.0/grid/bin/
[root@rac1 bin]# ./crsctl check cluster -all
/*
*****
rac1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
*****
rac2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
*****
*/
```

8.33. Now we have to verify the cluster status at RAC2, using “root/grid” user

```
[root@rac2 ~]# cd /u01/11.2.0.3.0/grid/bin/  
[root@rac2 bin]# ./crsctl check cluster -all  
/*  
*****  
rac1:  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*****  
rac2:  
CRS-4537: Cluster Ready Services is online  
CRS-4529: Cluster Synchronization Services is online  
CRS-4533: Event Manager is online  
*****  
*/
```

8.34. Now we have to verify the ASM status at RAC1, using “grid” user

```
[oracle@rac1 Desktop]$ su - grid  
/*  
Password:  
*/  
  
[grid@rac1 ~]$ asmcmd  
ASMCMD> lsdg  
/*  
State Type Sector Block AU Total_MB Free_MB Req_mir_free_MB Usable_file_MB Offline_disks Voting_files Name  
MOUNTED EXTERN N 512 4096 1048576 40959 39305 0 39305 0 N DATA/  
MOUNTED EXTERN N 512 4096 1048576 25023 24693 0 24693 0 N FRA/  
MOUNTED EXTERN N 512 4096 1048576 20479 20083 0 20083 0 Y OCR/  
*/  
ASMCMD> exit
```

8.35. Now we have to verify the ASM status at RAC1, using “grid” user

```
[oracle@rac2 Desktop]$ su - grid  
/*  
Password:  
*/  
  
[grid@rac2 ~]$ asmcmd  
ASMCMD> lsdg  
/*  
State Type Sector Block AU Total_MB Free_MB Req_mir_free_MB Usable_file_MB Offline_disks Voting_files Name  
MOUNTED EXTERN N 512 4096 1048576 40959 39305 0 39305 0 N DATA/  
MOUNTED EXTERN N 512 4096 1048576 25023 24693 0 24693 0 N FRA/  
MOUNTED EXTERN N 512 4096 1048576 20479 20083 0 20083 0 Y OCR/  
*/  
ASMCMD> exit
```

Now, I am able to successful install two node Oracle Real application cluster configuration over my machine having processor: core i7, Memory: 8GB and SSD 248 GB.



Oracle Database
11g Release 2 (11.2.)

Thank you,
Devesh Kumar Shrivastav