

**“LINUX
ADMINISTRATION”
PRACTICAL
MANUAL**

T.Y.B.Sc. (I.T) - SEMESTER V

Prepared By : 1. Prof. Sweta Chheda - N.M.College
2. Prof. Jagdish Sanas

Linux Administration Practical Manual

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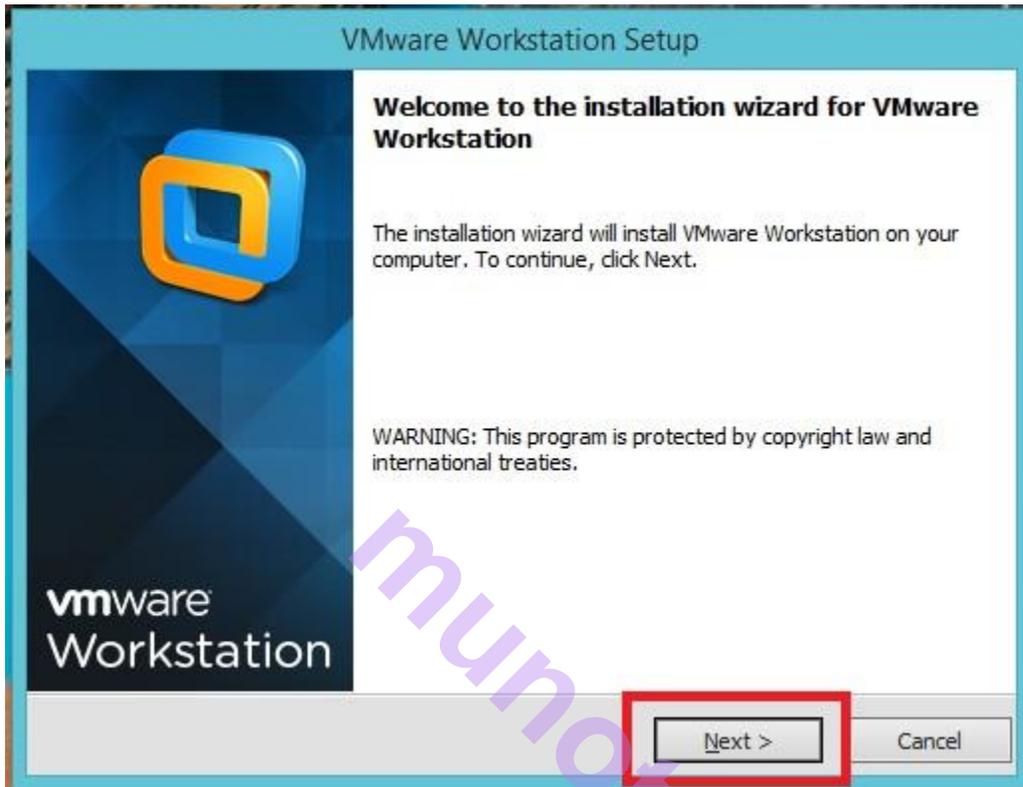
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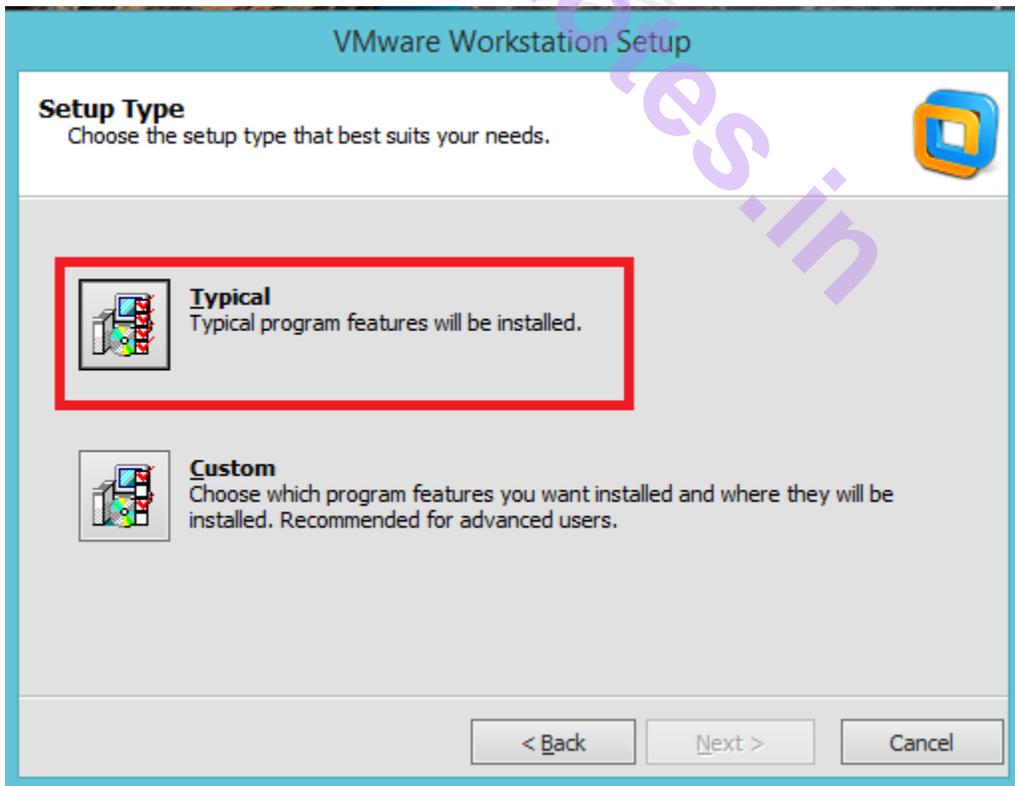
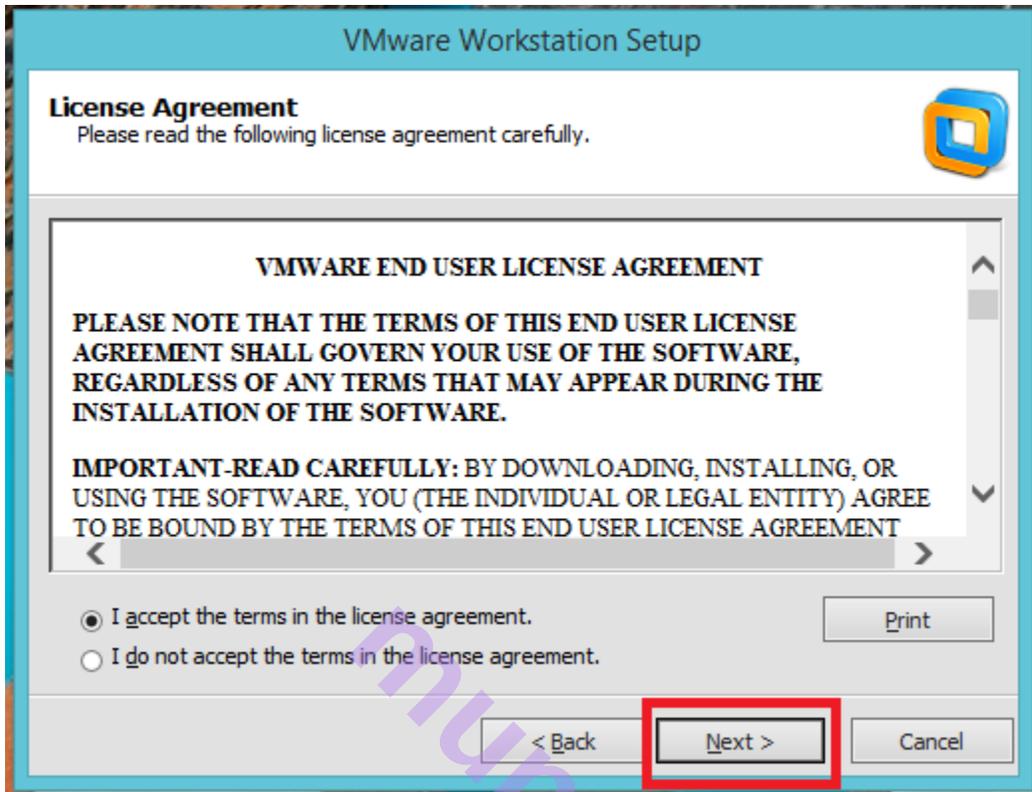
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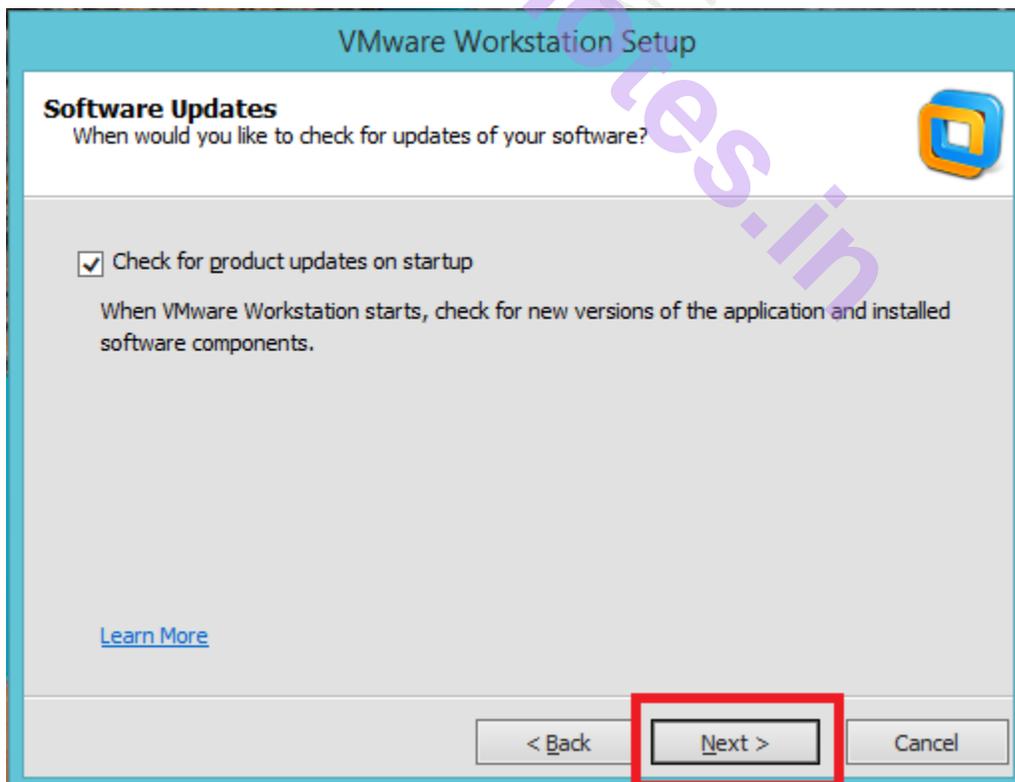
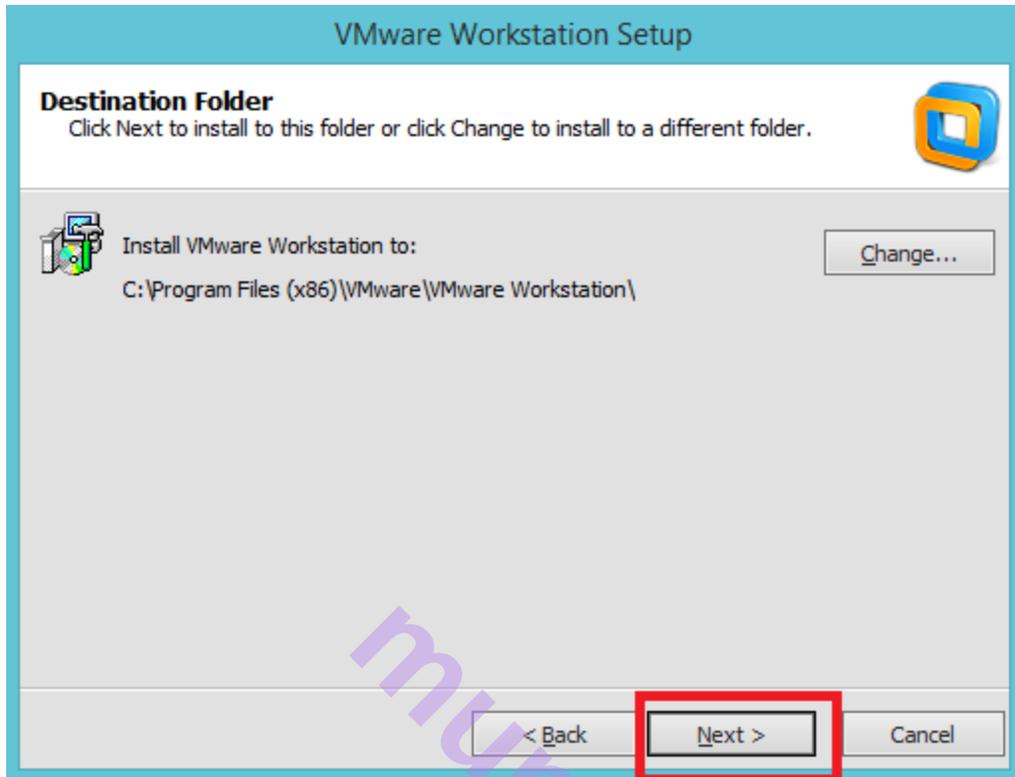
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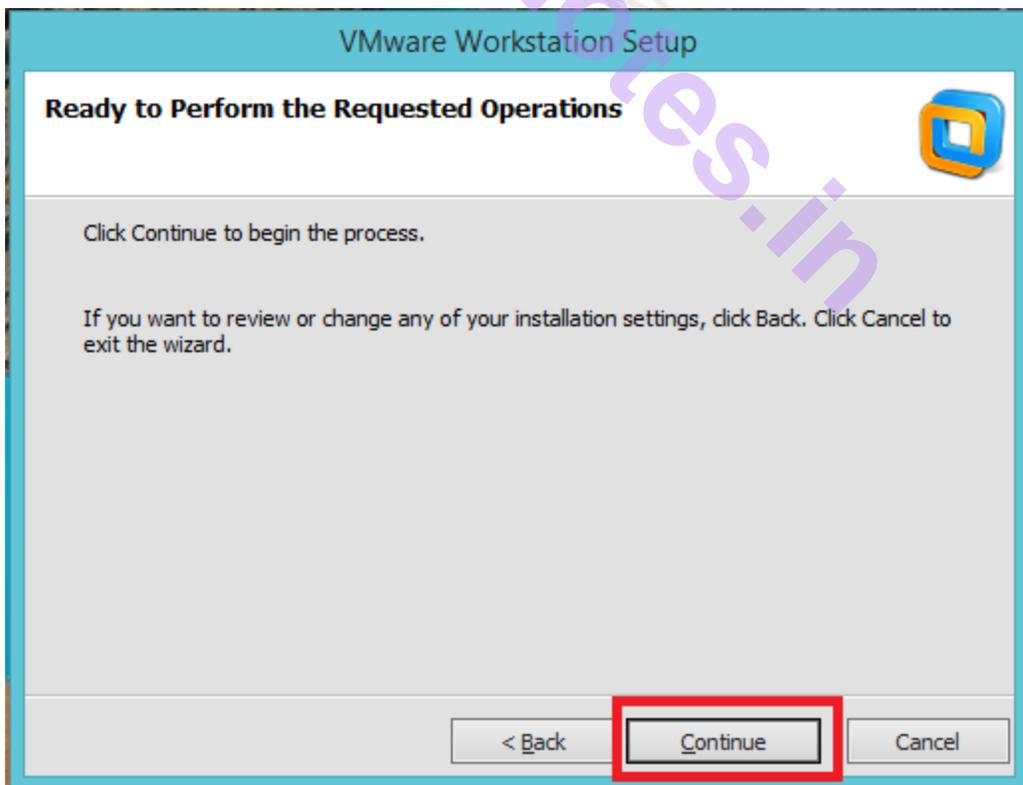
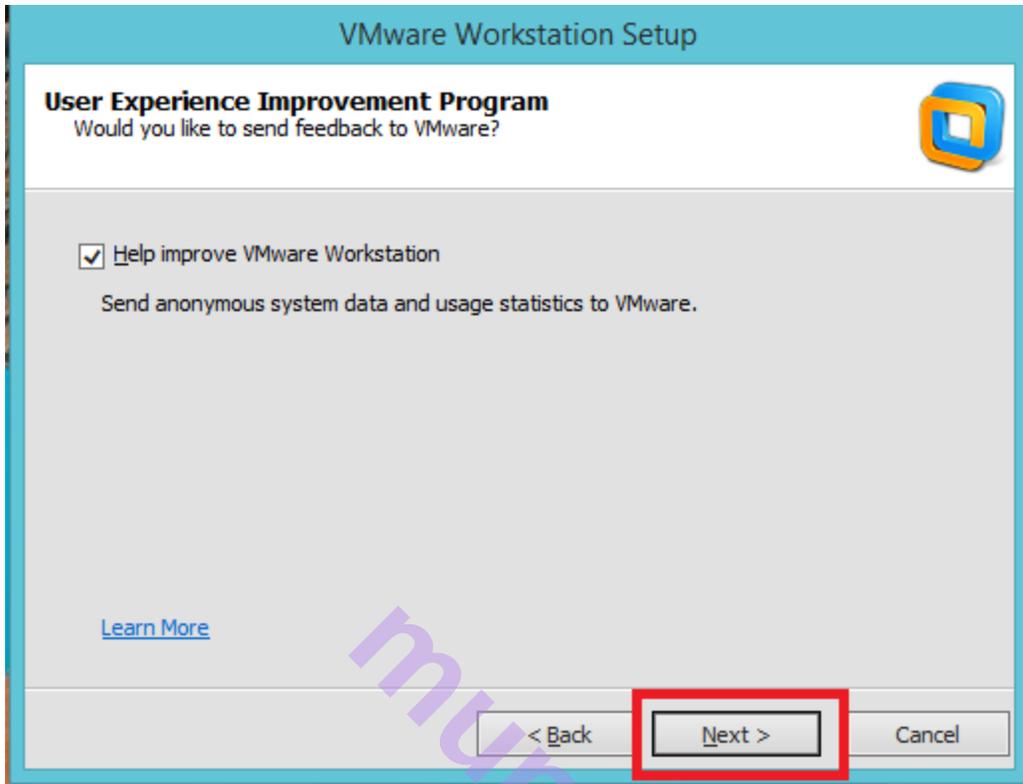
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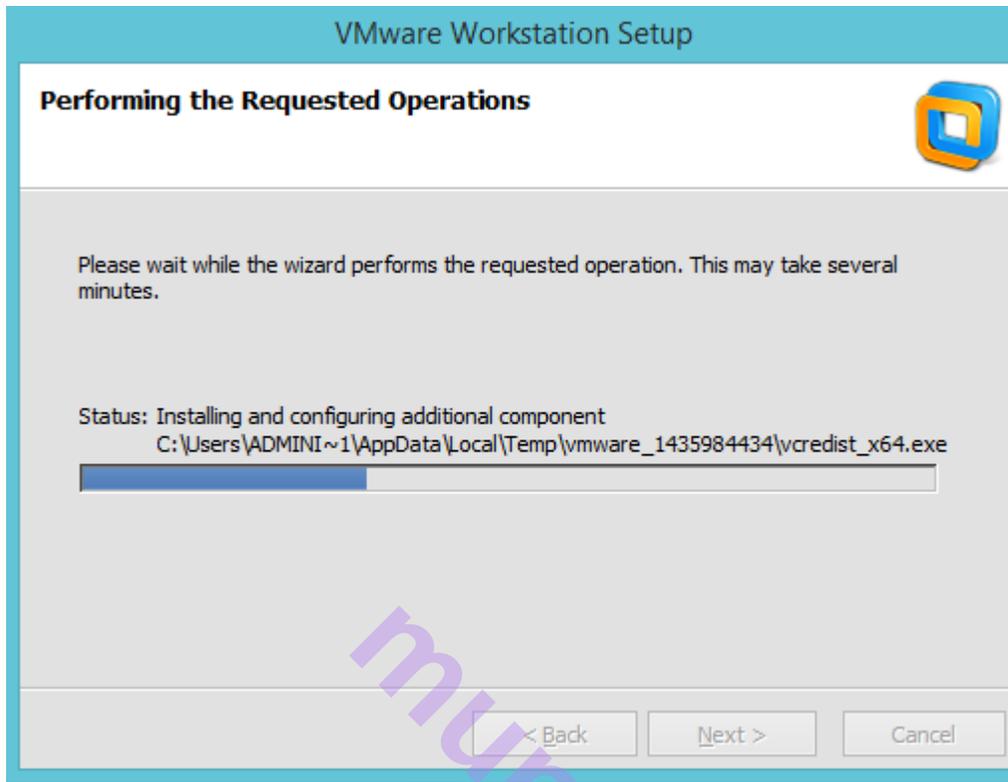
Practical no 1: Installation of Red HAT Linux operating system.





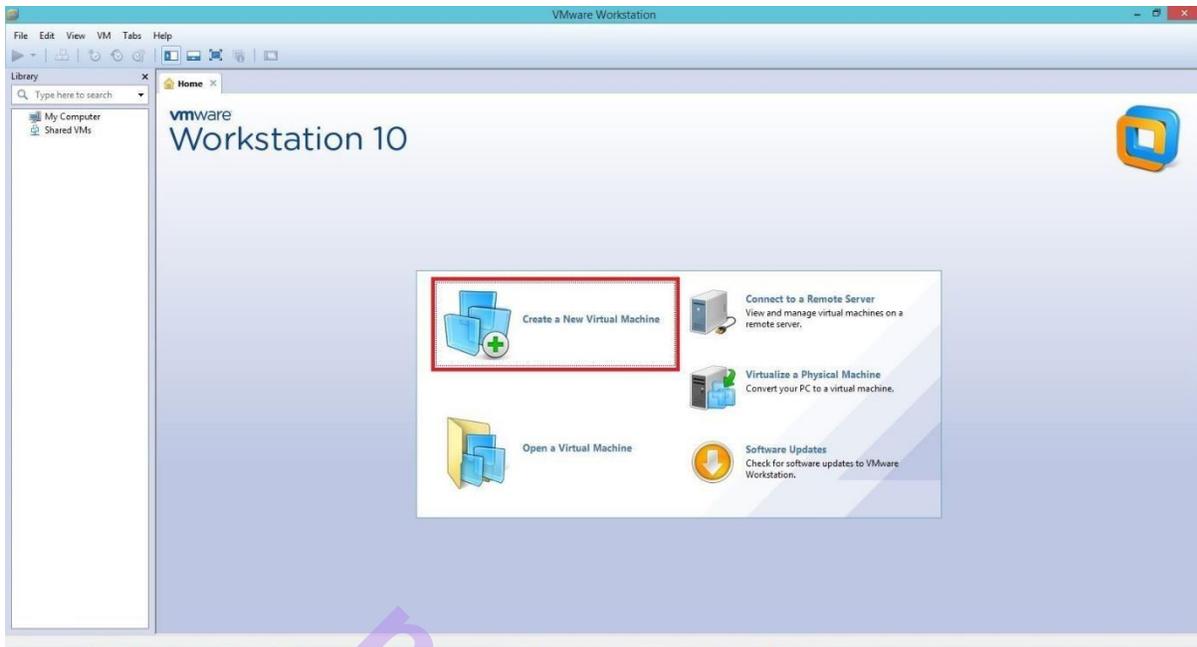




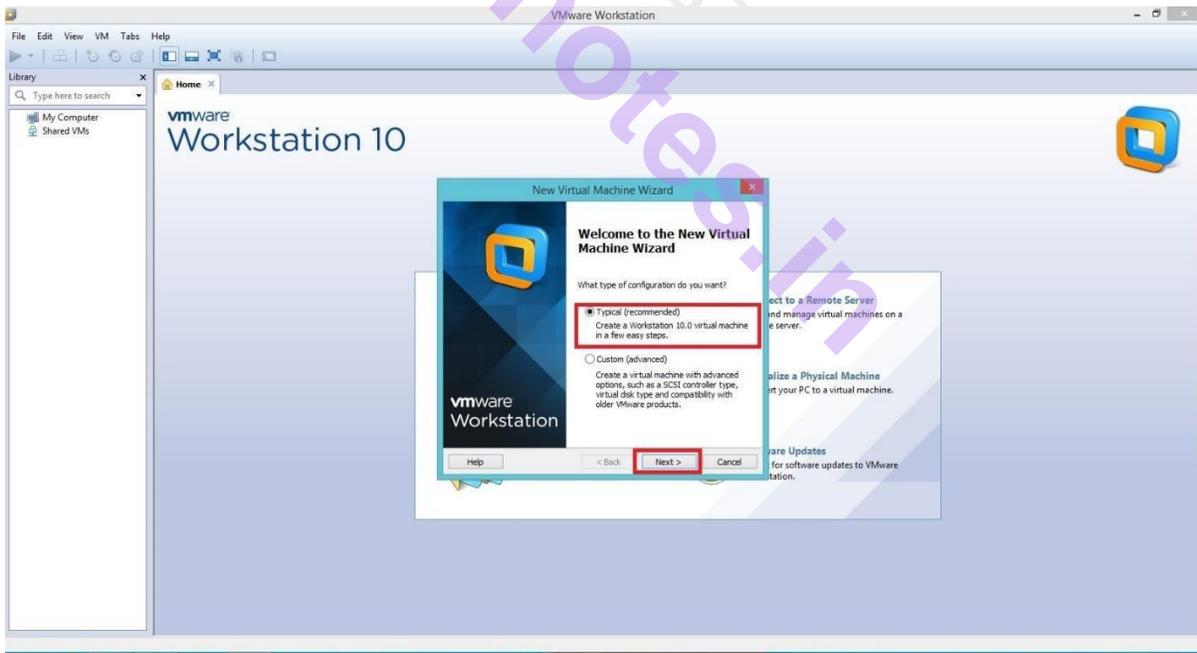


1. Double click on VM VirtualBox icon and Oracle VM VirtualBox Manager will open.
2. Click on New button in the toolbar to create a new virtual machine

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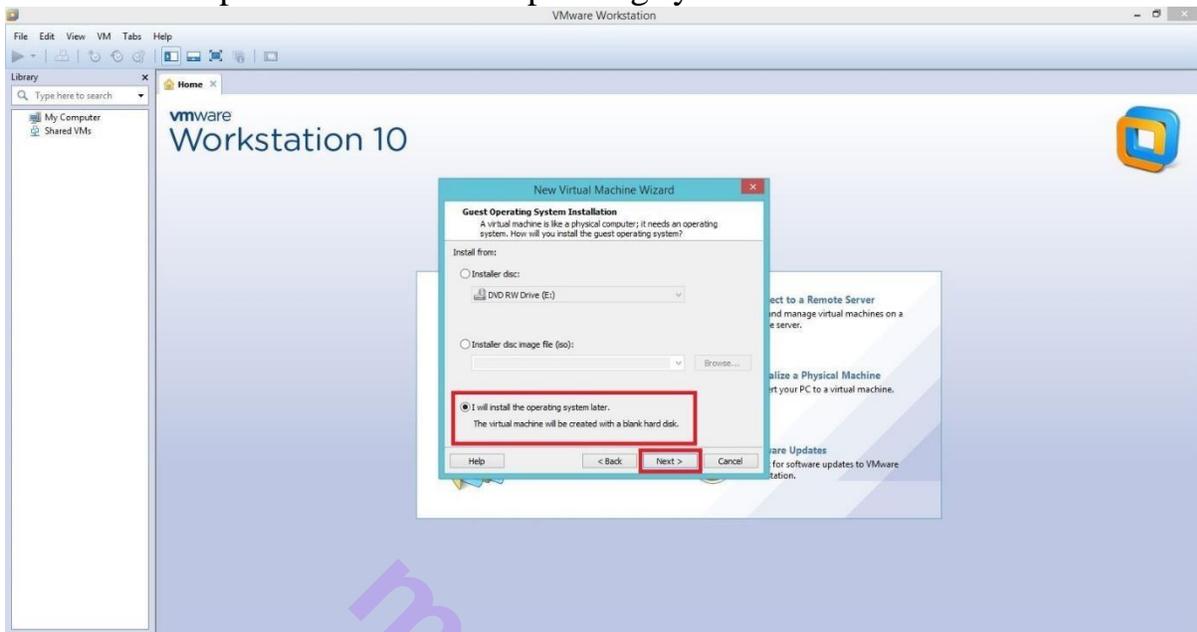


3. Create Virtual Machine Dialog box will open

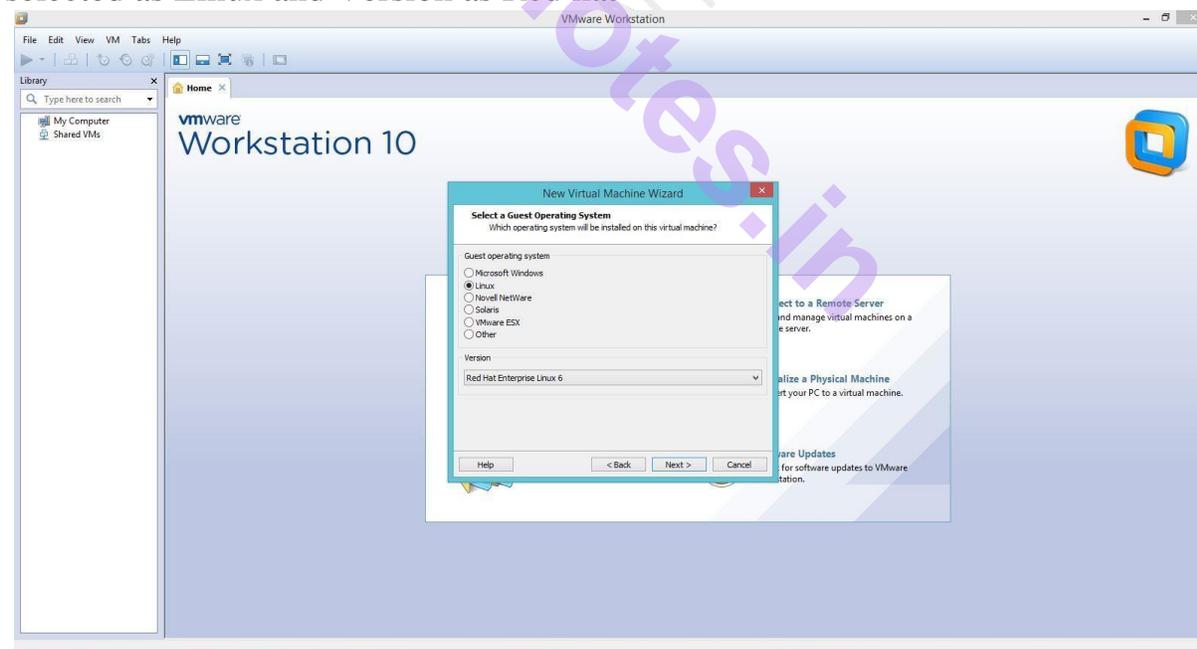


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4. Select option “I will install operating system later”.



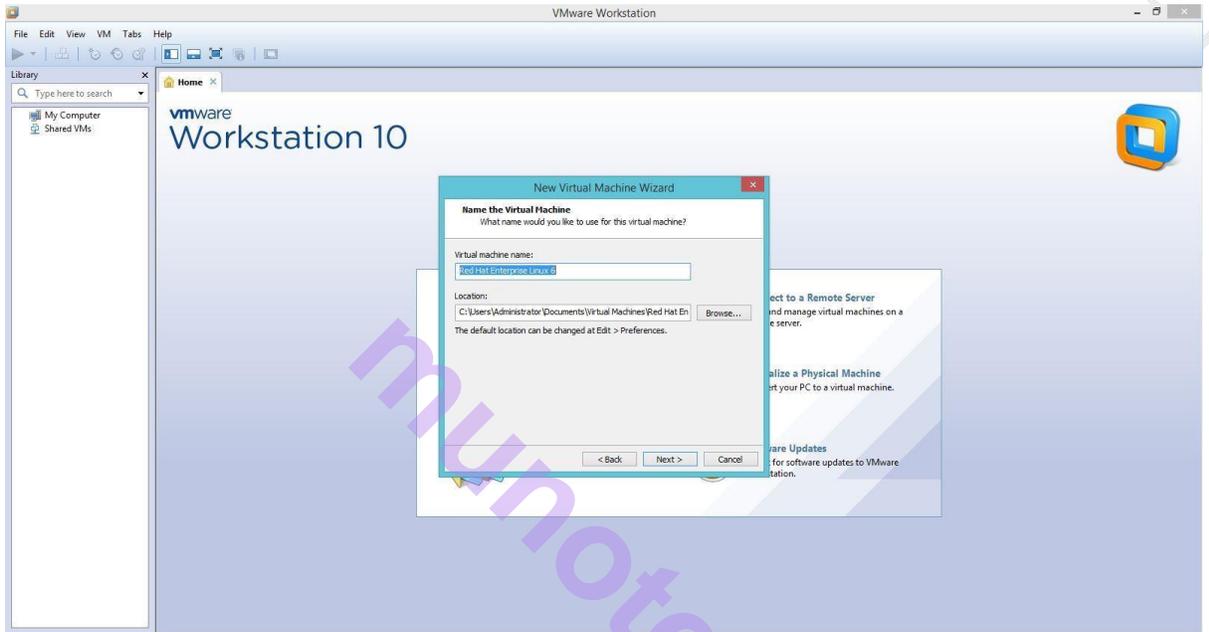
5. Select the operating system as RedHat the Type will automatically get selected as Linux and Version as Red hat



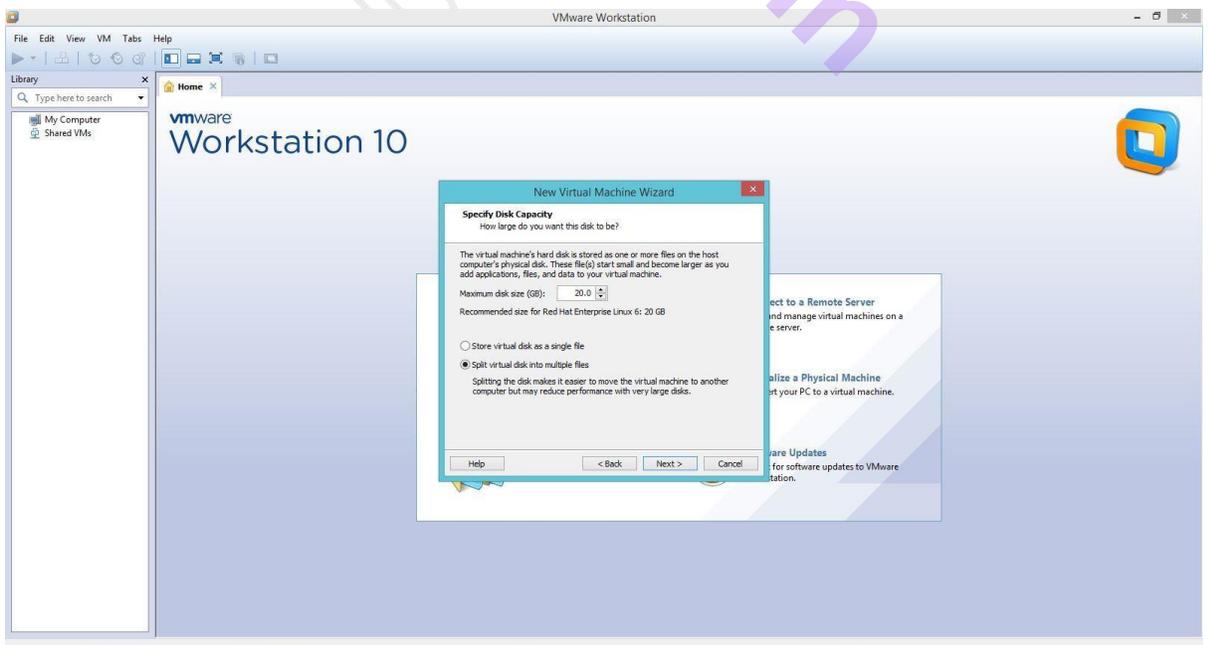
(Virtual Box support no of operating system which you can select from, Type drop down menu)

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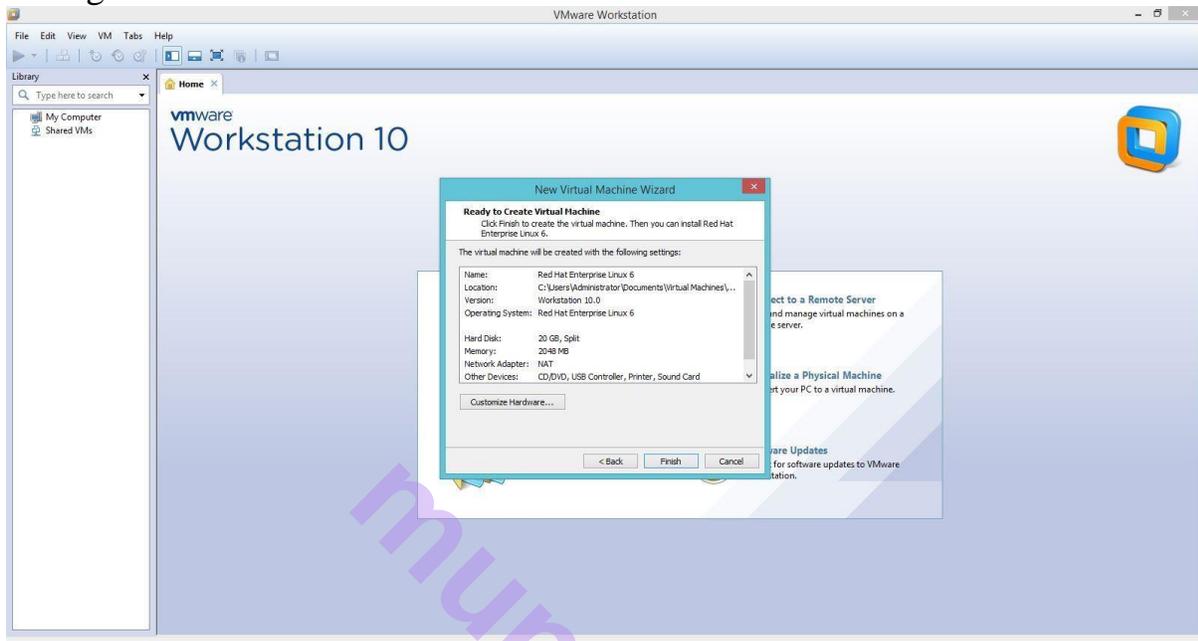
- Now write the virtual machine name as you want or set it by default “Red Hat Enterprise Linux 6”.



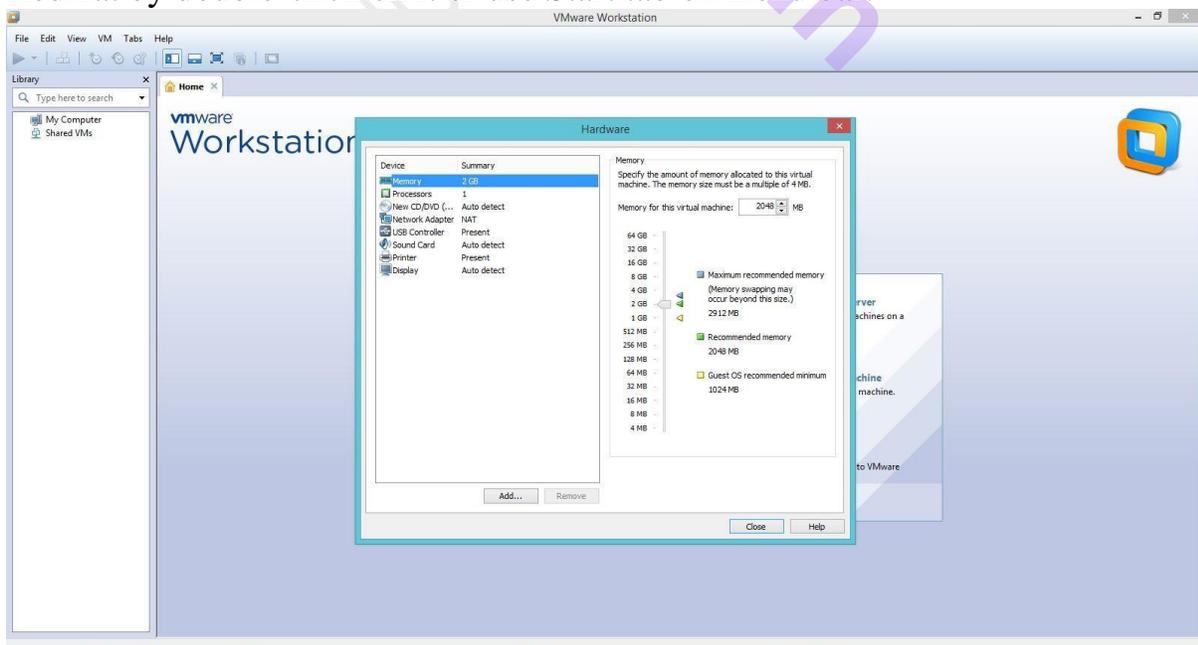
- Now Select the Hard disk space as 20GB and select Store virtual machine as single machine.



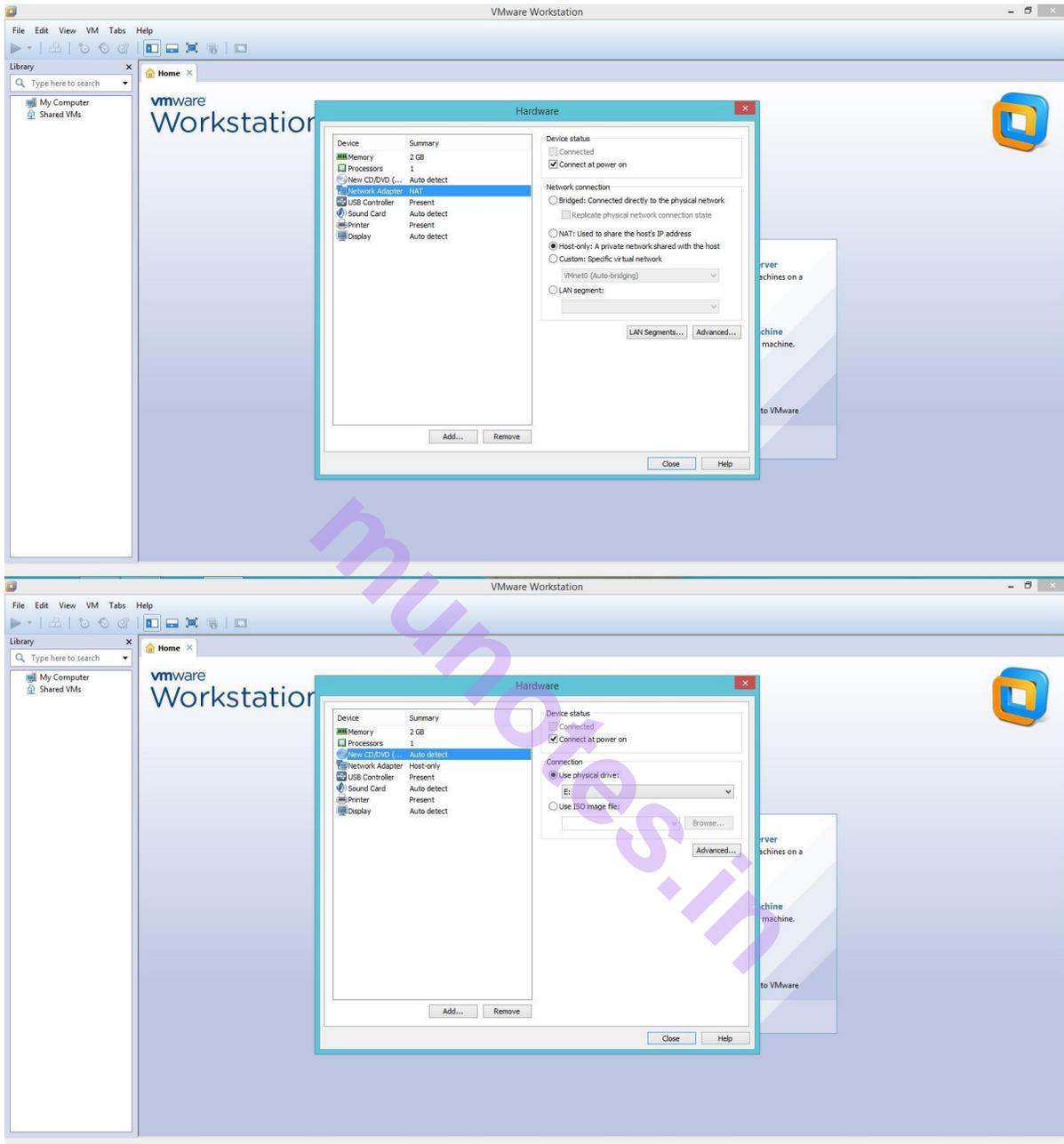
8. Now you get the option that virtual machine is created with the following settings



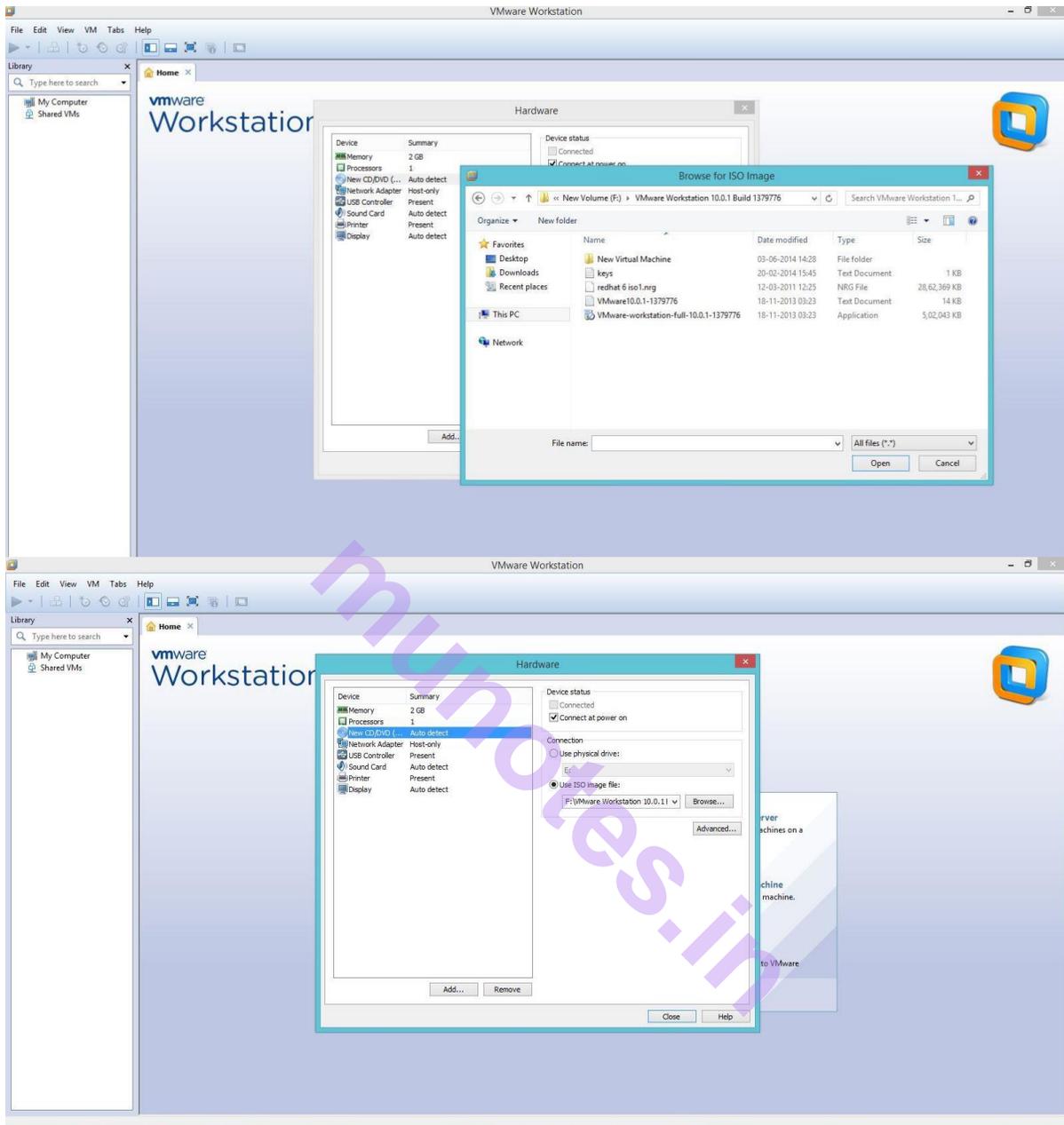
9. Click on “customize Hardware” Select the memory size that is RAM you want to allocate for RedHat virtual machine (1 GB) click Next button.
10. Now select create a virtual hard drive to the new machine click create button.
11. Your RedHat Virtual Box operating system drive is created. Now start the RedHat by double-click on it or use Start tab on menu bar.



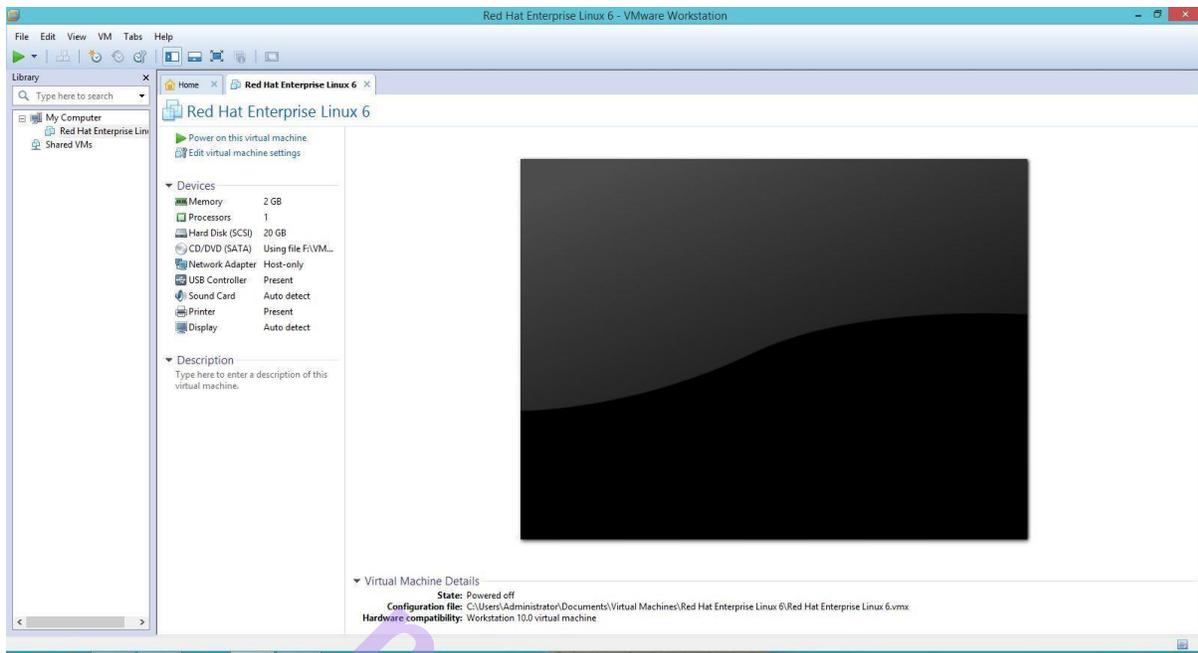
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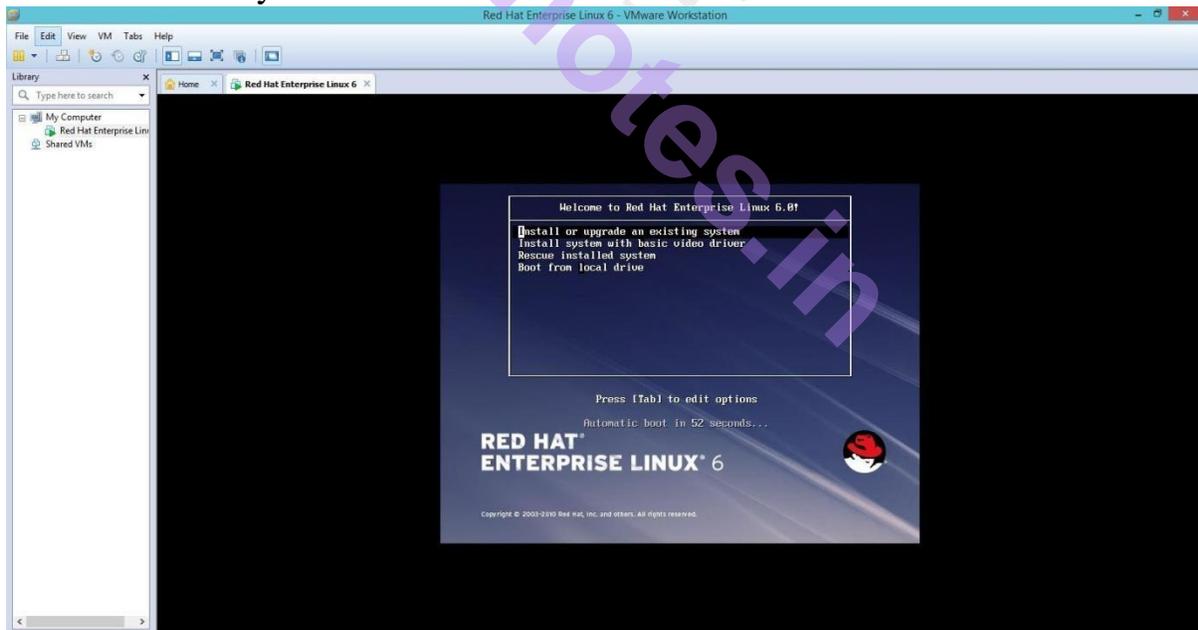
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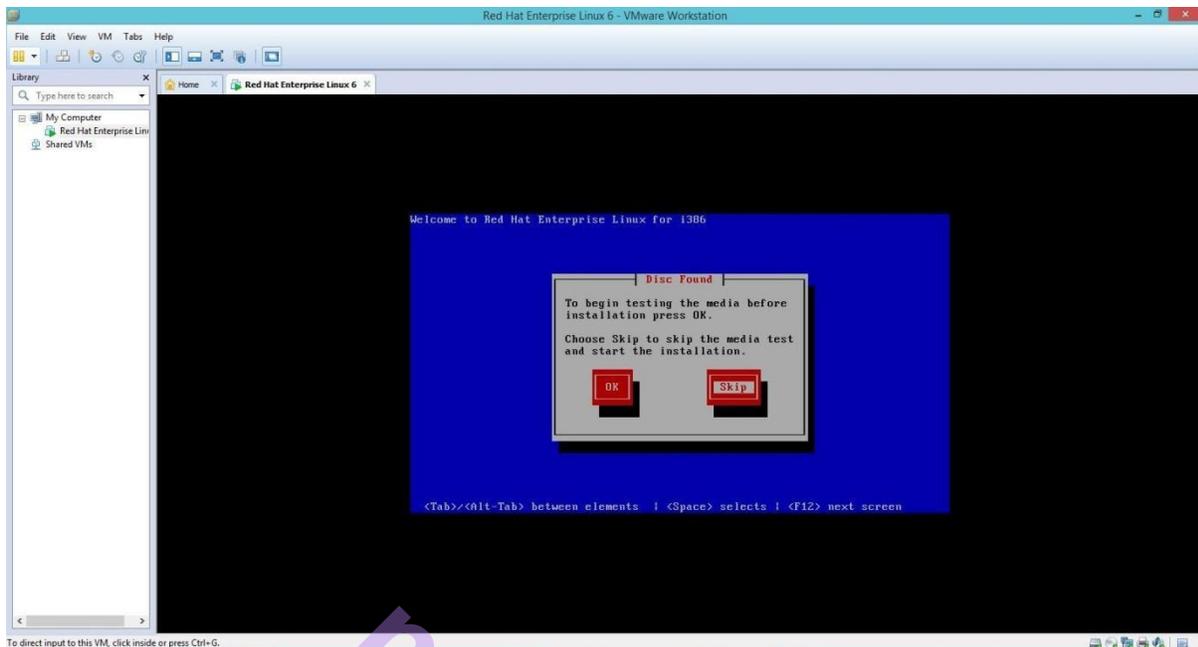
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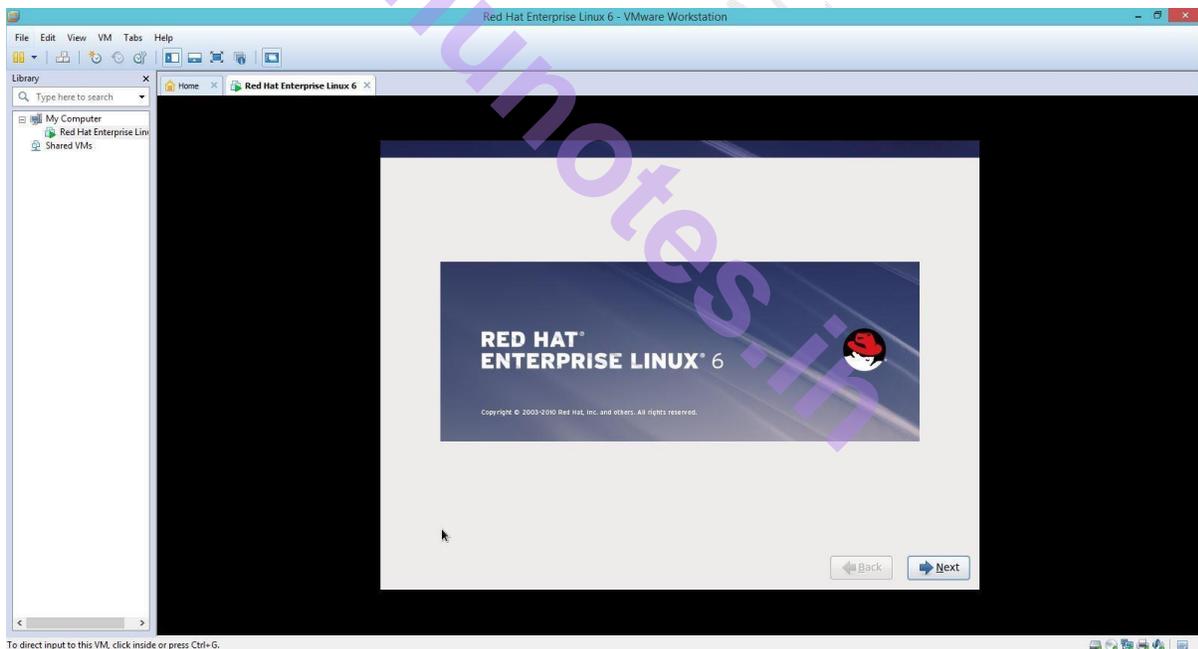
12. Red hat installation starts from here. select “ Install or upgrade an existing system “ option and press enter. It is a by default graphical installation option or it will automatically start in a while.



13. Here it will prompt for testing media before installation select “Skip” here



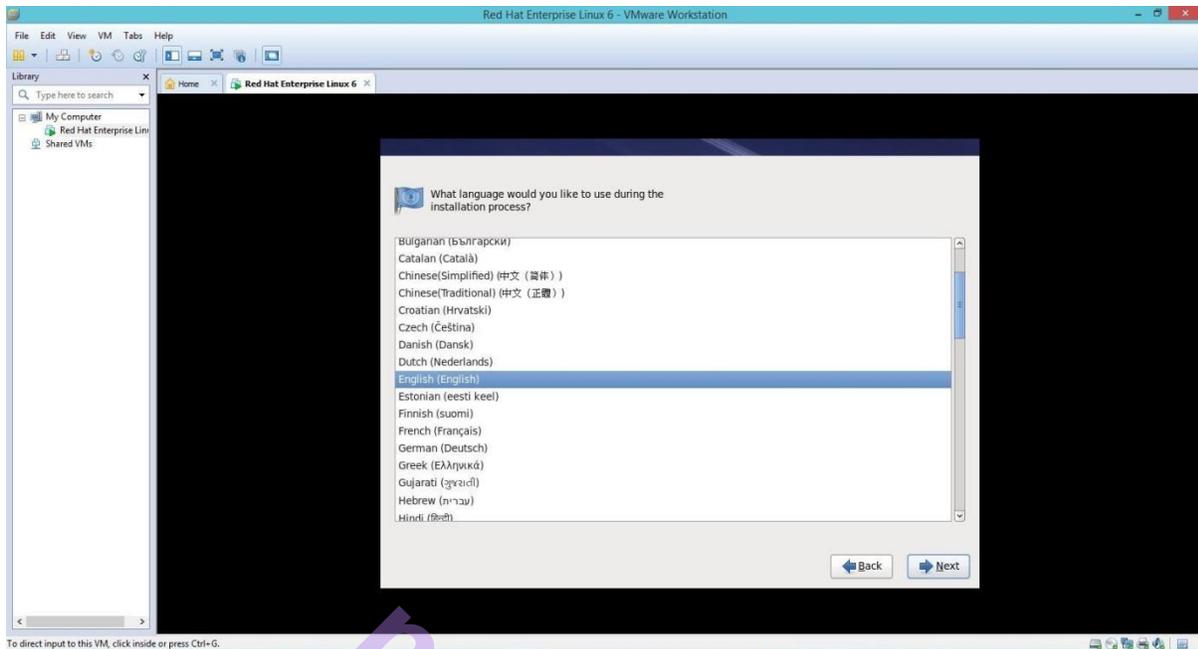
14. Select "Next"



15. Language Selection :-

Using the mouse select a language to use for the installation. The language we select here will become the default language for the operation system once it is installed. Once you select the appropriate language click "Next" button

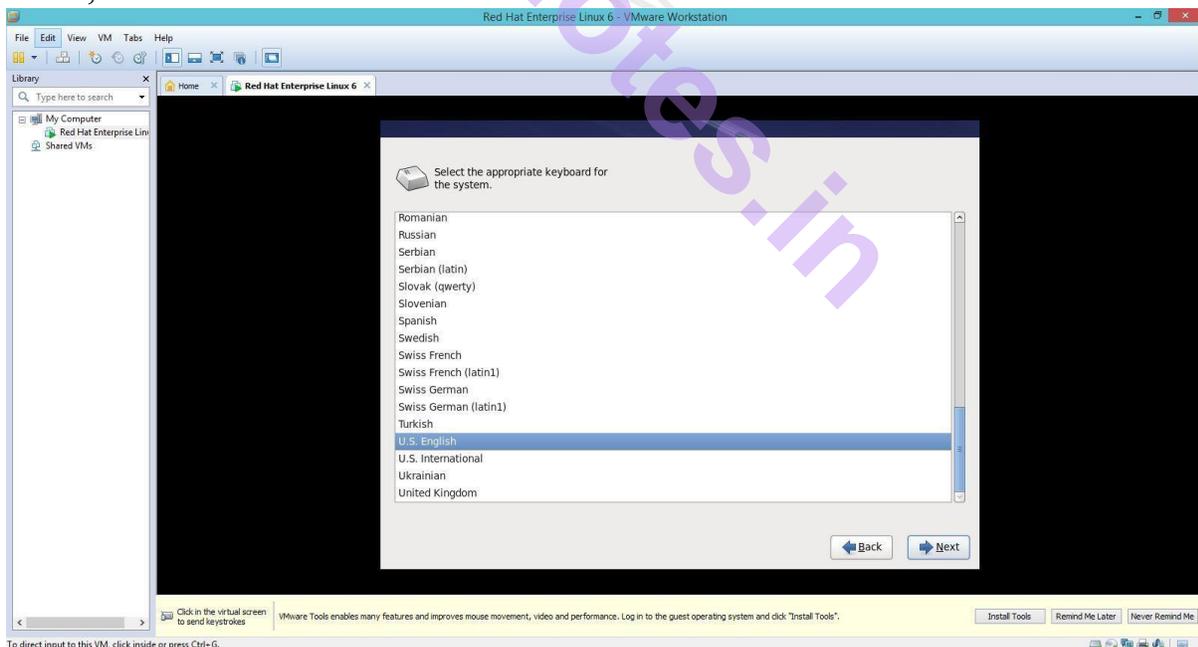
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To direct input to this VM, click inside or press Ctrl+G.

16. Keyboard configuration :-

Select the correct layout type (for example U.S. english) for the keyboard we should prefer for the installation and as the system default once the selection is made, click “Next” to continue.



To direct input to this VM, click inside or press Ctrl+G.

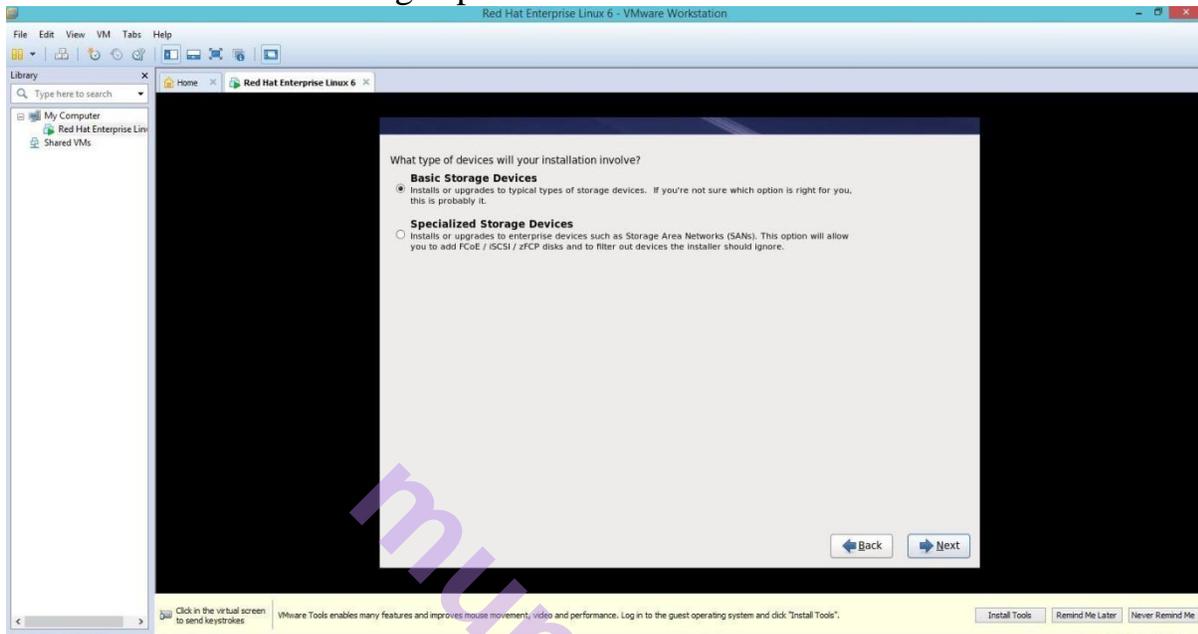
17. Enter the installation number:-

Enter the installation number. This no. will determine the package selection set that is available to the installer. If we choose to skip entering the installation number we will be presented with a basic selection of packages to install later on.

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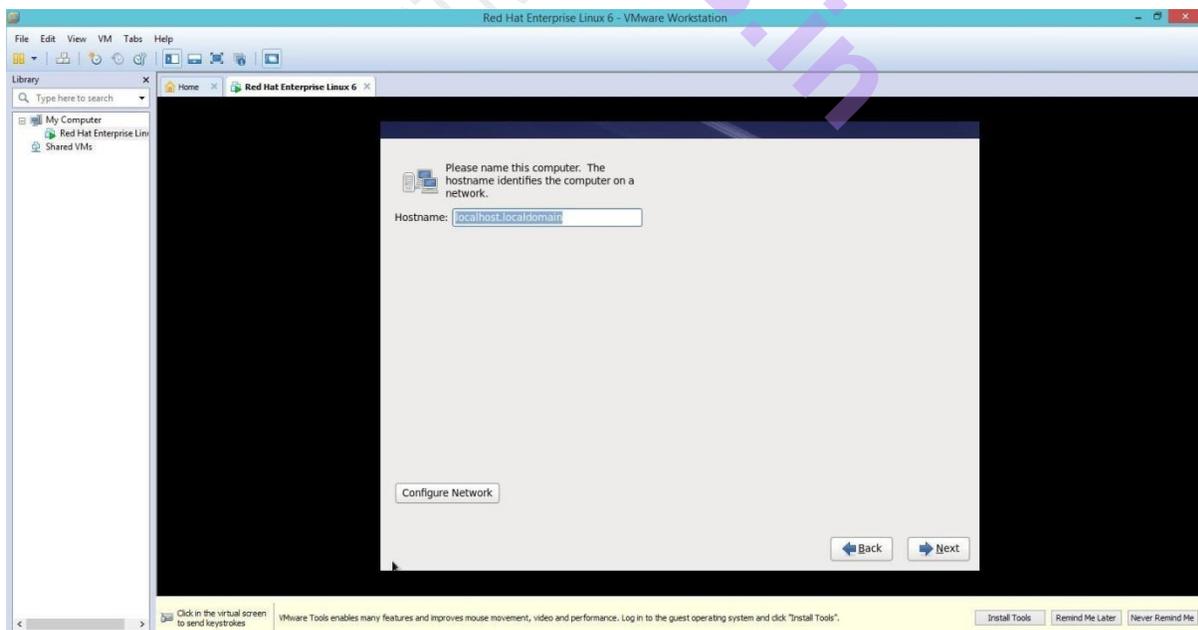
Click on “Skip entering installation number. Then Ok -. Skip-> Yes and then done.

19. Now select basic storage option

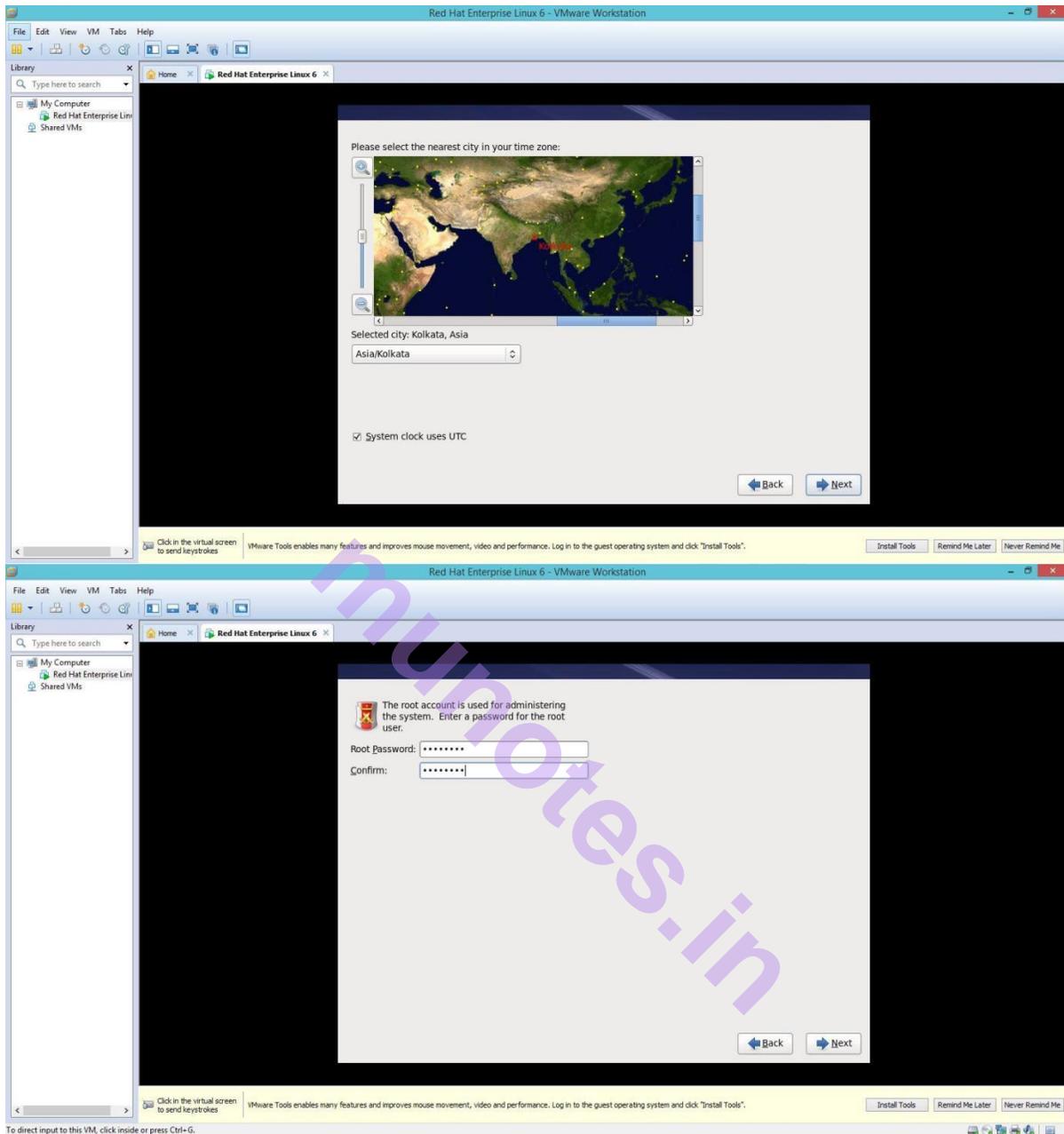


20. Now the system will find the hard disk space and need to re-initialize for creating directories. Select “re-initialize” all option.

21. Now here we assign our Hostname change the hostname as you desire or let it be as localhost.localdomain

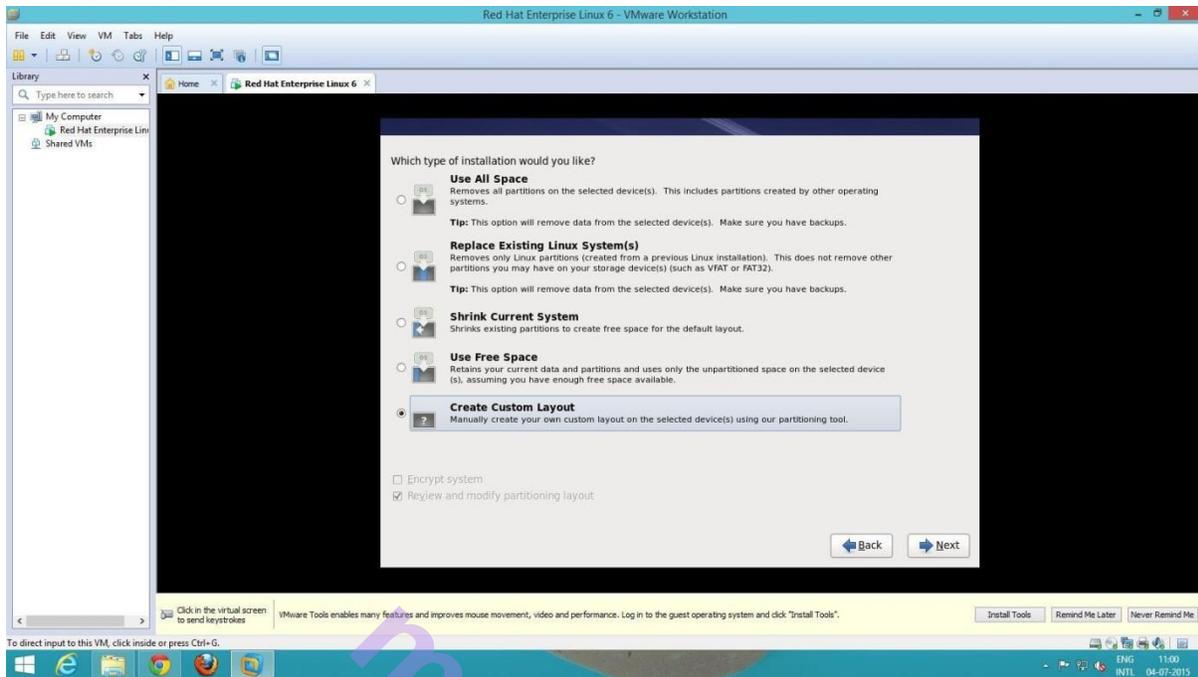


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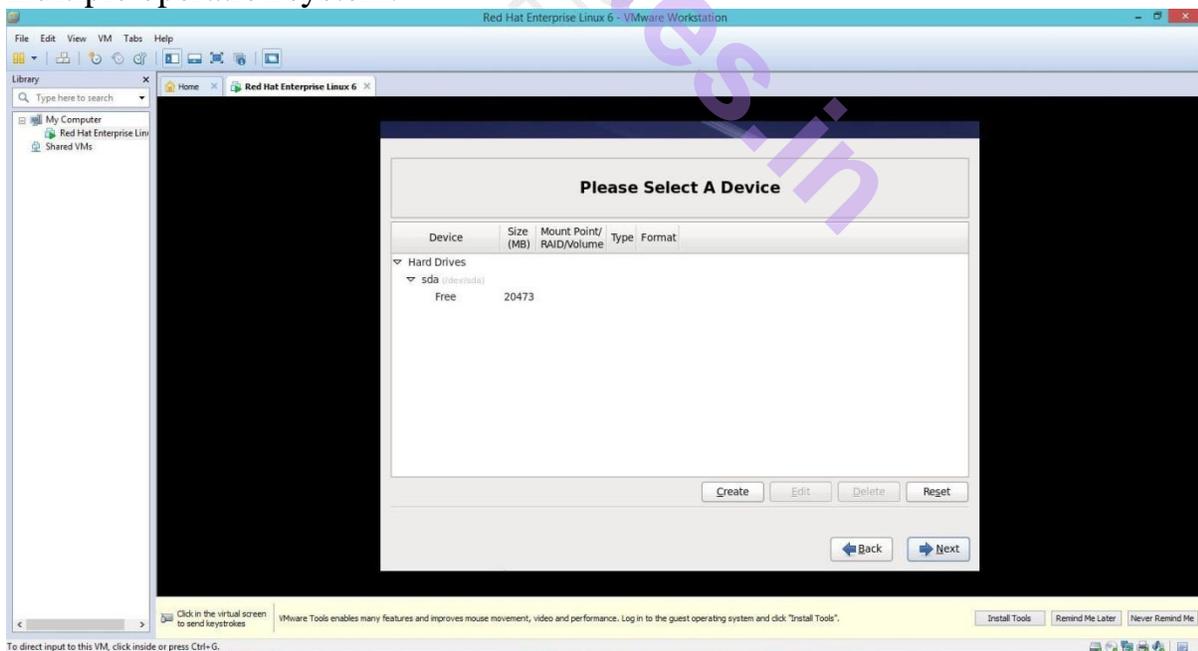
22.. Now select “Create Custom Layout” for manually creating Partitions

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23. Disk Partitioning Setup :-

Partitioning allow to divide the hard drive into installed sections where each section behaves as its own hard drive partitioning is particularly useful if we run multiple operation system.

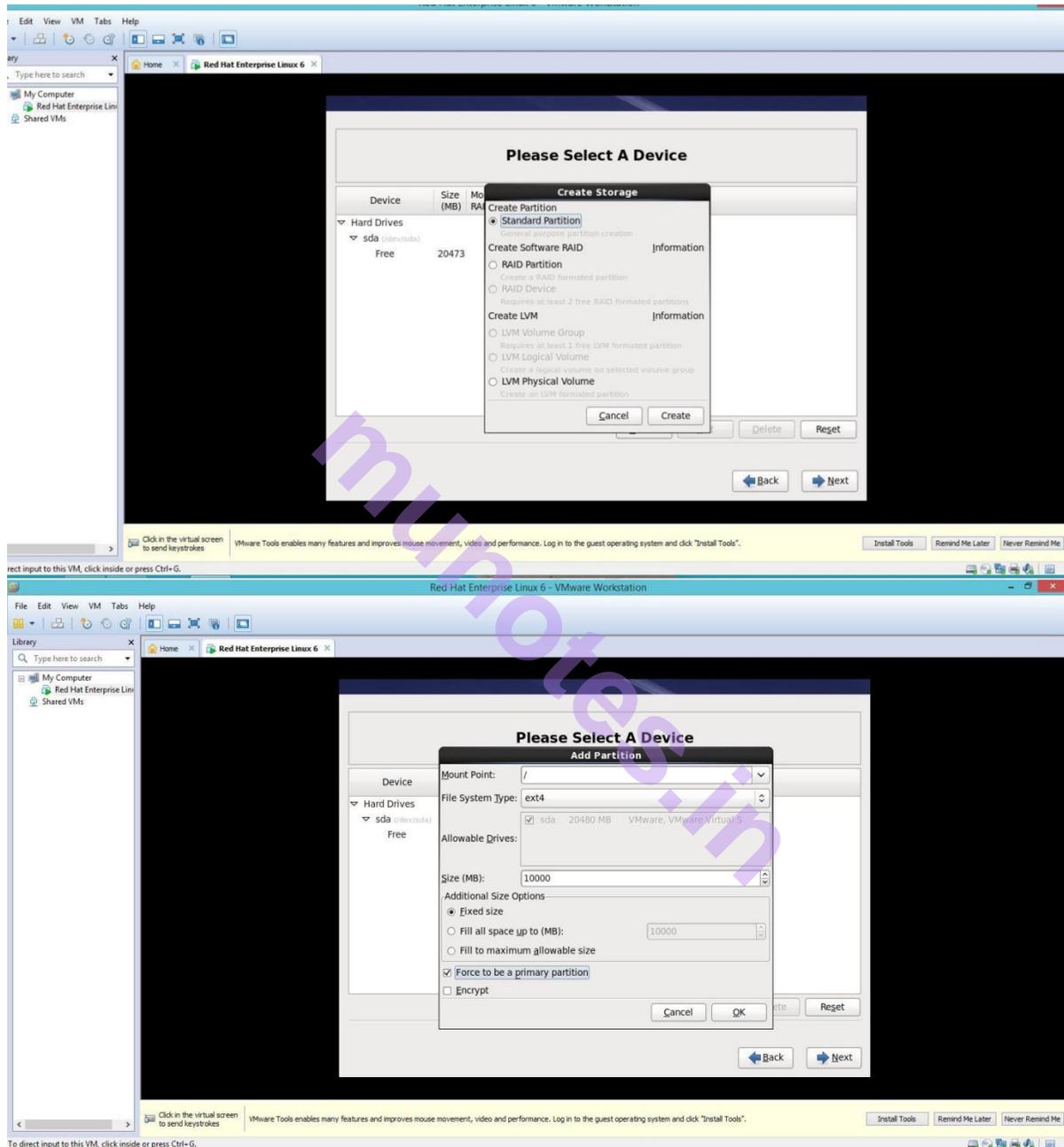


For Root :-

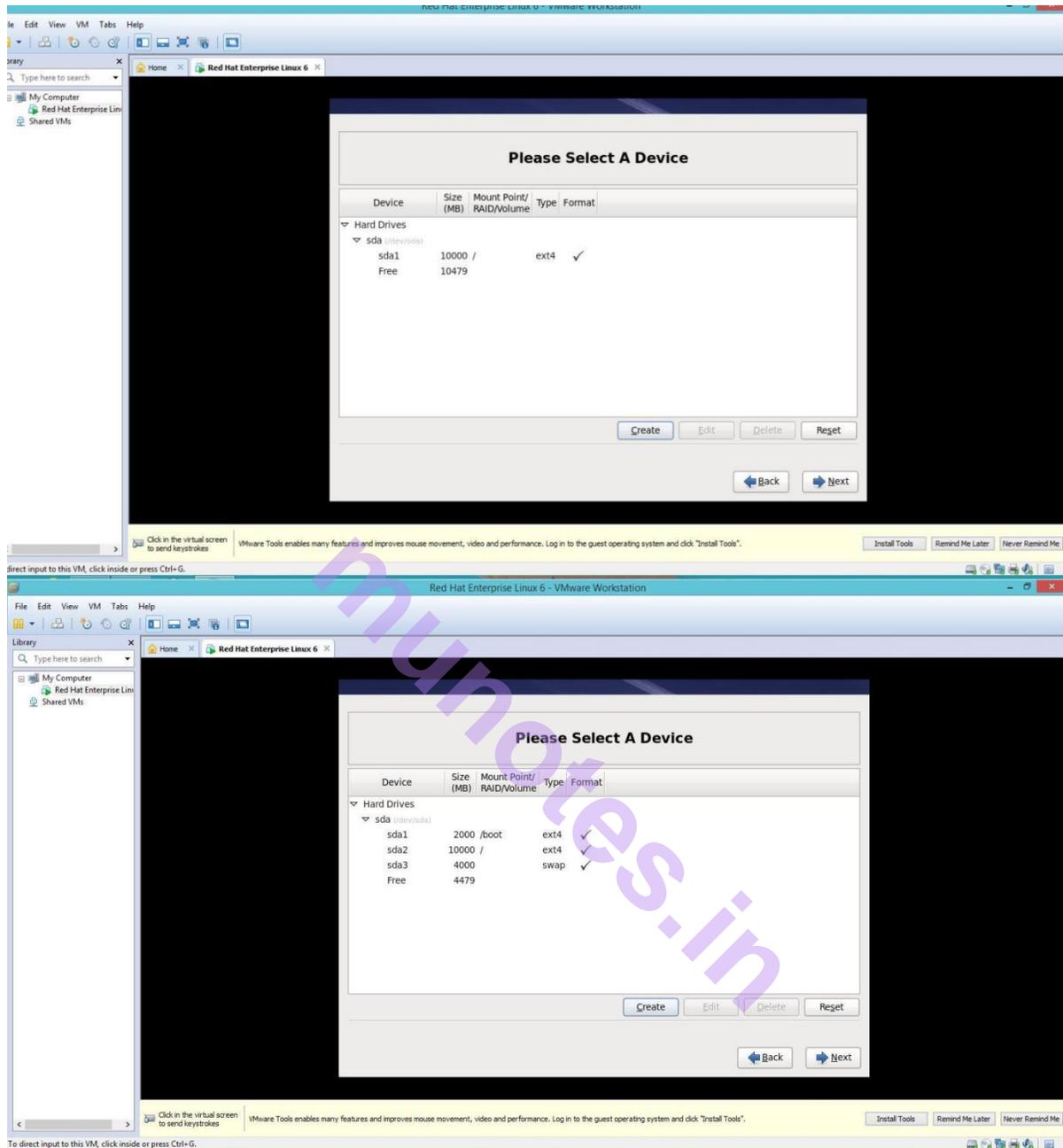
Select the option of create custom layout then create new partitions where mount

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point is /(root) of type ext4 click on “force to be primary partitions” and give size as 10000 MB and click Ok



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For Swap :-

create new partitions where file system type is swap and size 4000 MB, click Ok

Now partitioning is complete. Click on "next".

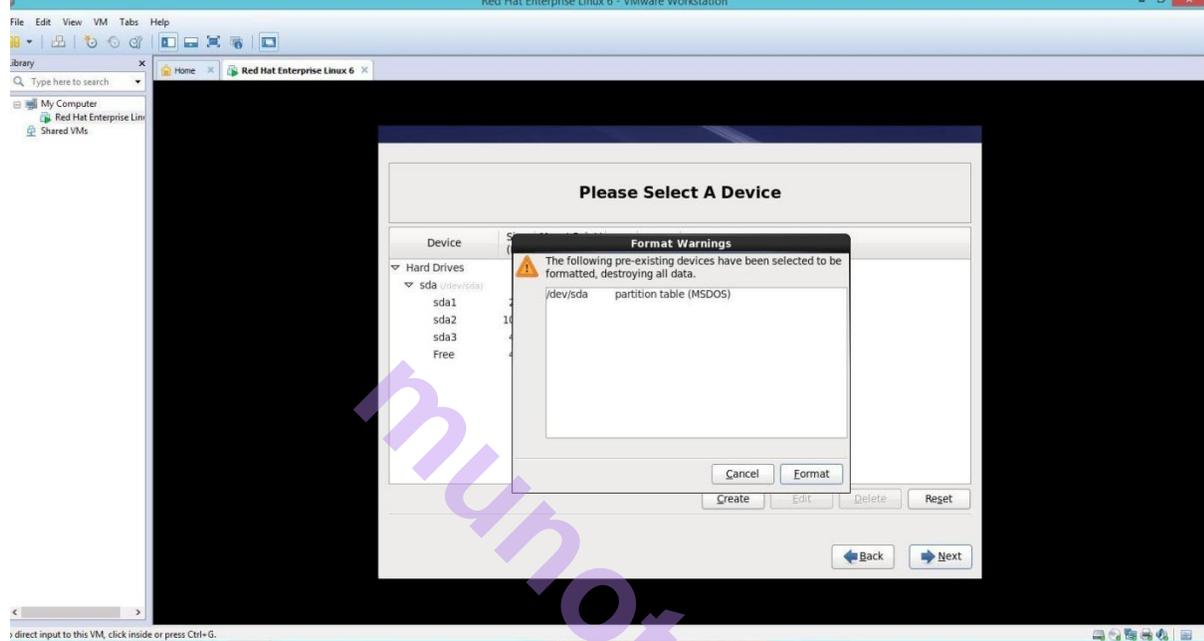
The following is tabular presentation of Disk Partition.

Sr. No	Mount Point	File system type	Size (MB)
--------	-------------	------------------	-----------

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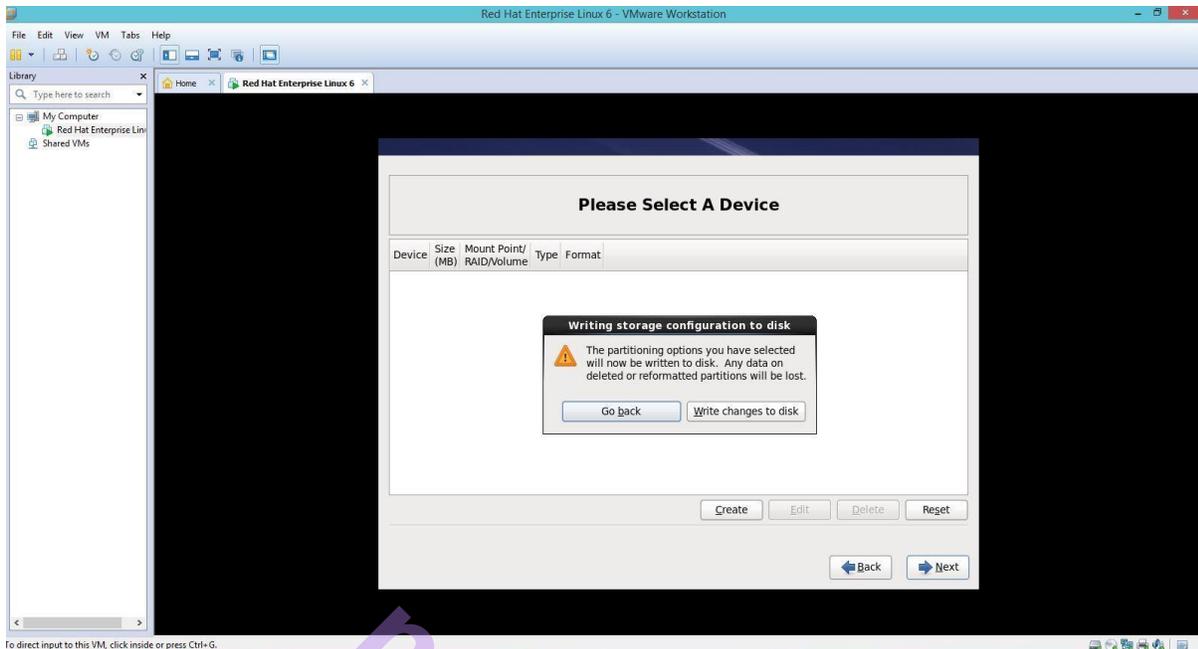
- | | | |
|---|------------------|----------|
| 1 | /(root)Ext3/Ext4 | 10000 MB |
| 2 | - /swap | 4000 MB |
| 3 | /boot Ext3/Ext4 | 2000 MB |

23. Now before creating New Partition Table it will ask you to format Hard Disk.

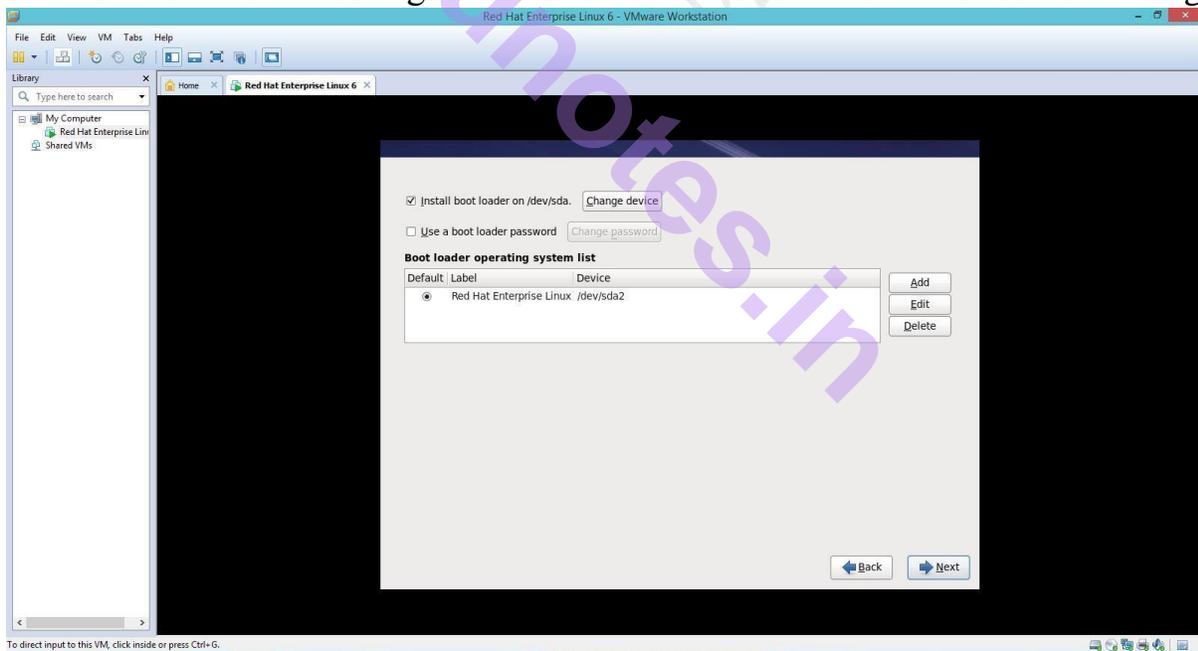


Now it will ask for format and write changes to disk, click on “Write changes to disk”

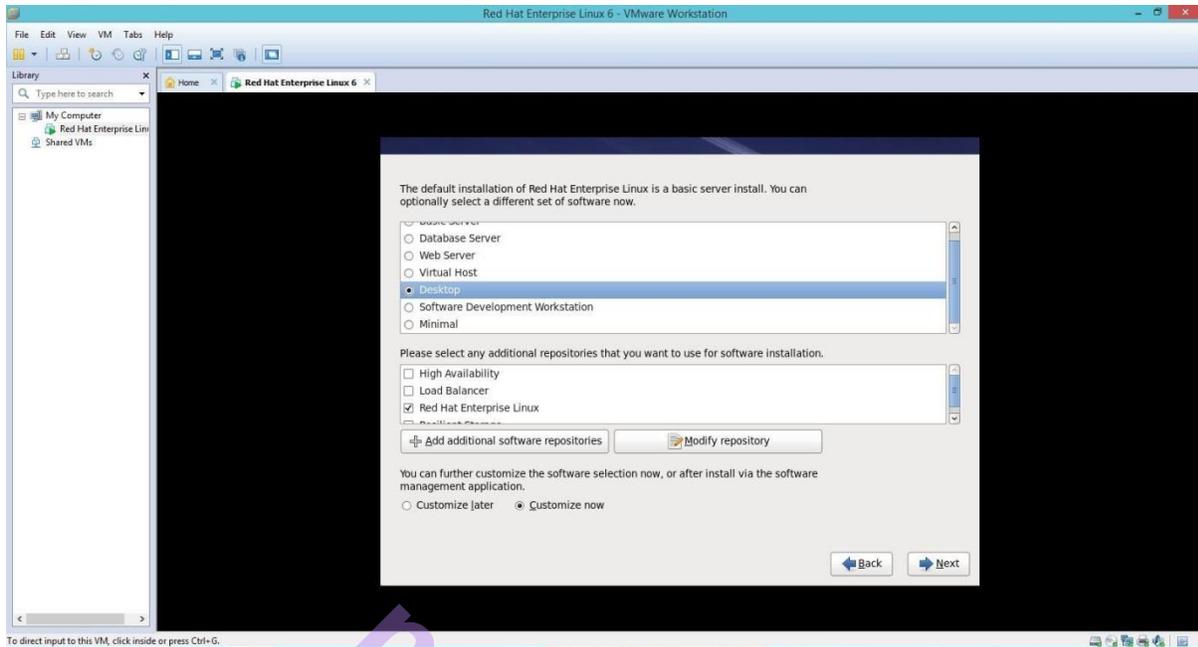
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24. Now here we can configure our boot loader. Click “Next ” for default setting



25. Now it gives you prompt for installation of Software. Select customize now for installation of set of software and click on “Next”



26. Software selection:-

By default, the Red Hat Enterprise Linux installation process loads a selection of software that is suitable for a system deployed as a basic server. Note that this installation does not include a graphical environment. To include a selection of software suitable for other roles, click the radio button that corresponds to one of the following options:

Basic Server

This option provides a basic installation of Red Hat Enterprise Linux for use on a server.

Database Server

This option provides the MySQL and PostgreSQL databases.

Web server

This option provides the Apache web server.

Enterprise Identity Server Base

This option provides OpenLDAP and Enterprise Identity Management (IPA) to create an identity and authentication server.

Virtual Host

This option provides the KVM and Virtual Machine Manager tools to create a host for virtual machines.

Desktop

This option provides the OpenOffice.org productivity suite, graphical tools such as the GIMP, and multimedia applications.

Software Development Workstation

This option provides the necessary tools to compile software on your Red Hat Enterprise Linux system.

This option provides only the packages essential to run Red Hat Enterprise Linux. A minimal installation provides the basis for a single-purpose server or desktop appliance and maximizes performance and security on such an installation. Click on Customize now and select following software.

1> Base server -Desktop :-

Desktop

KDE

X-windows

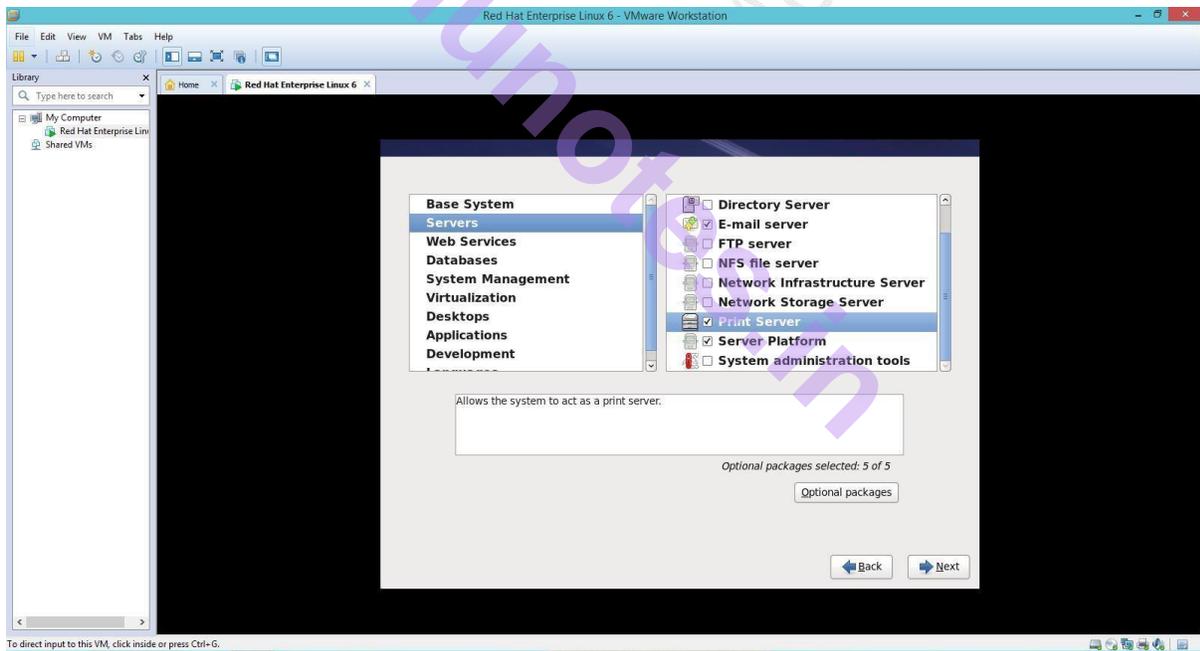
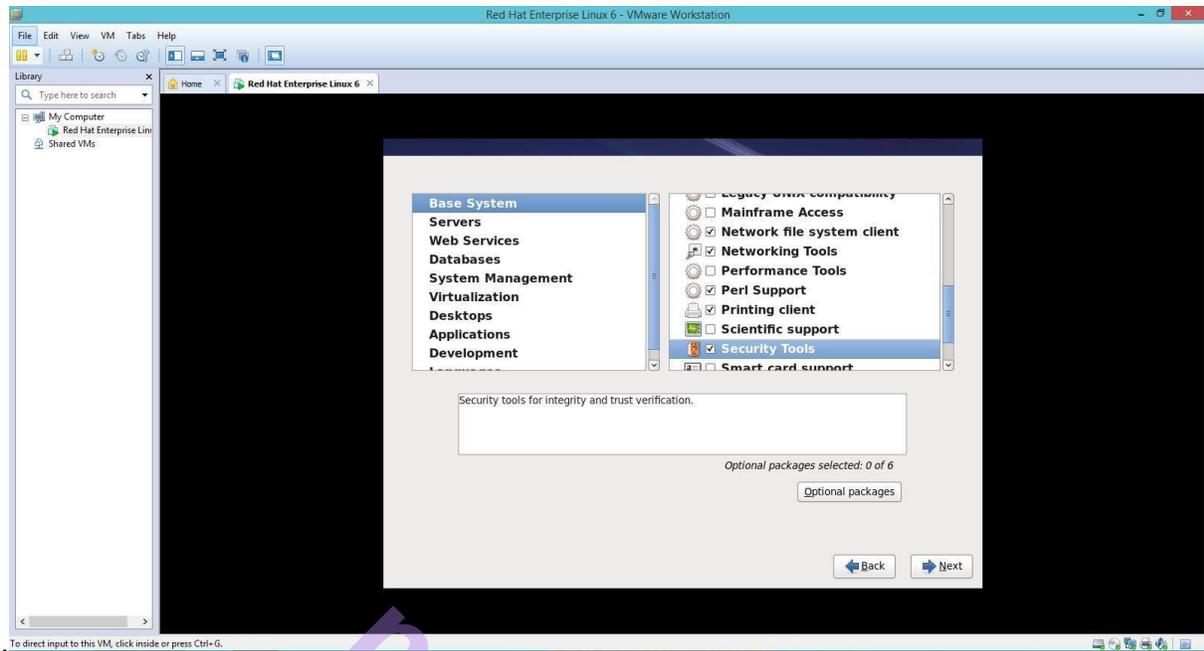
2> Server

3> Web server

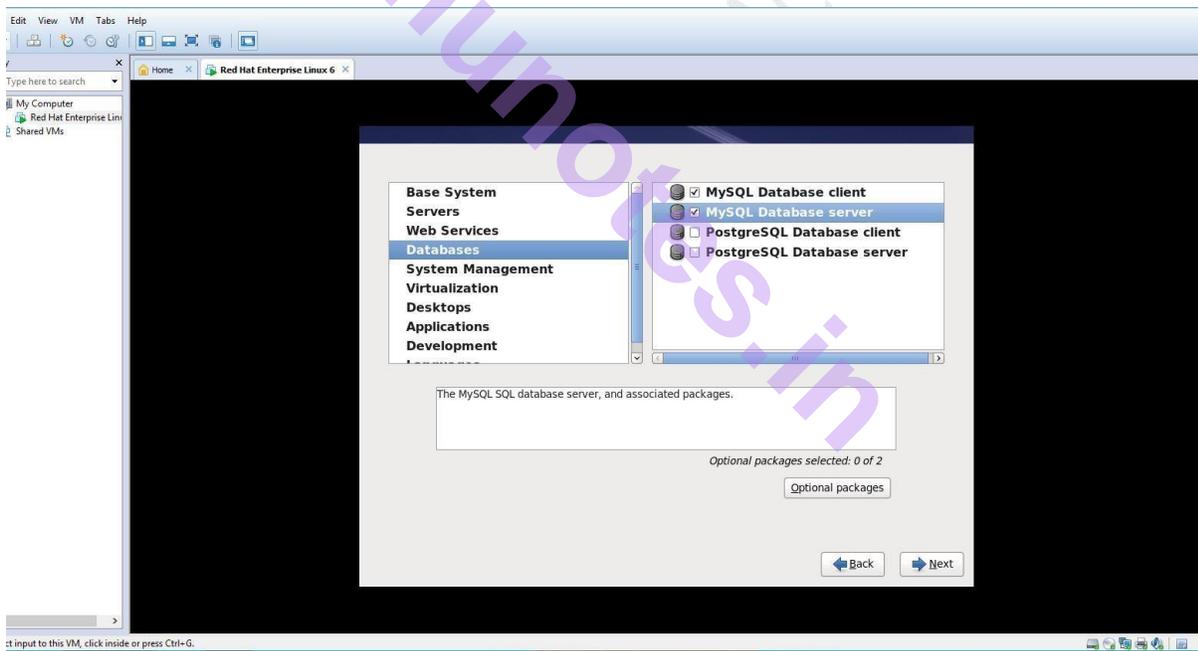
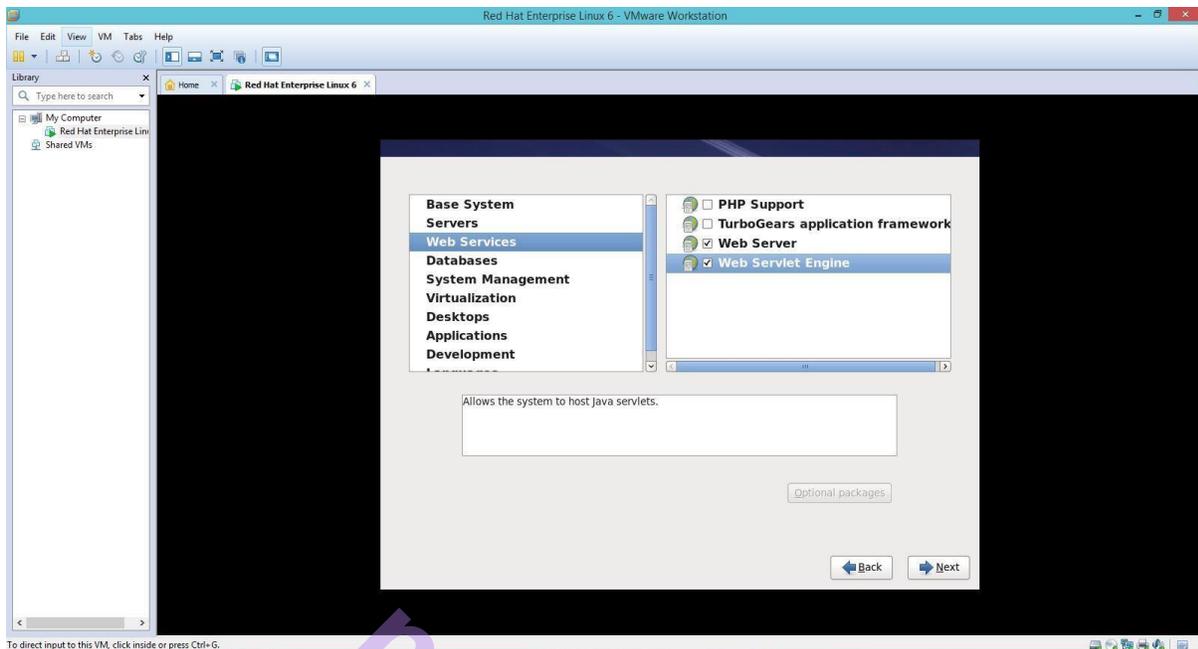
4> Database

5> System management

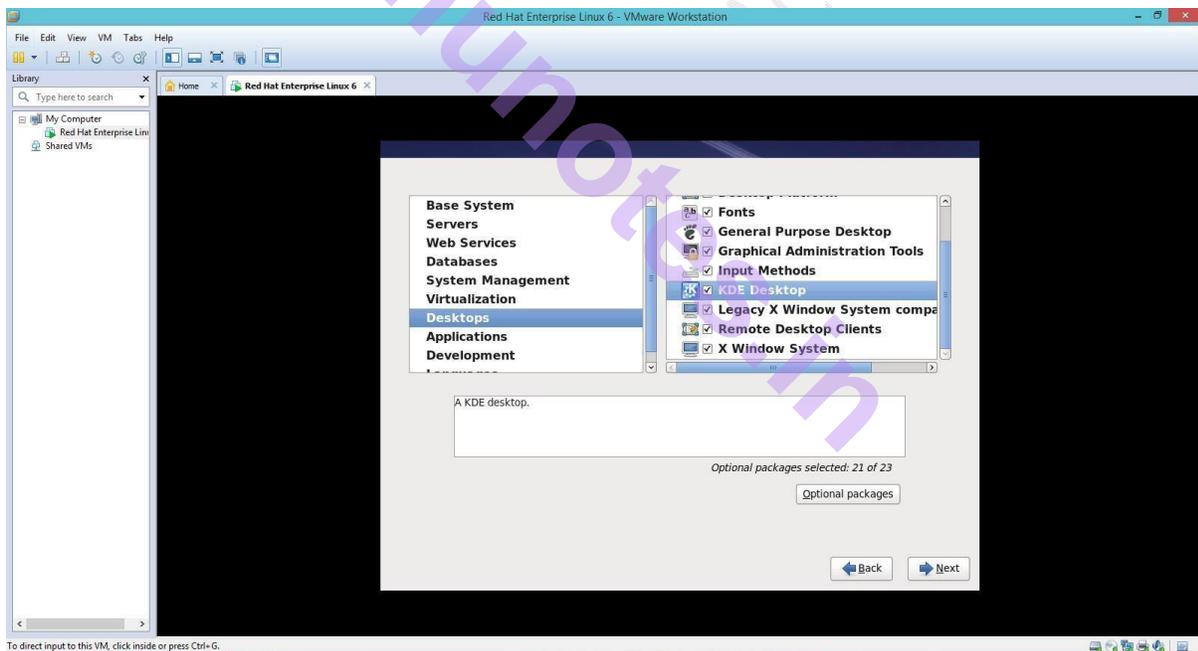
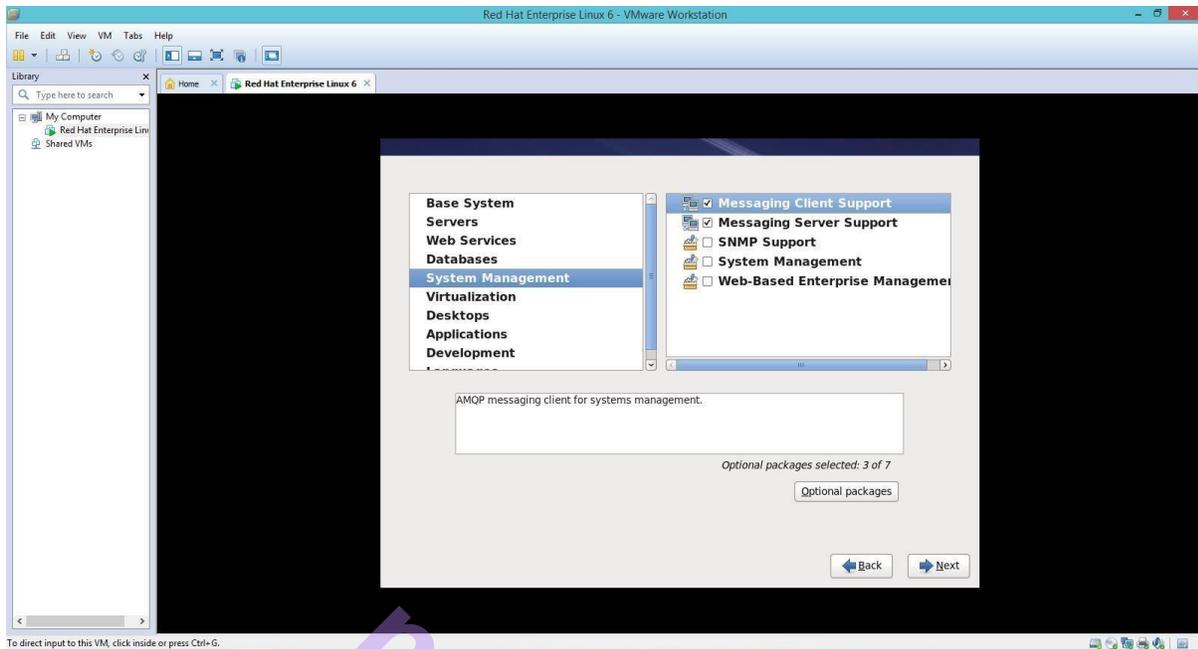
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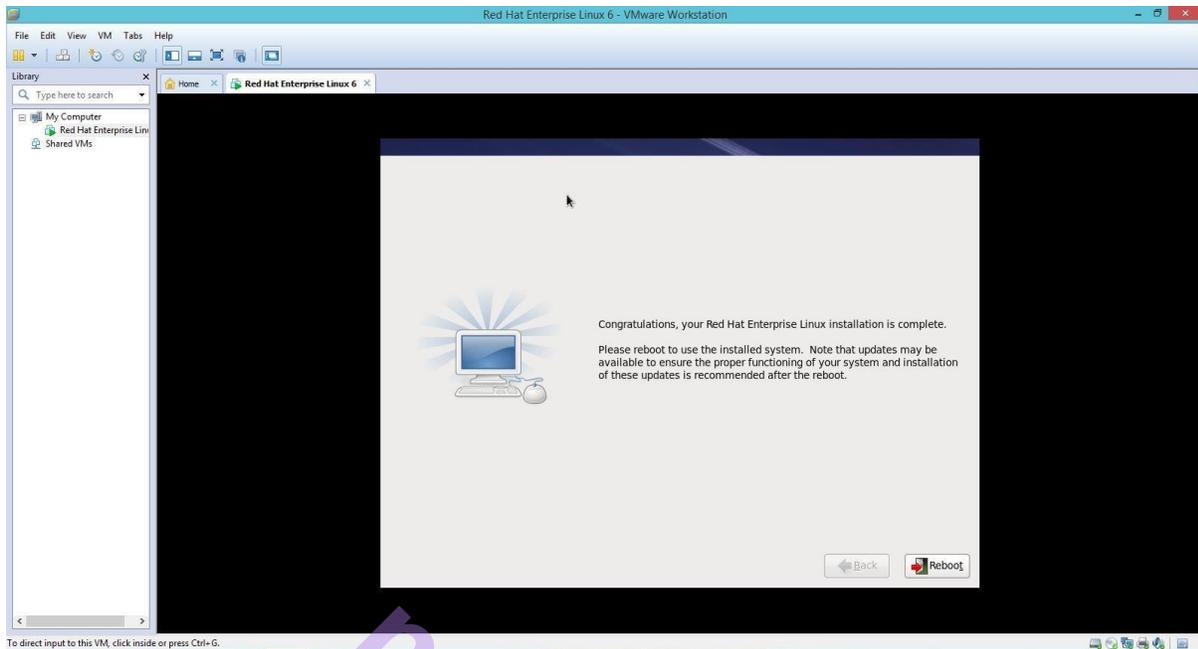


27. Now the next windows showing that it is “Transferring the install image to hard drive” it copy all files to hard drive so installation process get faster

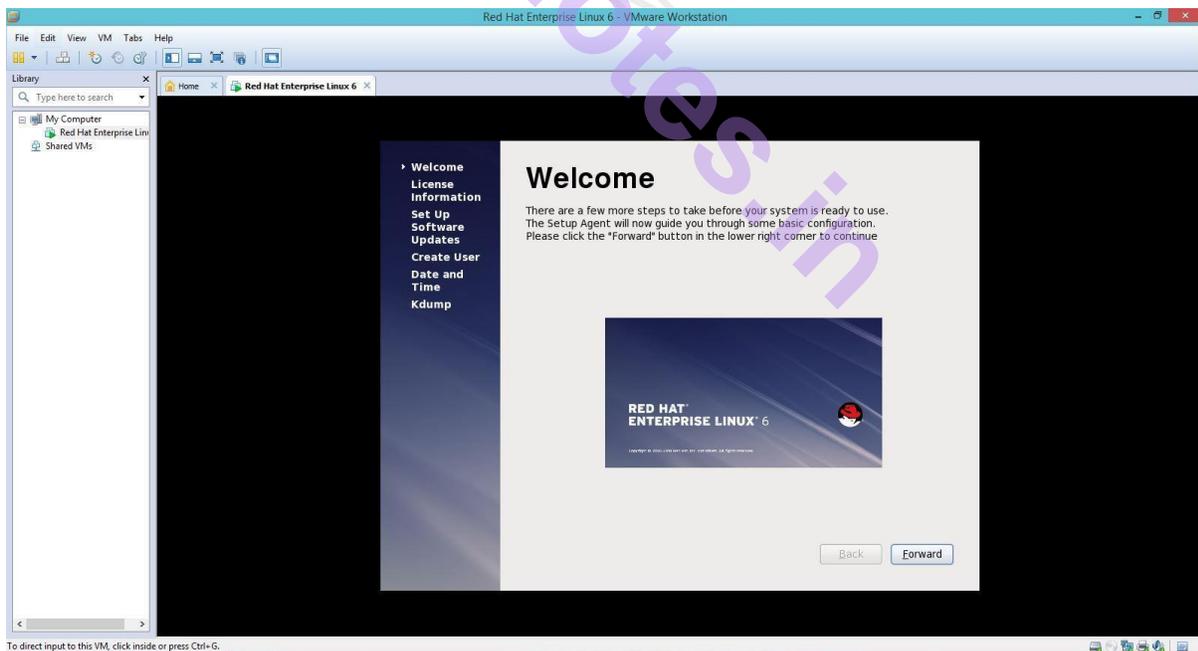
28. Now the installation start from the hard disk files.

29. Installation of Red hat is completed and ask for the reboot. Click on “Reboot”.

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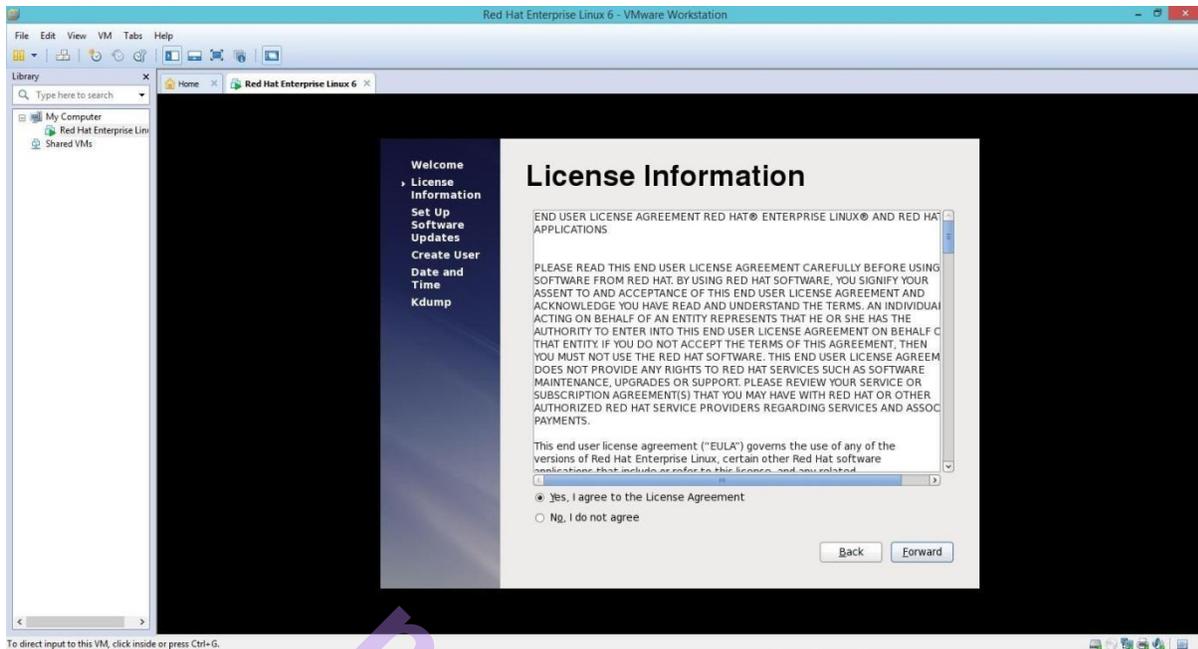


30. once the Red hat start it show the window saying few more steps are there for basic configuration. Click on “Forward”.



31. Here select “I agree to the license agreement” to proceed and click “Forward”.

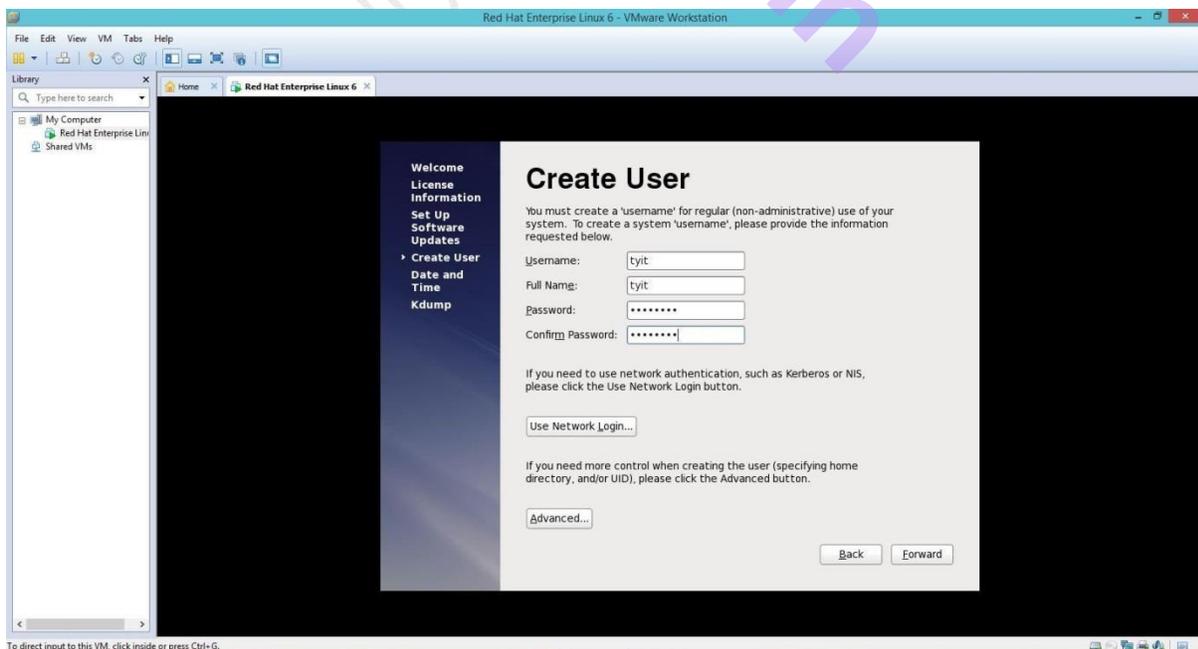
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32. Now it asks for software update as we don't have the RHN No. Click "Forward" .

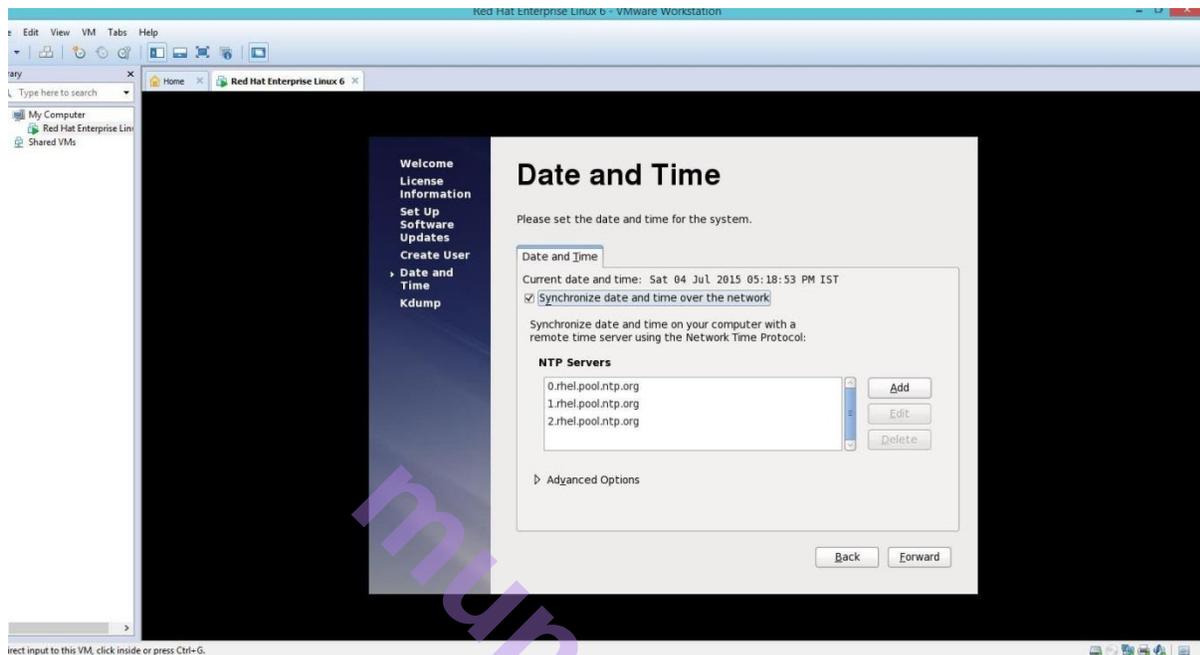
33. Click on "Forward" to finish update setup

35. Now we have to create Normal User for our system. Provide Username and password and click on "forward". The Root user is different from the user we created now. Root user has administrator rights and the user we created is normal user without administrative rights.



35. Date and Time Zone Configuration

Now select the System date for the window,



Set your time zone by selecting the city closest to your computer's physical location. Click on the map to zoom in to a particular geographical region of the world.

From here there are two ways for you to select your time zone:

Using your mouse, click on the interactive map to select a specific city (represented by a yellow dot).

A red X appears indicating your selection.

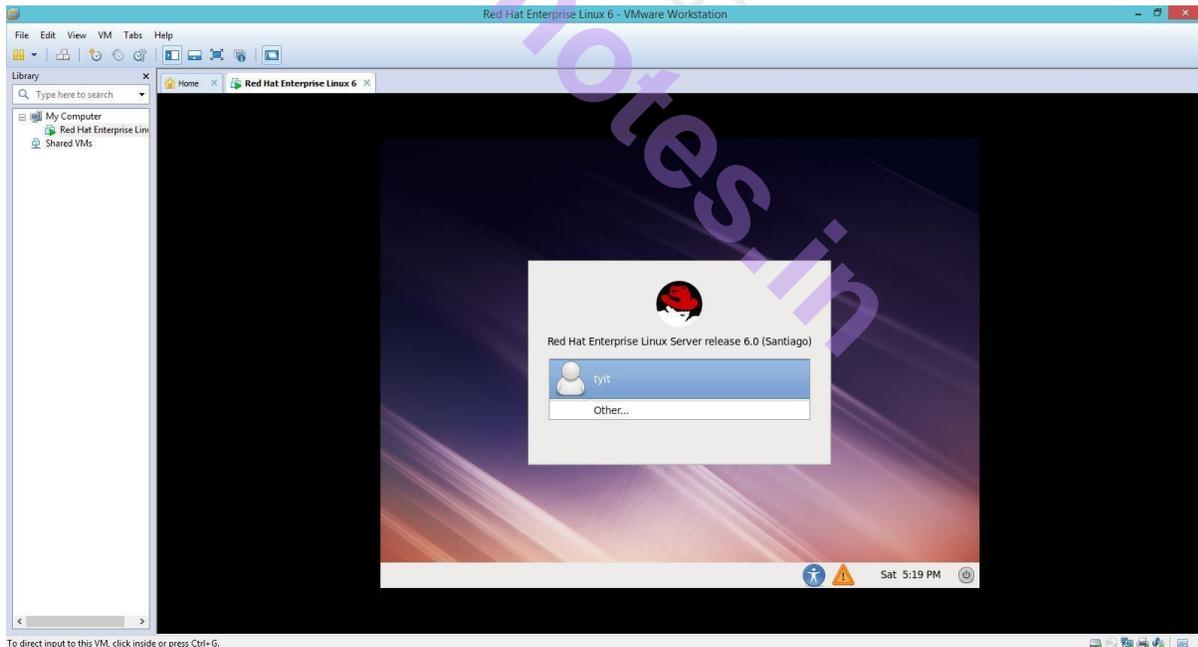
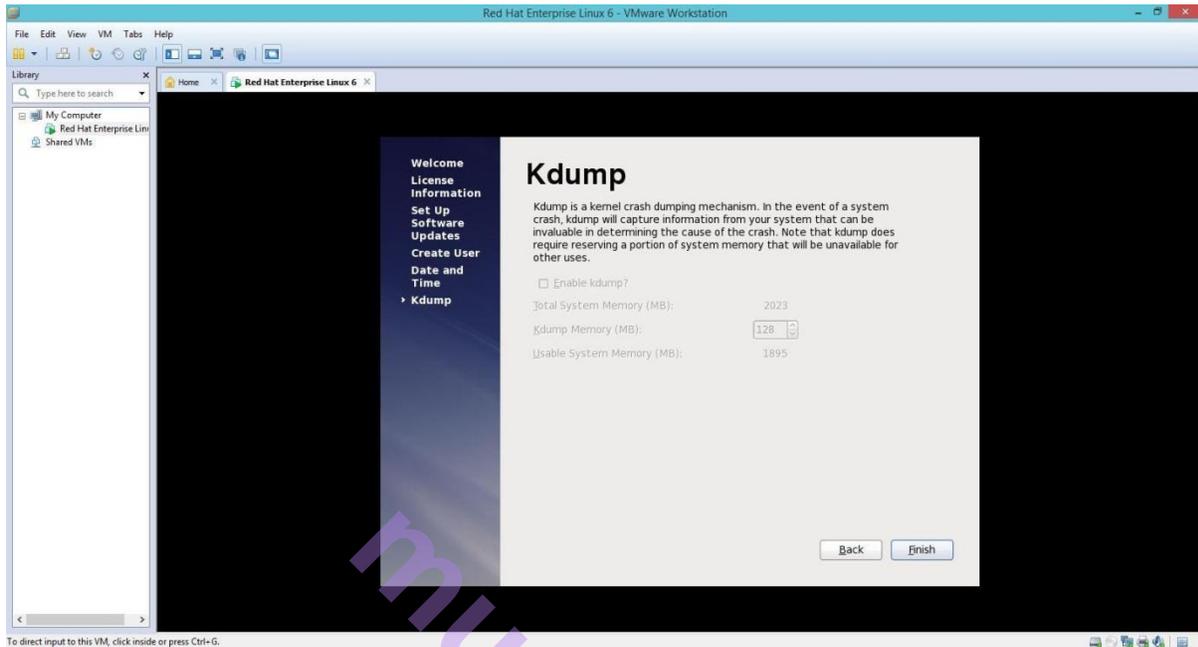
You can also scroll through the list at the bottom of the screen to select your time zone. Using your mouse, click on a location to highlight your selection.

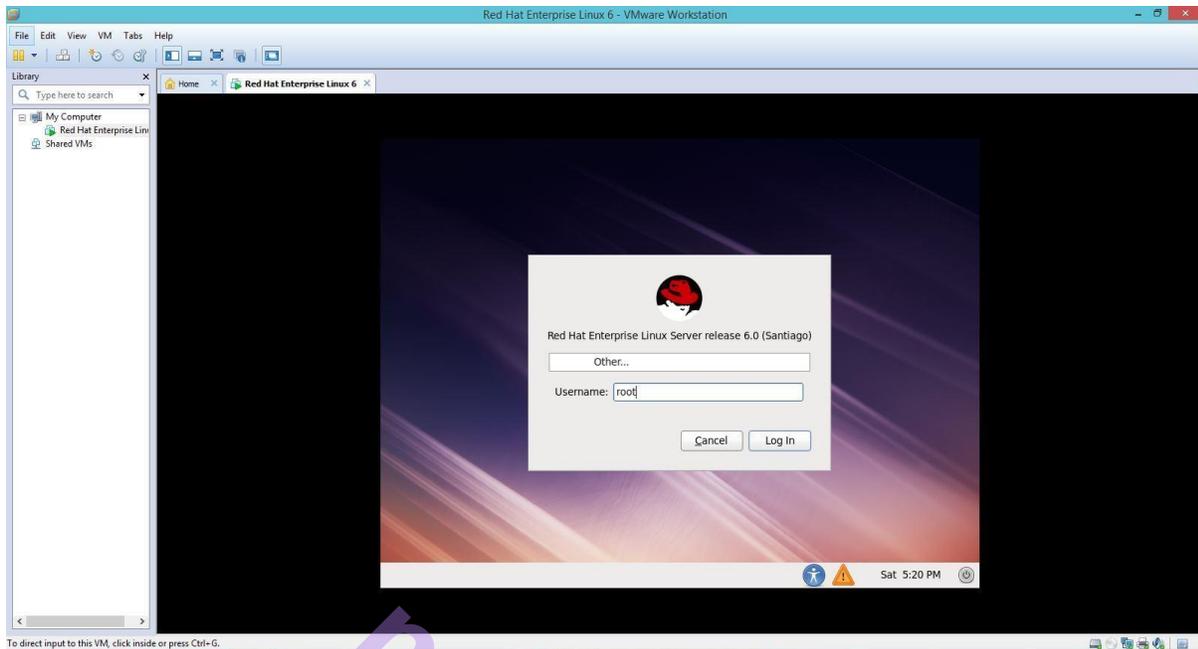
If Red Hat Enterprise Linux is the only operating system on your computer, select System clock uses UTC. The system clock is a piece of hardware on your computer system. Red Hat Enterprise Linux uses the time zone setting to determine the offset between the local time and UTC on the system clock. This behaviour is standard for systems that use UNIX, Linux, and similar operating systems.

Click Forward to proceed

36. Now it will give you Error "Insufficient memory to configure kdump". Click on Ok.

37.. Kdump is used for backup and recovery purpose





39. Now your RedHat Virtual Machine is ready for use. Select the Redhat Virtual Option from VM-Ware Workstation.

Shutting Down

To shut down Red Hat Enterprise Linux, the root user may issue the `/sbin/shutdown` command. The shutdown man page has a complete list of options, but the two most common uses are:

```
/sbin/shutdown -h now
```

and

```
/sbin/shutdown -r now
```

After shutting everything down, the `-h` option halts the machine, and the `-r` option reboots.

PAM console users can use the `reboot` and `halt` commands to shut down the system while in runlevels 1 through 5. For more information about PAM console users, refer to the Red Hat Enterprise Linux Deployment Guide.

If the computer does not power itself down, be careful not to turn off the computer until a message appears indicating that the system is halted.

Failure to wait for this message can mean that not all the hard drive partitions are unmounted, which can lead to file system corruption.

Practical no 2: Software Selection and Installation

RPM (Red Hat Package Manager) is a default open source and most popular package management utility for Red Hat based systems like (RHEL, CentOS and Fedora).

The tool allows system administrators and users to install, update, uninstall, query, verify and manage system software packages in Unix/Linux operating systems.

The RPM formerly known as .rpm file, that includes compiled software programs and libraries needed by the packages.

This utility only works with packages that built on .rpm format.

Some Facts about RPM Package:

1. RPM is free and released under GPL (General Public License).
2. RPM keeps the information of all the installed packages under /var/lib/rpm database.
3. RPM is the only way to install packages under Linux systems, if you've installed packages using source code, then rpm won't manage it.
4. RPM deals with .rpm files, which contains the actual information about the packages such as: what it is, from where it comes, dependencies info, version info etc.

(The *name* of the packaged software, The *version* of the packaged software, The package's *release* number).

There are 5 basic modes of RPM:

1. Install : It is used to install any RPM package.
2. Remove : It is used to erase, remove or un-install any RPM package.
3. Upgrade : It is used to update the existing RPM package.
4. Verify : It is used to query about different RPM packages.
5. Query : It is used for the verification of any RPM package.

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To install any package go to the Packages Folder:

```
# cd /media/RHEL_6.0\i386\Disc\1/Packages
```

Once you are in the Packages folder - Now you can run your rpm commands.

(1) Package Installation:

- The basic syntax for installation with rpm (redhat package manager) is:

```
[root@tyit ~]#rpm -ivh package [name and version]
```

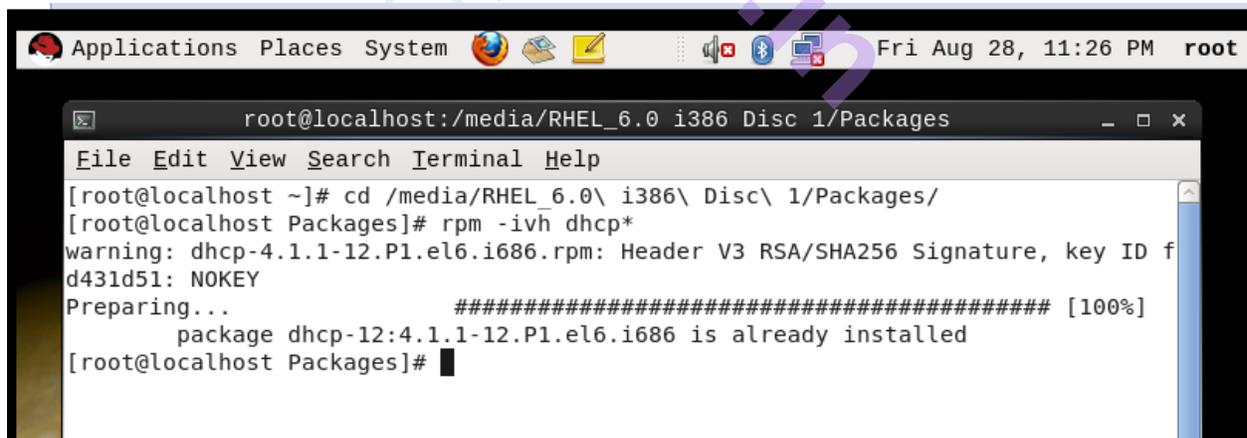
- Following are rpm installation options:**

-i : To install the package

-v : verbose it is to enable verbose and shows useful messages during installation.

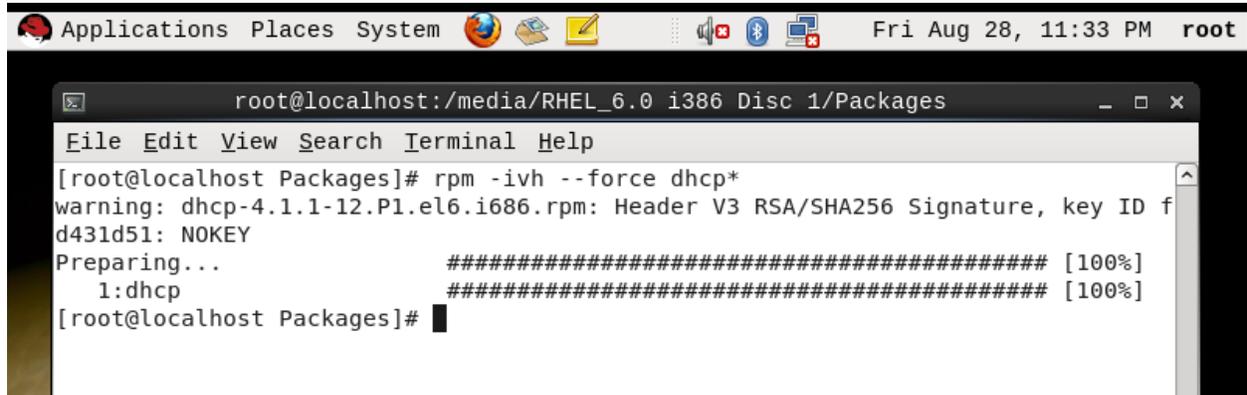
-h : It prints during installation up to 50 hash (#) to illustrate the progress.

Example : rpm -ivh dhcp*



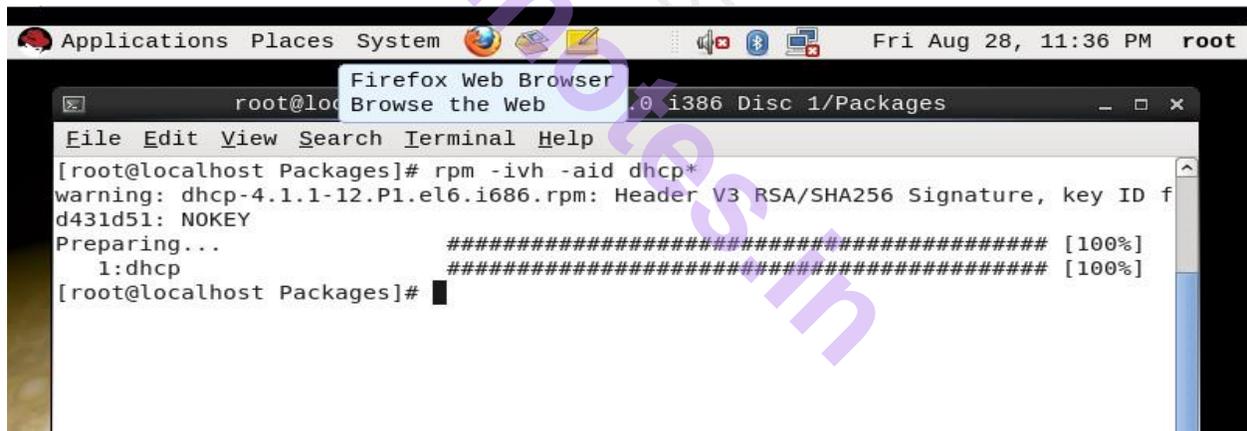
```
root@localhost:~# cd /media/RHEL_6.0\ i386\ Disc\ 1/Packages/
[root@localhost Packages]# rpm -ivh dhcp*
warning: dhcp-4.1.1-12.P1.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing... ##### [100%]
package dhcp-12:4.1.1-12.P1.el6.i686 is already installed
[root@localhost Packages]#
```

--force : installs package forcefully or replaces if already exists.



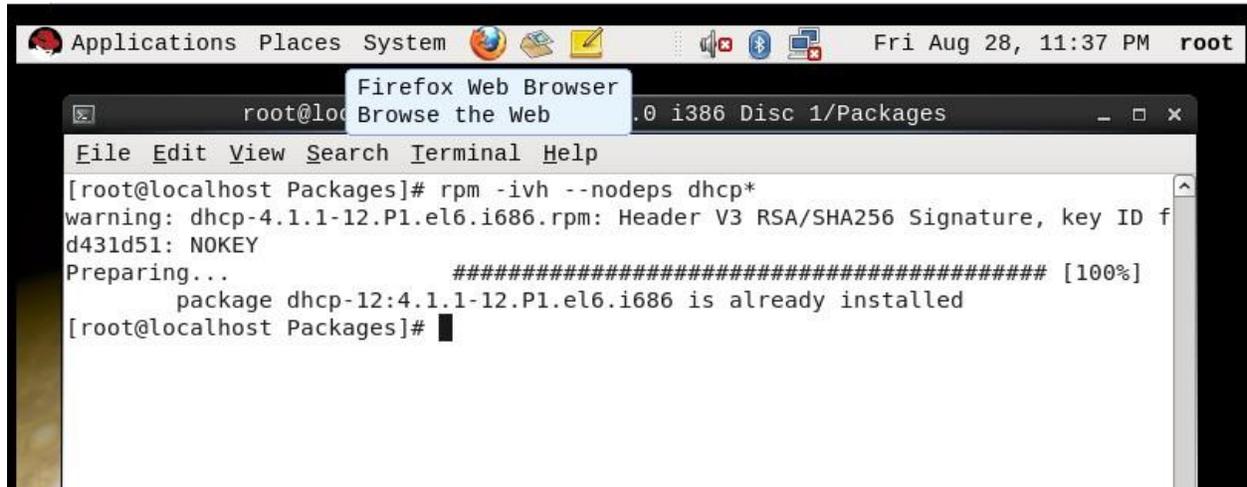
```
Applications Places System Fri Aug 28, 11:33 PM root
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -ivh --force dhcp*
warning: dhcp-4.1.1-12.P1.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID f
d431d51: NOKEY
Preparing... ##### [100%]
 1:dhcp ##### [100%]
[root@localhost Packages]#
```

--aid : To install package along with dependencies



```
Applications Places System Fri Aug 28, 11:36 PM root
Firefox Web Browser
Browse the Web
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -ivh -aid dhcp*
warning: dhcp-4.1.1-12.P1.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID f
d431d51: NOKEY
Preparing... ##### [100%]
 1:dhcp ##### [100%]
[root@localhost Packages]#
```

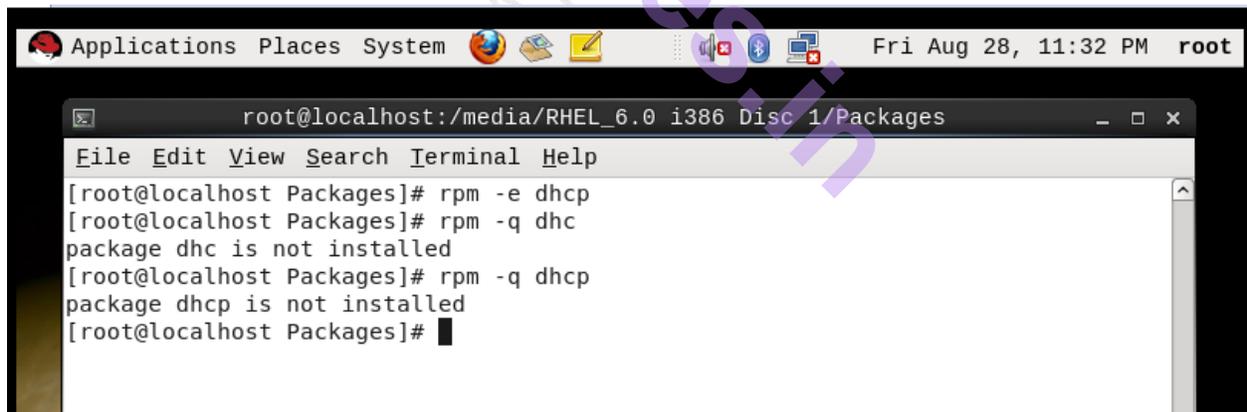
--nodeps : it performs no dependency check.



```
Applications Places System Fri Aug 28, 11:37 PM root
Firefox Web Browser
root@localhost Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -ivh --nodeps dhcp*
warning: dhcp-4.1.1-12.P1.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID f
d431d51: NOKEY
Preparing... ##### [100%]
package dhcp-12:4.1.1-12.P1.el6.i686 is already installed
[root@localhost Packages]#
```

2) Remove Installation Packages:

1. `-e` : To uninstall the package from the system



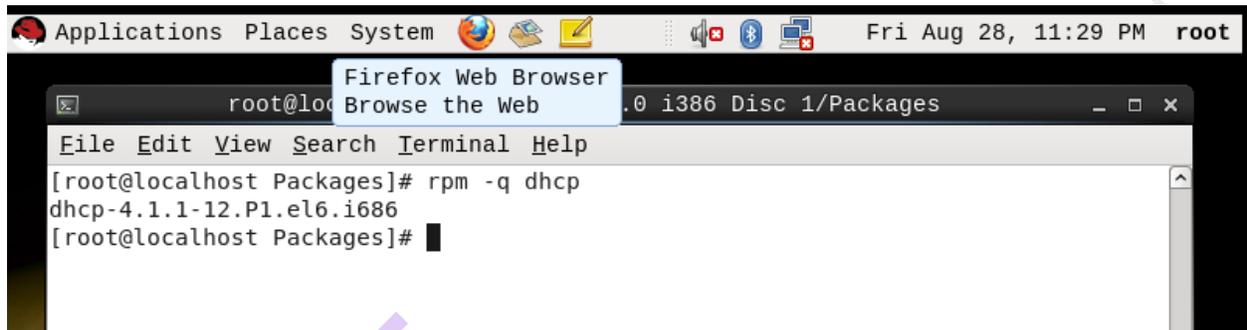
```
Applications Places System Fri Aug 28, 11:32 PM root
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -e dhcp
[root@localhost Packages]# rpm -q dhc
package dhc is not installed
[root@localhost Packages]# rpm -q dhcp
package dhcp is not installed
[root@localhost Packages]#
```

3. Upgrade the Package:

-u : to upgrade the existing package.

4. Query the Installed Package:

-q: to query any installed packages



```
Applications Places System Fri Aug 28, 11:29 PM root
Firefox Web Browser
root@localhost: /media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -q dhcp
dhcp-4.1.1-12.P1.el6.i686
[root@localhost Packages]#
```

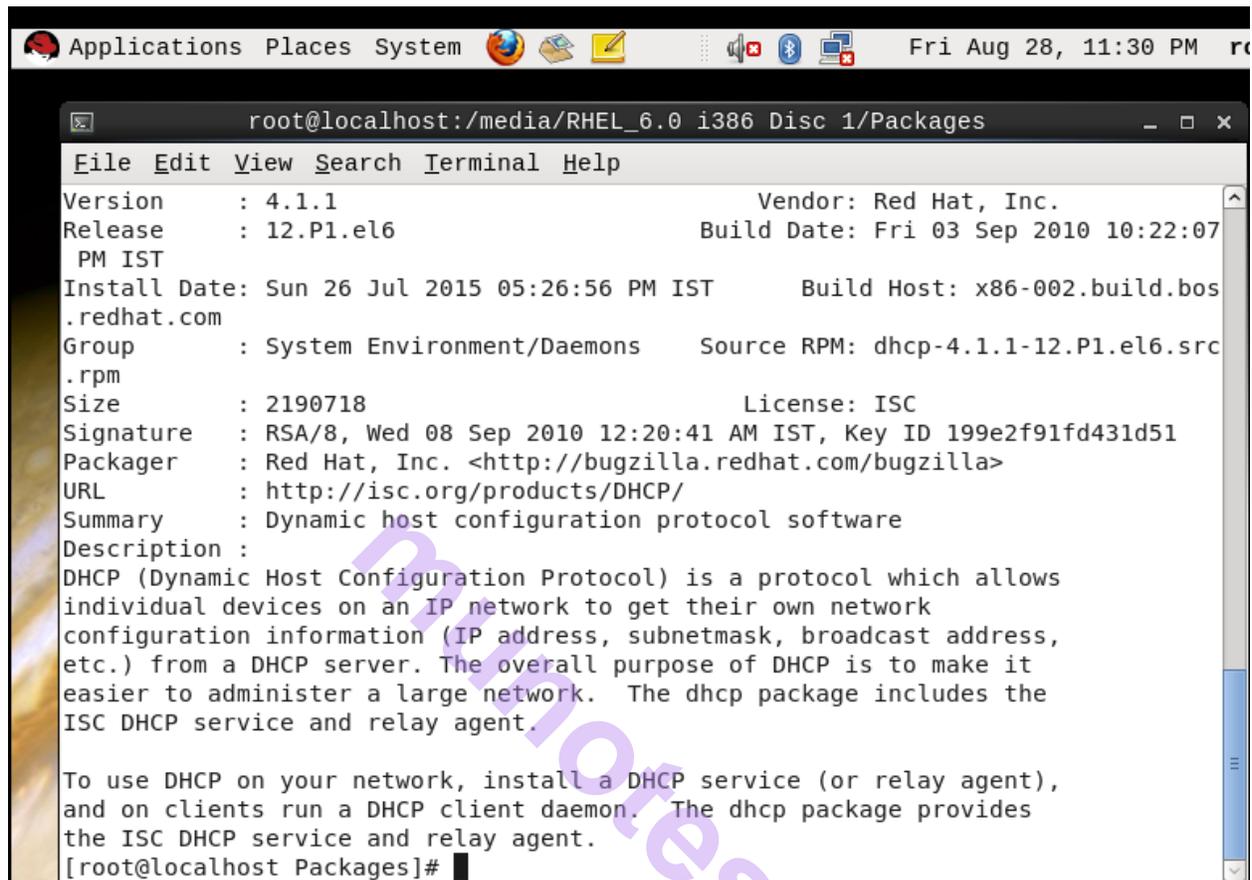
-qa : to query all installed packages



```
Applications Places System Fri Aug 28, 11:29 PM root
Click to view your appointments and tasks
root@localhost: /media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -qa | grep dhcp
dhcp-4.1.1-12.P1.el6.i686
[root@localhost Packages]#
```

Linux Administration Practical Manual

-qi : to show general information about the package searched for.

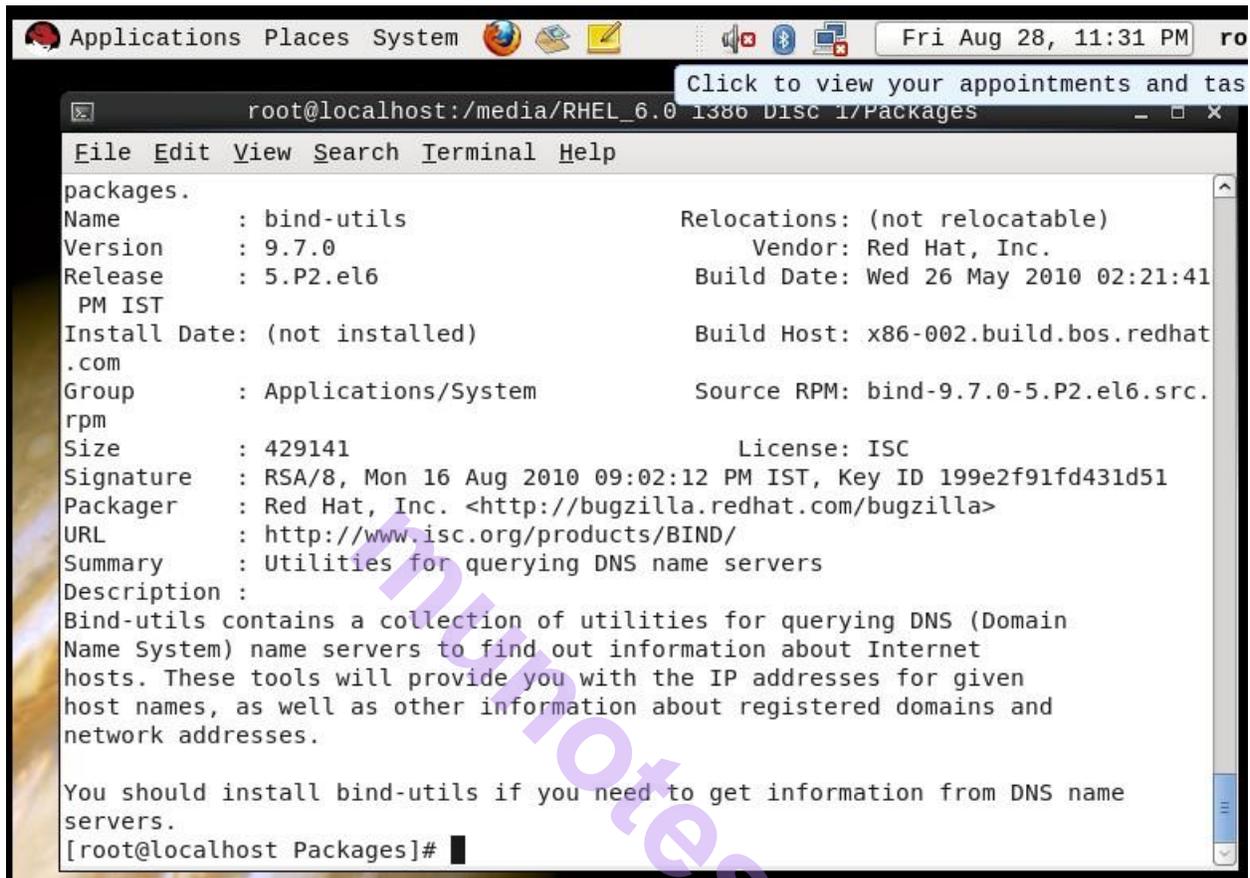


```
root@localhost:~/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
Version      : 4.1.1                      Vendor: Red Hat, Inc.
Release      : 12.P1.el6         Build Date: Fri 03 Sep 2010 10:22:07
PM IST
Install Date: Sun 26 Jul 2015 05:26:56 PM IST   Build Host: x86-002.build.bos
.redhat.com
Group        : System Environment/Daemons      Source RPM: dhcp-4.1.1-12.P1.el6.src
.rpm
Size         : 2190718                License: ISC
Signature    : RSA/8, Wed 08 Sep 2010 12:20:41 AM IST, Key ID 199e2f91fd431d51
Packager     : Red Hat, Inc. <http://bugzilla.redhat.com/bugzilla>
URL          : http://isc.org/products/DHCP/
Summary      : Dynamic host configuration protocol software
Description  :
DHCP (Dynamic Host Configuration Protocol) is a protocol which allows
individual devices on an IP network to get their own network
configuration information (IP address, subnetmask, broadcast address,
etc.) from a DHCP server. The overall purpose of DHCP is to make it
easier to administer a large network. The dhcp package includes the
ISC DHCP service and relay agent.

To use DHCP on your network, install a DHCP service (or relay agent),
and on clients run a DHCP client daemon. The dhcp package provides
the ISC DHCP service and relay agent.
[root@localhost Packages]#
```


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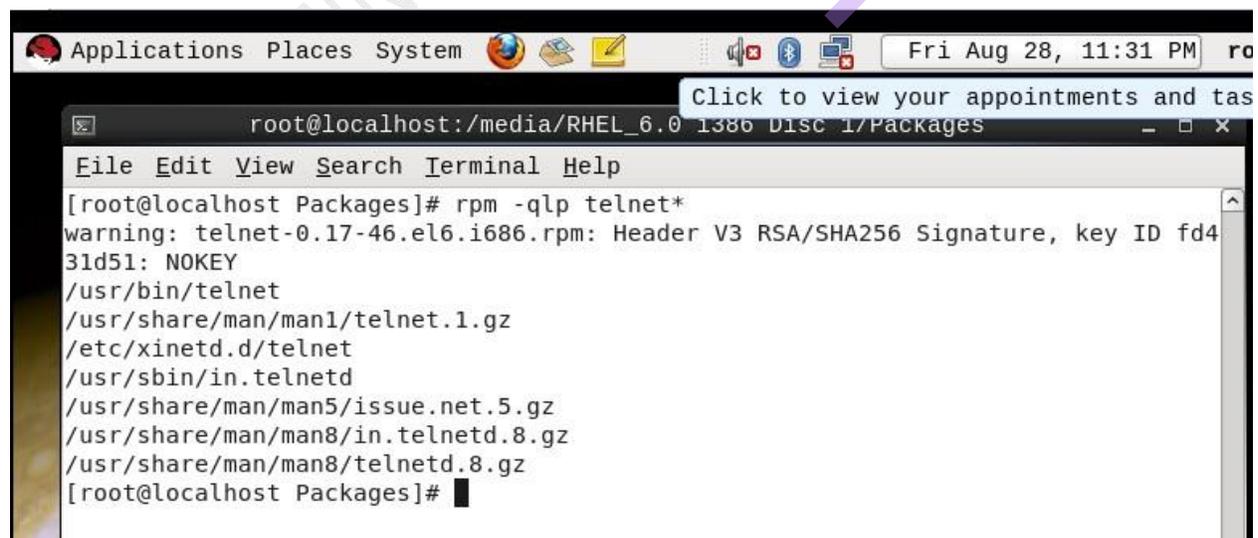
-qip : to show general information of uninstalled packages



```
root@localhost: /media/RHEL_6.0 1386 Disc 17/Packages
File Edit View Search Terminal Help
packages.
Name       : bind-utils           Relocations: (not relocatable)
Version    : 9.7.0                 Vendor: Red Hat, Inc.
Release    : 5.P2.el6       Build Date: Wed 26 May 2010 02:21:41
           PM IST
Install Date: (not installed) Build Host: x86-002.build.bos.redhat
           .com
Group      : Applications/System Source RPM: bind-9.7.0-5.P2.el6.src.
           rpm
Size       : 429141         License: ISC
Signature  : RSA/8, Mon 16 Aug 2010 09:02:12 PM IST, Key ID 199e2f91fd431d51
Packager   : Red Hat, Inc. <http://bugzilla.redhat.com/bugzilla>
URL        : http://www.isc.org/products/BIND/
Summary    : Utilities for querying DNS name servers
Description:
Bind-utils contains a collection of utilities for querying DNS (Domain
Name System) name servers to find out information about Internet
hosts. These tools will provide you with the IP addresses for given
host names, as well as other information about registered domains and
network addresses.

You should install bind-utils if you need to get information from DNS name
servers.
[root@localhost Packages]#
```

-qlp : to show list of package files of uninstalled package.

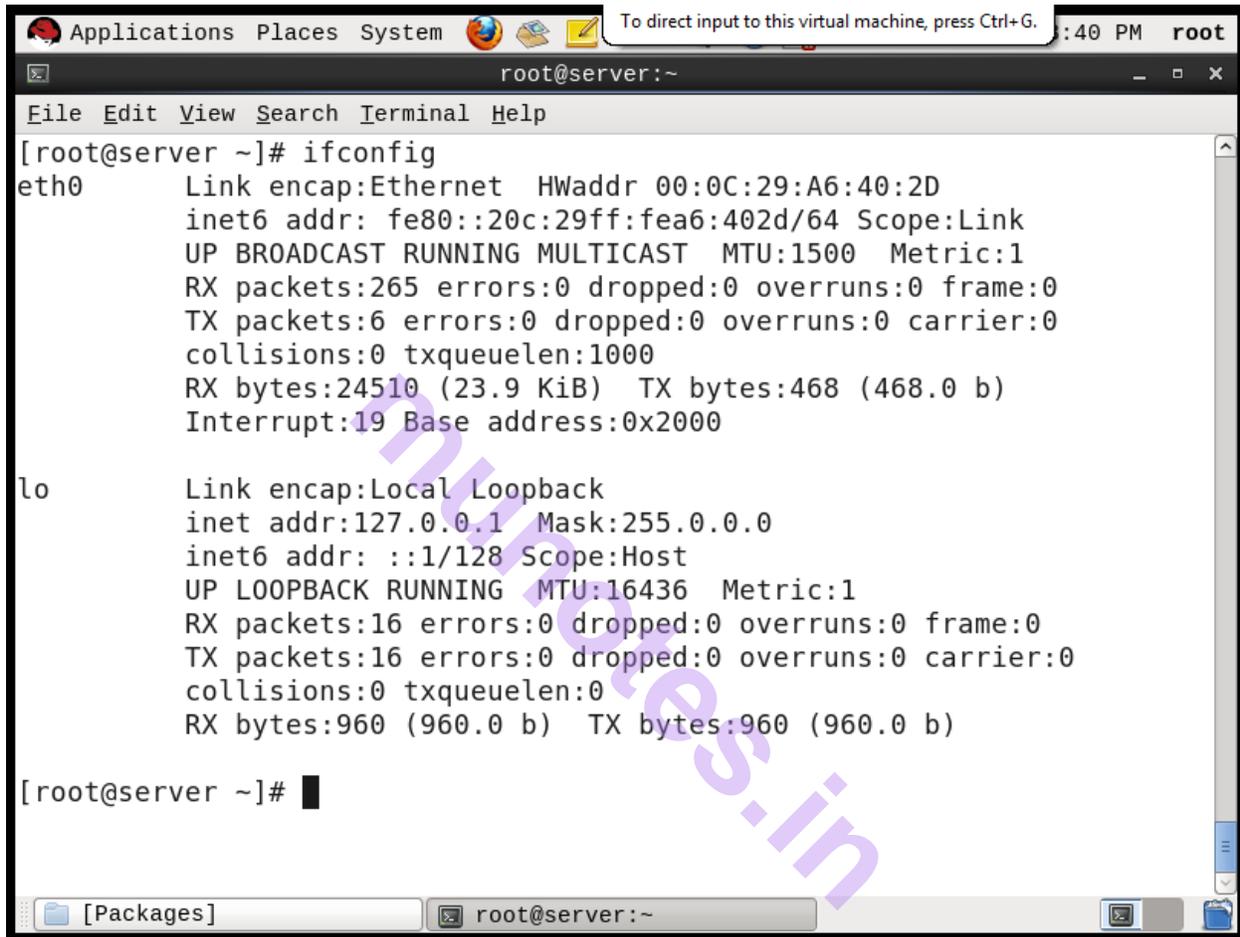


```
root@localhost: /media/RHEL_6.0 1386 Disc 17/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -qlp telnet*
warning: telnet-0.17-46.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd4
31d51: NOKEY
/usr/bin/telnet
/usr/share/man/man1/telnet.1.gz
/etc/xinetd.d/telnet
/usr/sbin/in.telnetd
/usr/share/man/man5/issue.net.5.gz
/usr/share/man/man8/in.telnetd.8.gz
/usr/share/man/man8/telnetd.8.gz
[root@localhost Packages]#
```

Practical no 3: Basic Commands

ifconfig :-

The ifconfig command is used to set an IP address



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :40 PM root
root@server:~
File Edit View Search Terminal Help
[root@server ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:A6:40:2D
          inet6 addr: fe80::20c:29ff:fea6:402d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:265 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:24510 (23.9 KiB)  TX bytes:468 (468.0 b)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:16 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:960 (960.0 b)  TX bytes:960 (960.0 b)

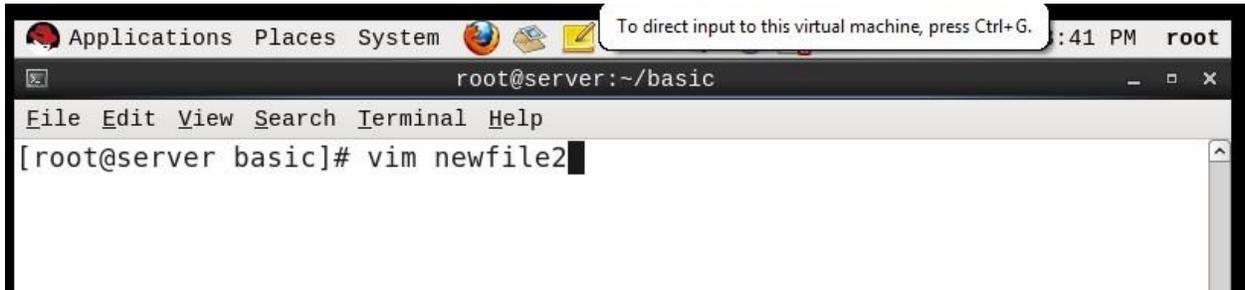
[root@server ~]# █
```

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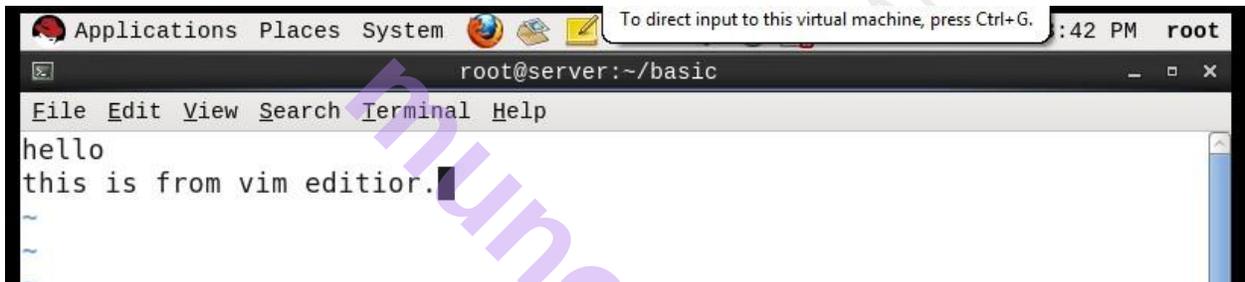
vim/ vi :-

vi stands for visual editor.

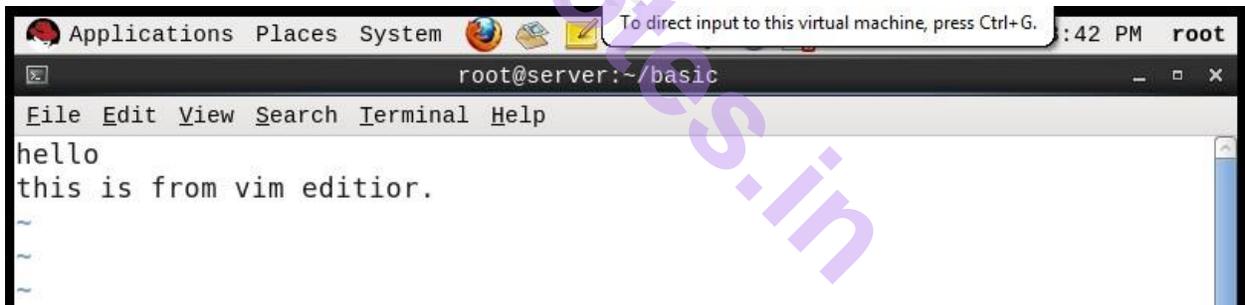
To save a file in vi press Esc key and type :wq (write and quit) or :wq!



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :41 PM root
root@server:~/basic
File Edit View Search Terminal Help
[root@server basic]# vim newfile2
```



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :42 PM root
root@server:~/basic
File Edit View Search Terminal Help
hello
this is from vim editor.
```



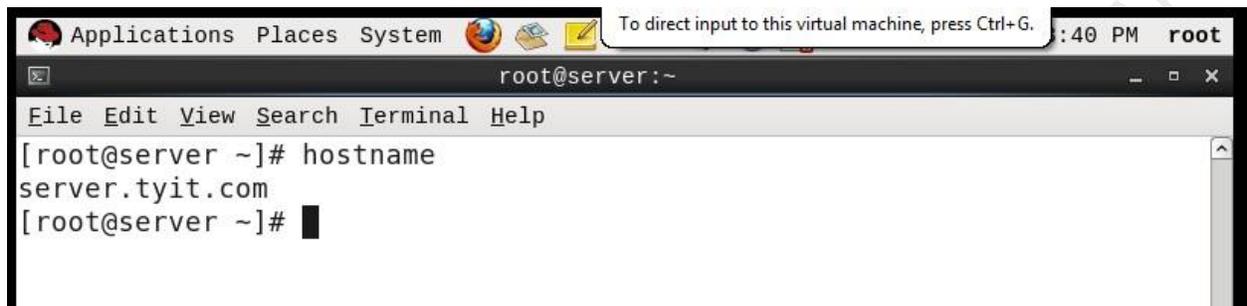
```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :42 PM root
root@server:~/basic
File Edit View Search Terminal Help
hello
this is from vim editor.
```

Hostname:-

The #hostname command is used to change the hostname

Syntax:

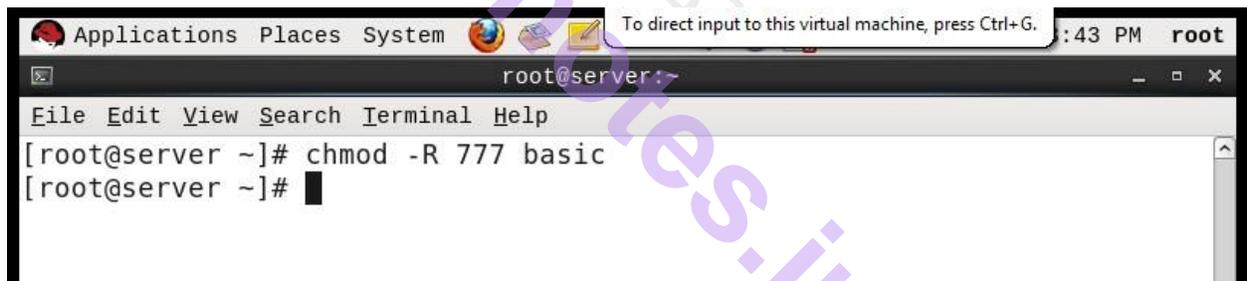
#hostname <>



```
Applications Places System :40 PM root
root@server:~
File Edit View Search Terminal Help
[root@server ~]# hostname
server.tyit.com
[root@server ~]#
```

chmod:-

#chmod is used to give permission for a particular directory



```
Applications Places System :43 PM root
root@server:~
File Edit View Search Terminal Help
[root@server ~]# chmod -R 777 basic
[root@server ~]#
```

mkdir :-

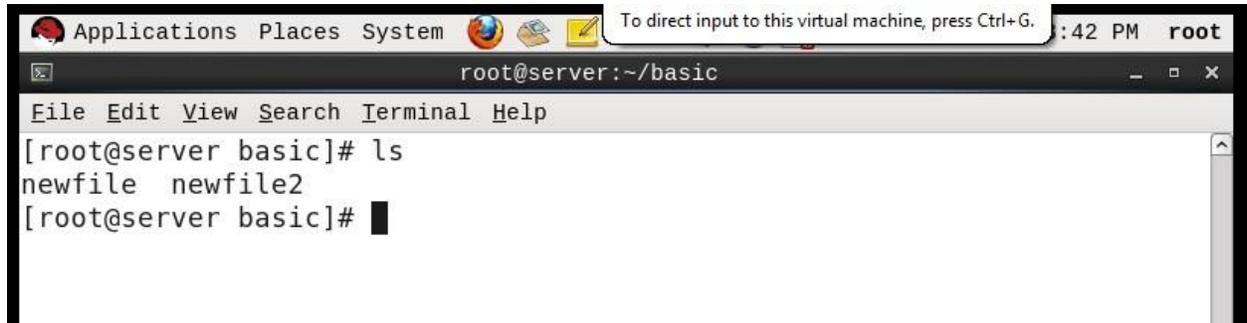
The mkdir is used to create a new directory



```
Applications Places System :40 PM root
root@server:~
File Edit View Search Terminal Help
[root@server ~]# mkdir basic
[root@server ~]#
```

ls :-

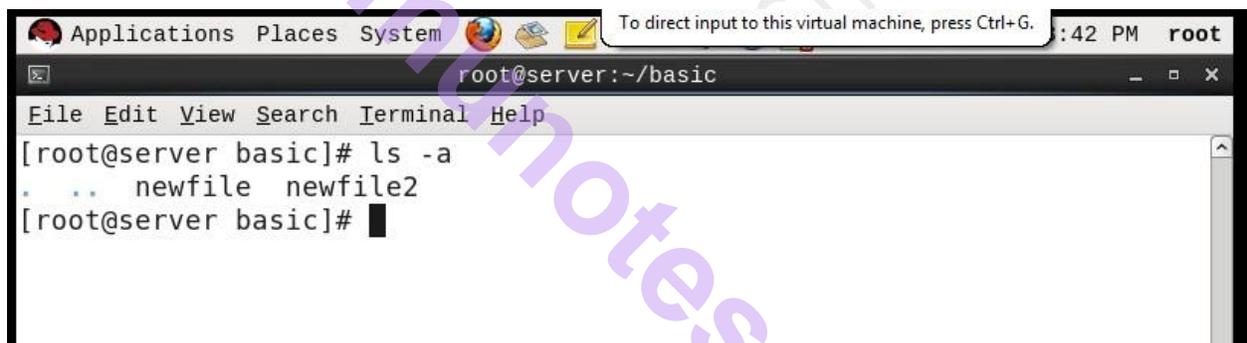
The `ls` command is used to list all the files in a particular folder



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :42 PM root
root@server:~/basic
File Edit View Search Terminal Help
[root@server basic]# ls
newfile newfile2
[root@server basic]#
```

ls-a :-

The `ls-a` command is used to list all files in a particular directory.



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :42 PM root
root@server:~/basic
File Edit View Search Terminal Help
[root@server basic]# ls -a
. .. newfile newfile2
[root@server basic]#
```

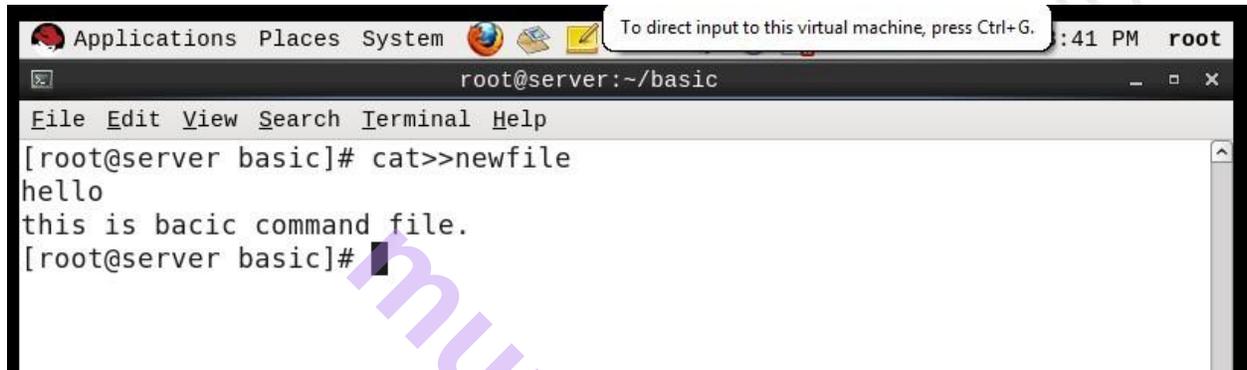
cat :-

The cat command is used to create a new file.

Syntax:

cat>>[filename]

To save a file ctrl+d



```
Applications Places System    To direct input to this virtual machine, press Ctrl+G. 4:41 PM root
root@server:~/basic
File Edit View Search Terminal Help
[root@server basic]# cat>>newfile
hello
this is basic command file.
[root@server basic]#
```

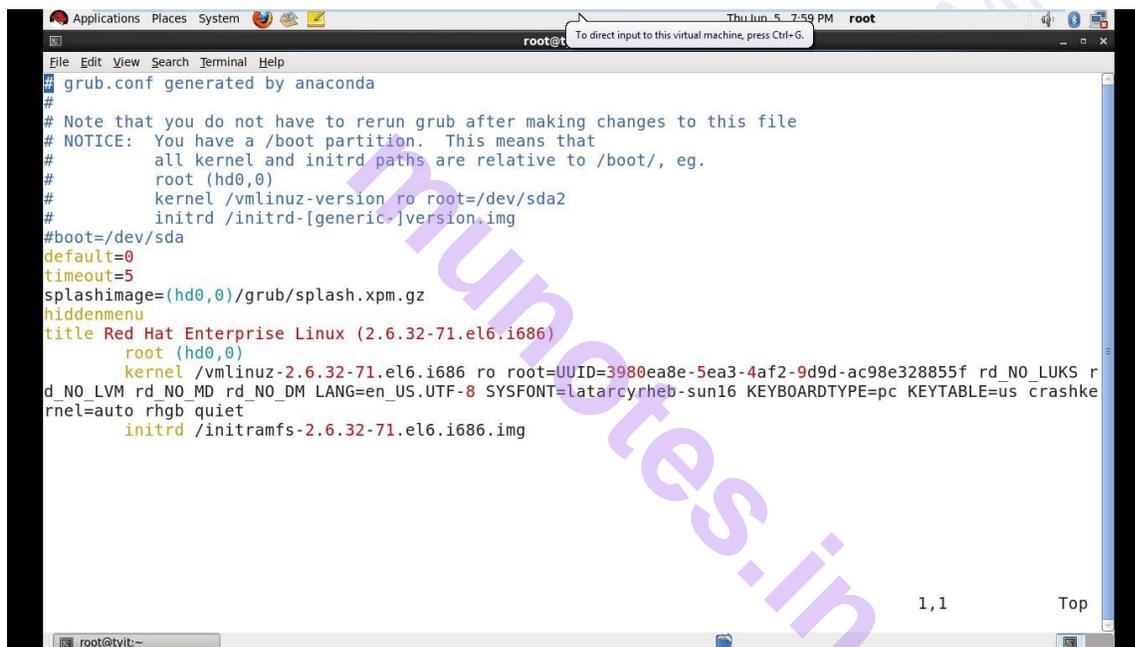
Practical no 4: Introduction to Grub.conf

What is GRUB?

GRUB stands for Grand Unified Boot Loader.

(1) On RedHat open the GRUB configuration file (/boot/grub/grub.conf) in any text editor as follows:

```
[root@tyit ~]#vim /boot/grub/grub.conf
```



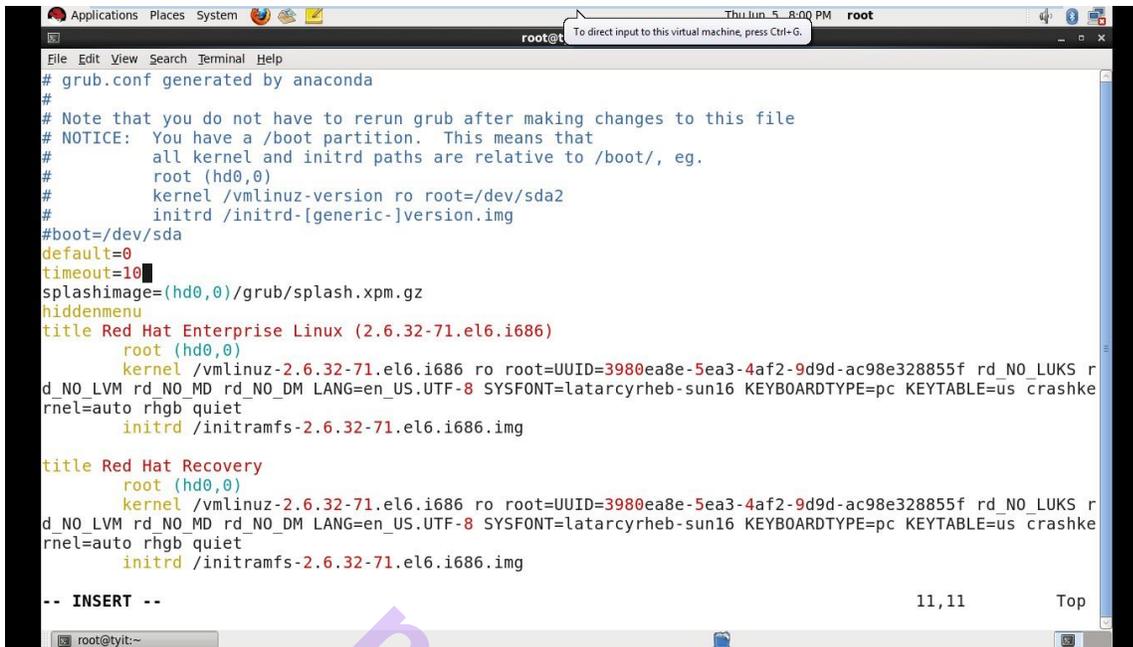
```
root@tyit ~]# cat /boot/grub/grub.conf
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
# all kernel and initrd paths are relative to /boot/, eg.
# root (hd0,0)
# kernel /vmlinuz-version ro root=/dev/sda2
# initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=0
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux (2.6.32-71.el6.i686)
  root (hd0,0)
  kernel /vmlinuz-2.6.32-71.el6.i686 ro root=UUID=3980ea8e-5ea3-4af2-9d9d-ac98e328855f rd_NO_LUKS r
d_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashke
rnel=auto rhgb quiet
  initrd /initramfs-2.6.32-71.el6.i686.img
```

To edit the configuration file : Go to Insert mode (press ‘i’)

(2) Add a new entry to the configuration file:

- The new entry should have the title “Red Hat Recovery”.
- The new entry should not be the default.
- Change the timeout of the boot selection to 10 seconds.

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```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#           all kernel and initrd paths are relative to /boot/, eg.
#           root (hd0,0)
#           kernel /vmlinuz-version ro root=/dev/sda2
#           initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=0
timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux (2.6.32-71.el6.i686)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.i686 ro root=UUID=3980ea8e-5ea3-4af2-9d9d-ac98e328855f rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.i686.img

title Red Hat Recovery
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.i686 ro root=UUID=3980ea8e-5ea3-4af2-9d9d-ac98e328855f rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.i686.img

-- INSERT --
```

The task is complete when the system boots with both entries in the GRUB menu and they both work correctly.



The grub.conf configuration file is explained in detail below.

- **Default=0** - This line tells grub to boot the kernel with the first title in the file.
- **Timeout=5** - This line tells the grub to boot the default kernel after 5 seconds.

The default timeout can be edited too.

- **Splashimage=(hd0,0)/grub/splash.xpm.gz** - This line helps grub to identify the path of splash image it displays for the menu. Although user can create his own image but it has to be kept in the same path.
- **Hiddenmenu** - This line tells the GRUB not to display the menu and to boot the default kernel after the timeout expires.
- **Title** - This line helps GRUB to set title as boot name on the menu.

The lines following the title are :

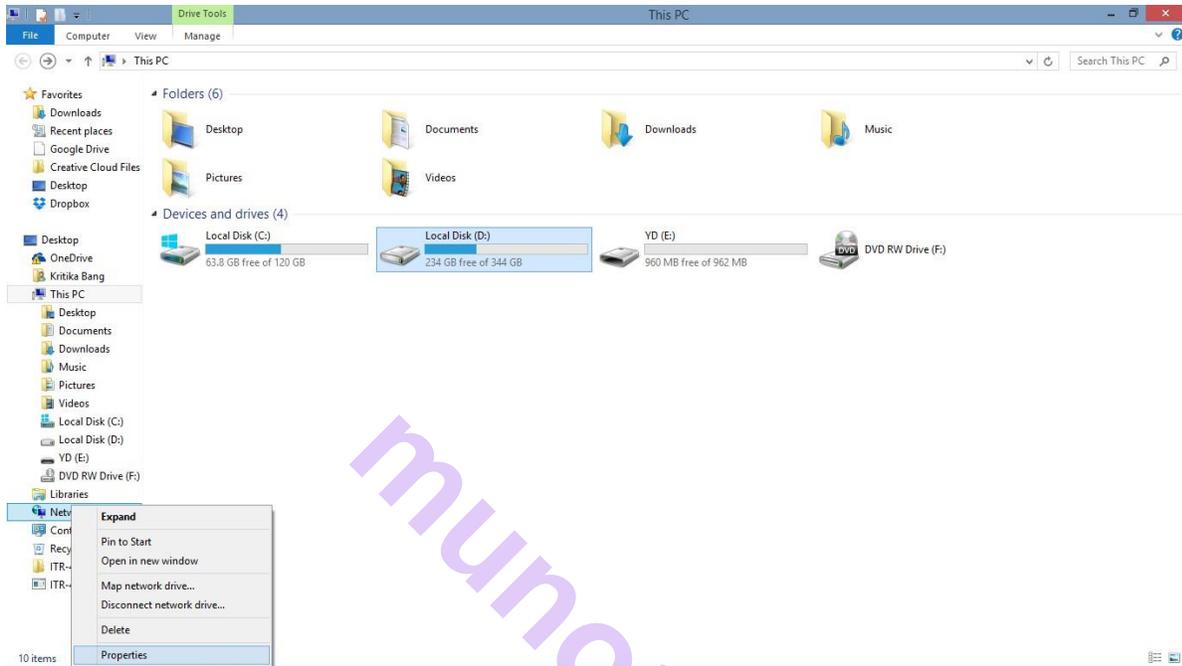
- **Root (hd0,0)** - This line instructs the GRUB to boot the system from the first partition of the first hard disk.
- **kernel /vmlinuz-2.6.18-8.el5 ro root=LABEL=/ rhgb quiet** - Specifies the kernel location which is inside the /boot folder as well as passes the parameters to the kernel. There are already two parameters i.e. rhgb tells the system to use the graphical boot whereas quiet option tells the system to be quiet and not to display everything that happens at the time of system boot.
- **initrd /initrd-2.6.18-8.el5.img** - This line tells the GRUB location of the initial ramdisk image that is used to load special drivers for the system during boot process.

Practical no 5: Setting up Samba Server

- Samba is basically used for establishing connection among linux to windows, with help of samba file sharing can be done using Windows file-sharing protocol and connect your Red Hat Enterprise network to a windows network to share files and printers.
- Windows use a protocol called Server Message Block (SMB) to communicate with each other and to share services such as file and print sharing.
- With Samba, the Linux PC icon appears in the Windows Network Places window and the files on the Linux PC can be browsed using Windows Explorer.
- The Windows File system can be mounted on your Linux System , and you can browse the Windows files from your Linux PC.
- Before using Samba to connect to the Windows computers, it must first be installed on the Linux PC.
- All current distributions of Linux include three Samba packages:
 - Samba
 - Samba-client
 - Samba-common

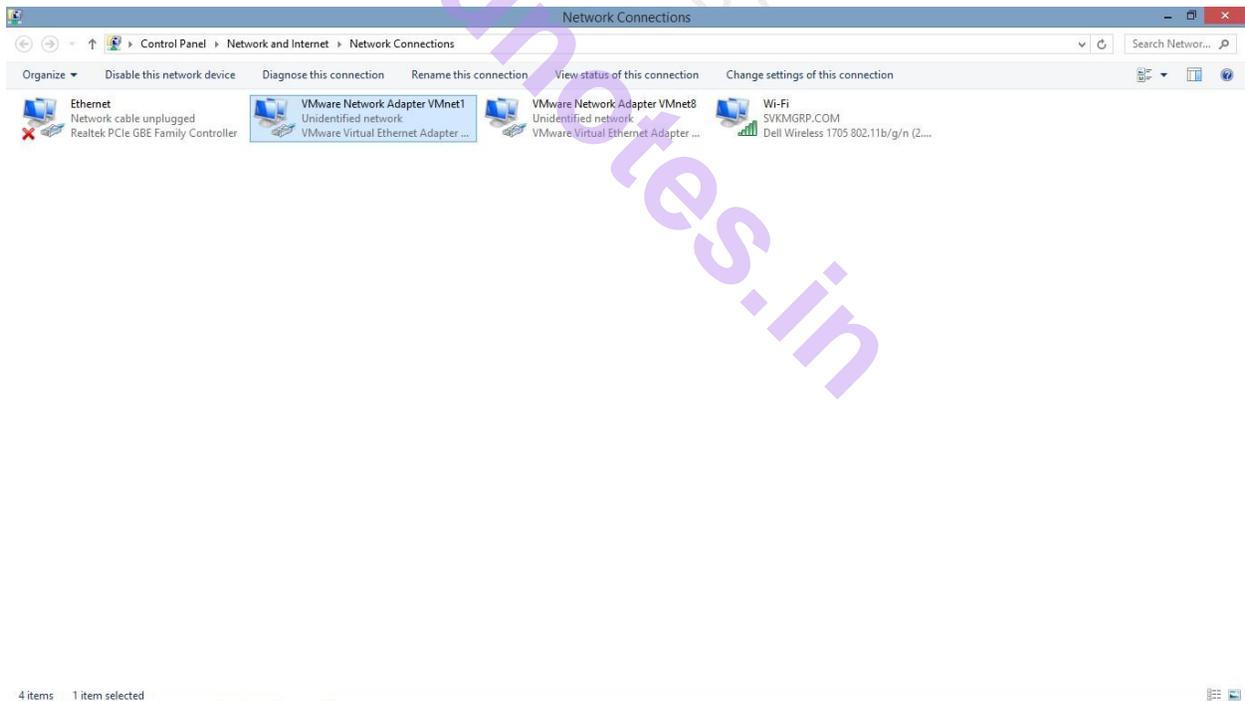
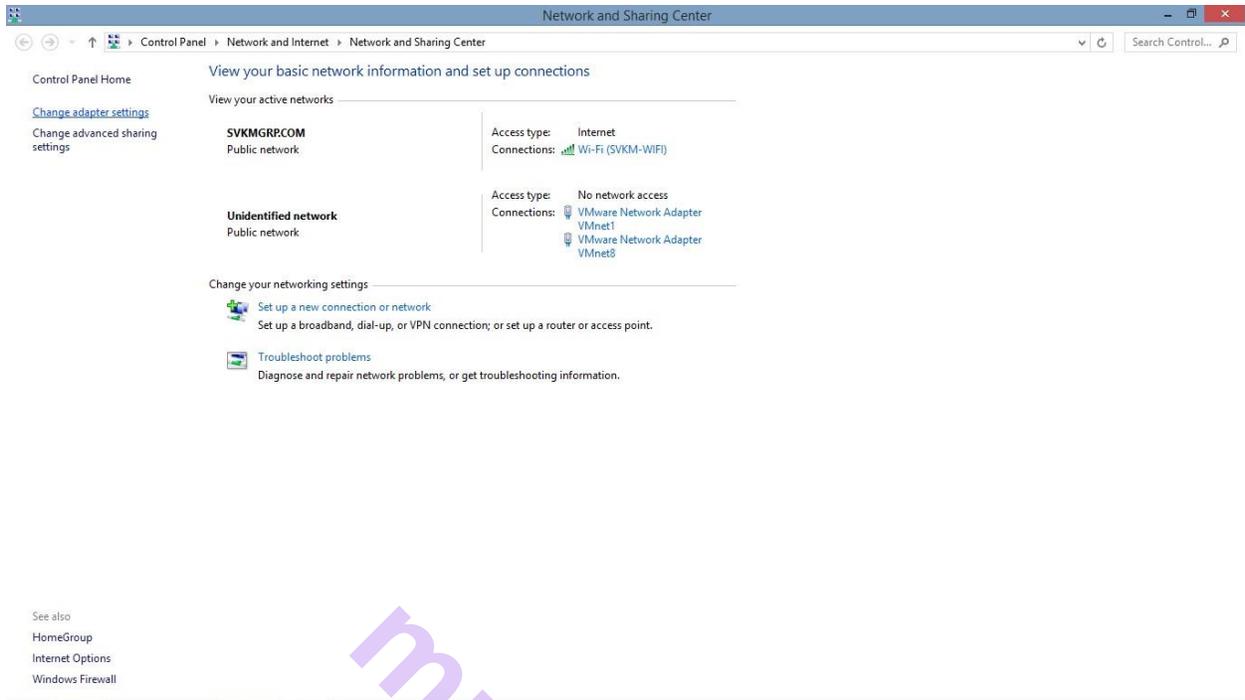
Settings to be done in Windows

Go to “My Computer” -> “Network” -> Right Click on “Properties”

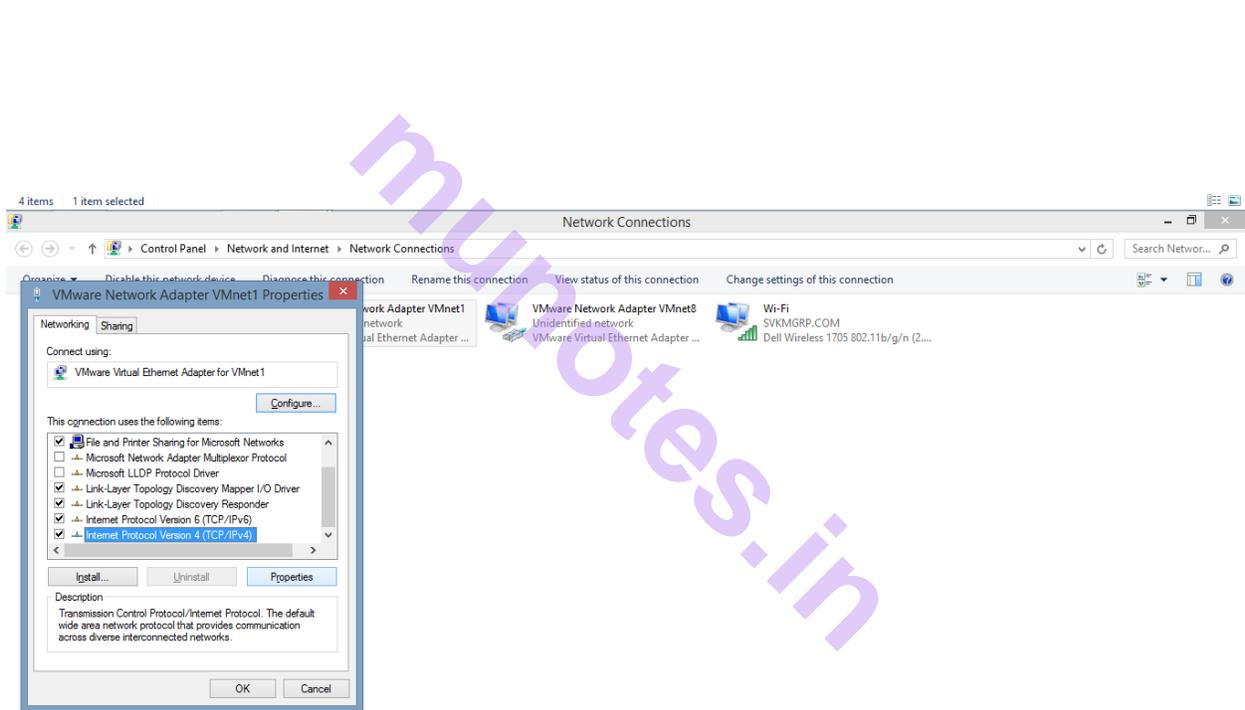
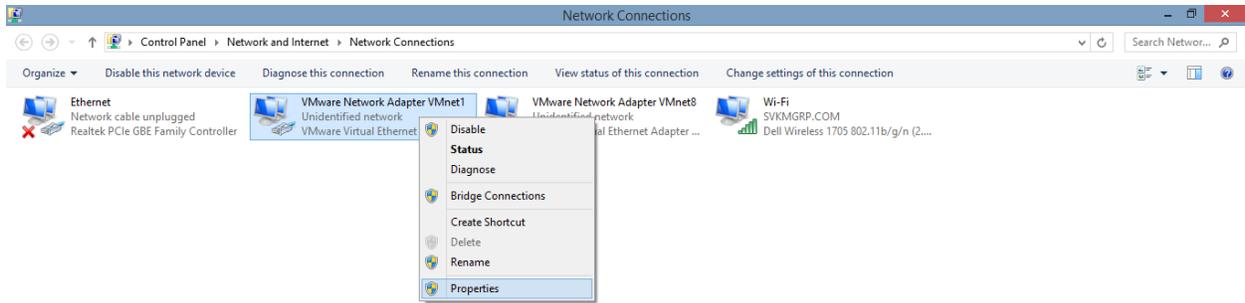


Go to the option “Change adapter settings” -> Right click on “VMWare Network Adapter VMnet1” -> Click “IPV4” -> Click on “Properties” button -> Set IP Address Example : 192.168.1.1 -> Click “OK” -> Click “Close”.

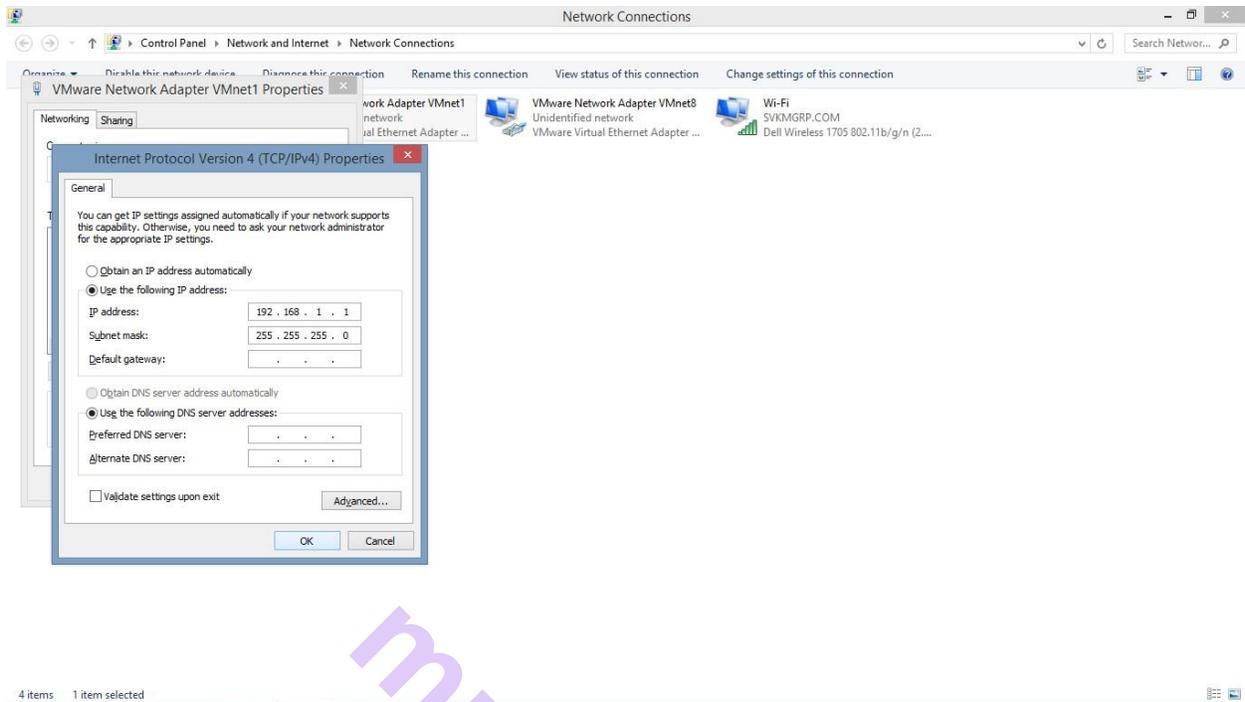
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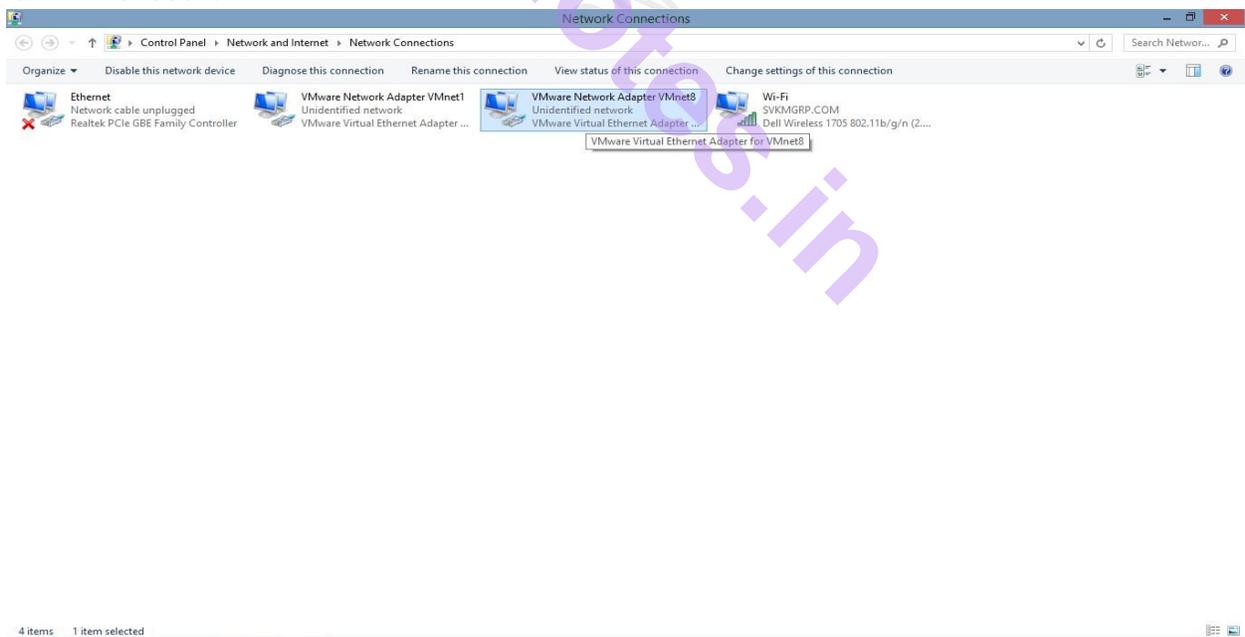
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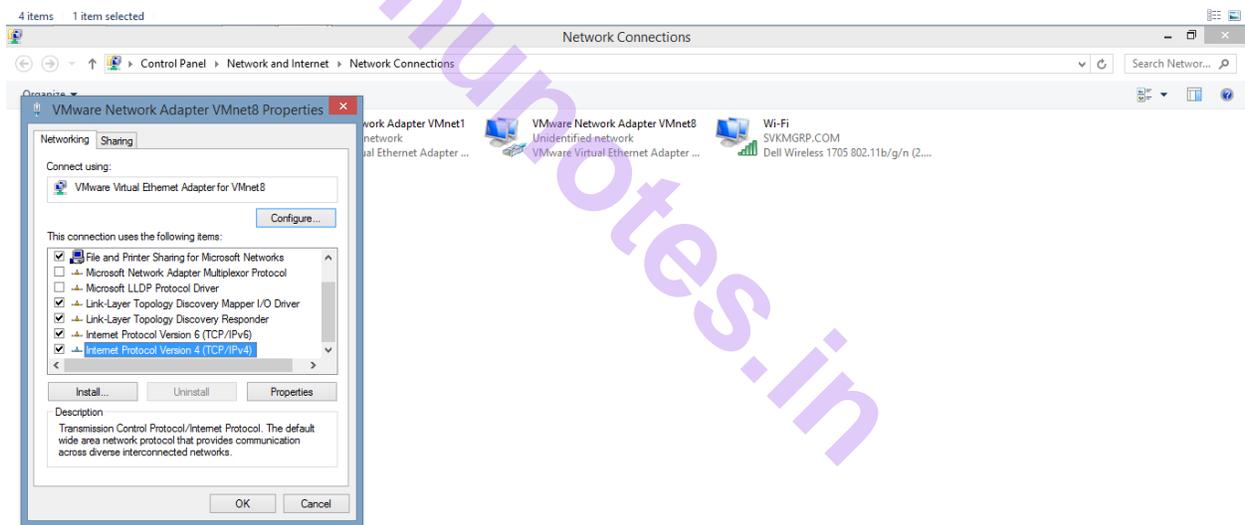
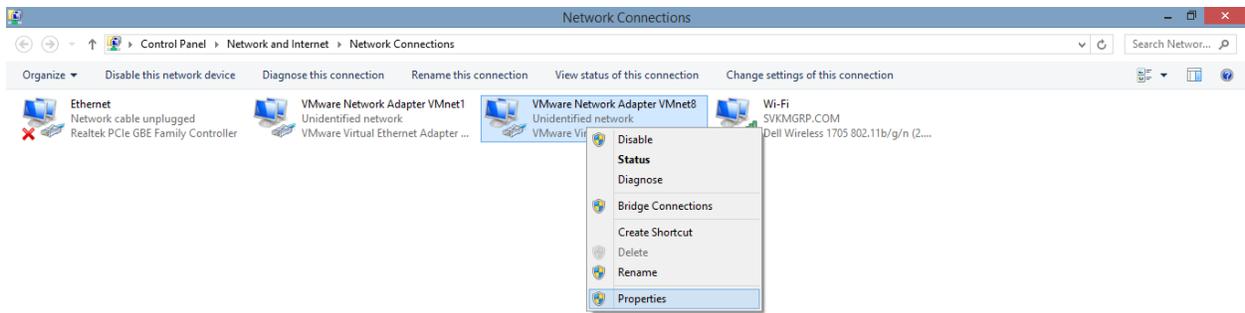
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Right click on “VMWare Network Adapter VMnet8” -> Click “IPv4” -> Click on “Properties” button -> Set IP Address Example : 192.168.1.2 -> Click “OK” -> Click “Close”.

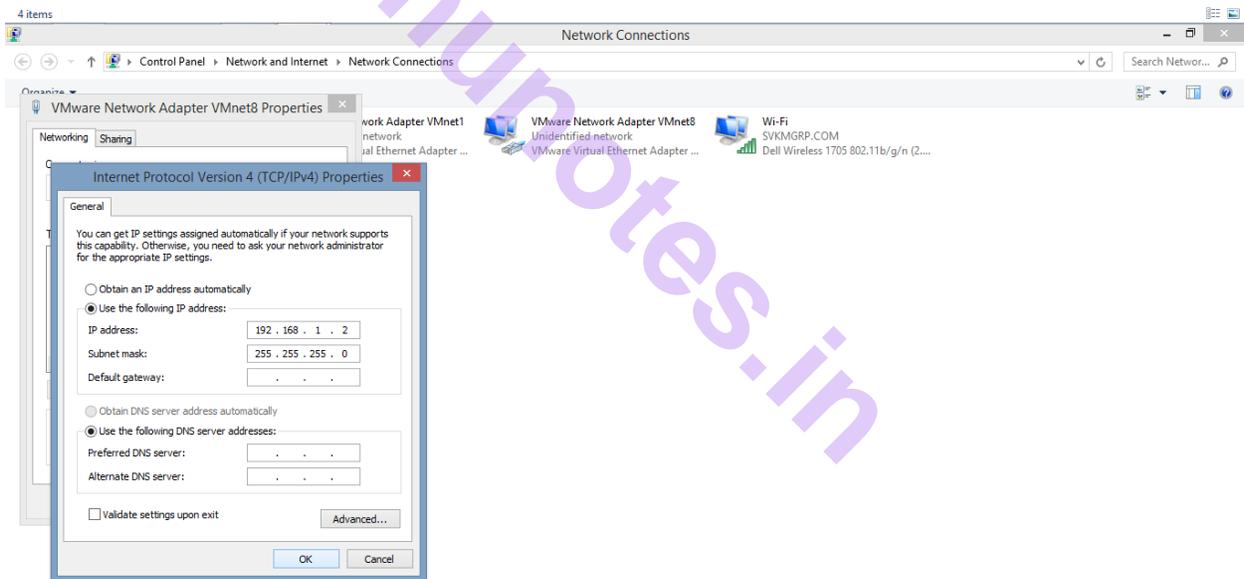
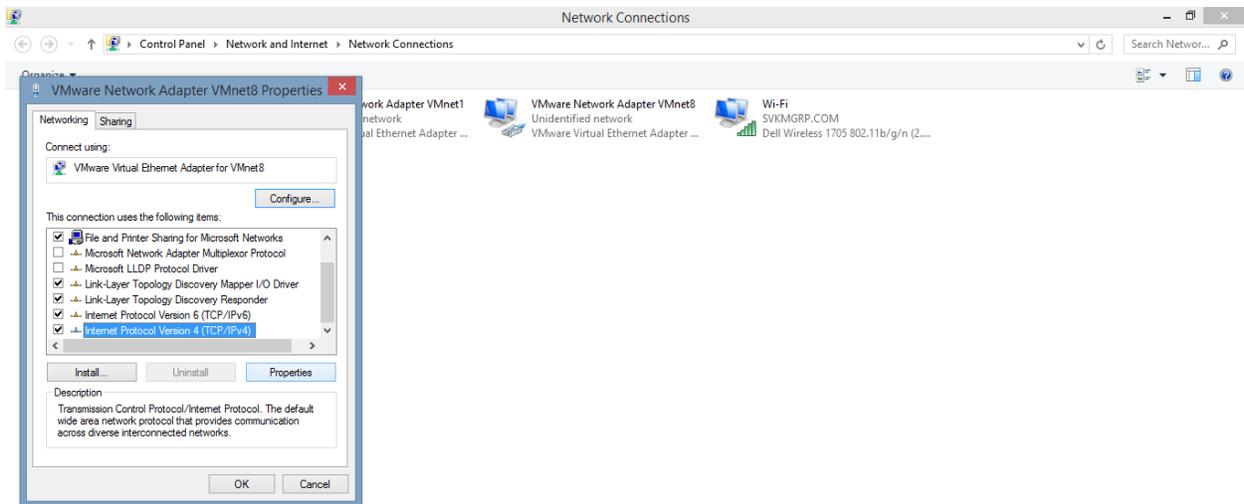


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4 items

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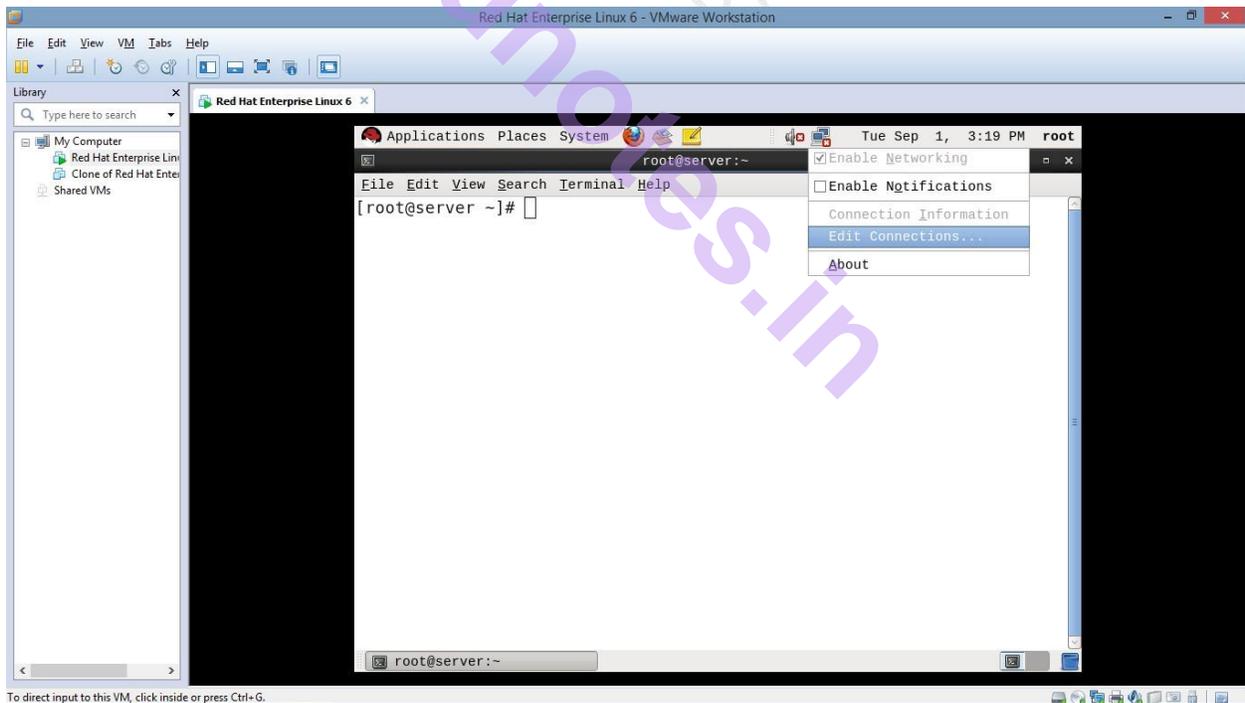
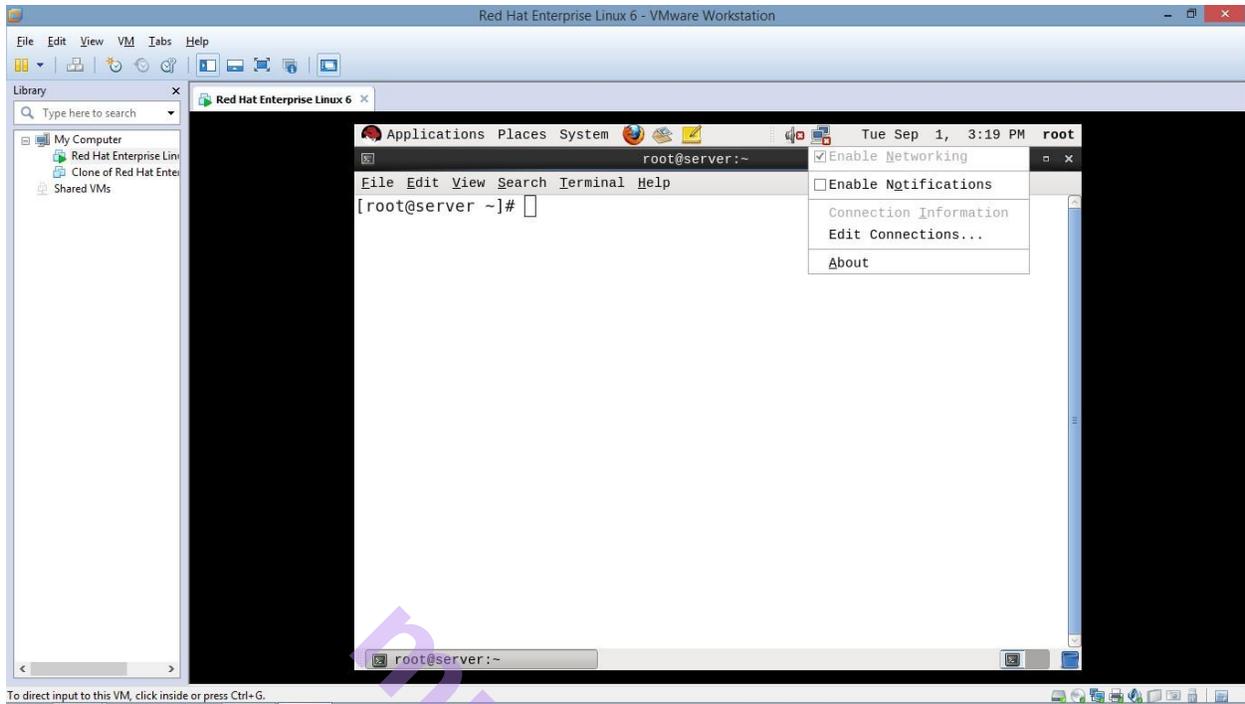
Now Open “VMWare”– Linux Virtual machine

Set the IP Address to 192.168.1.3

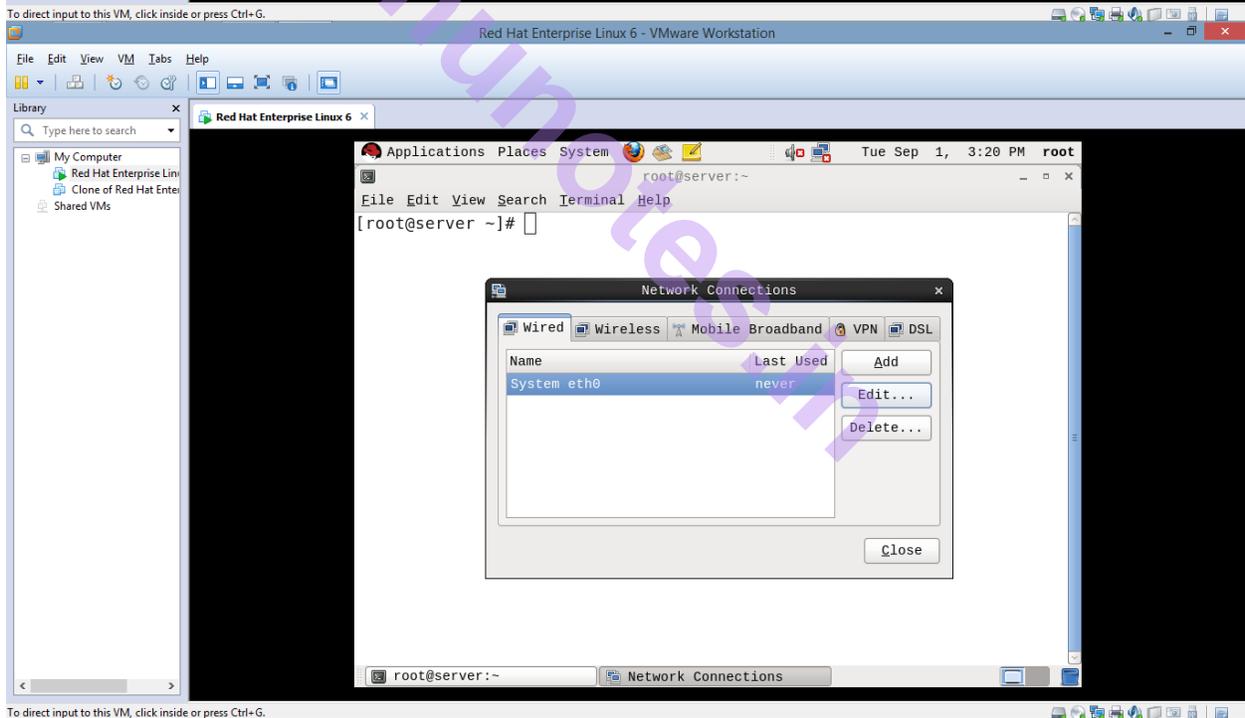
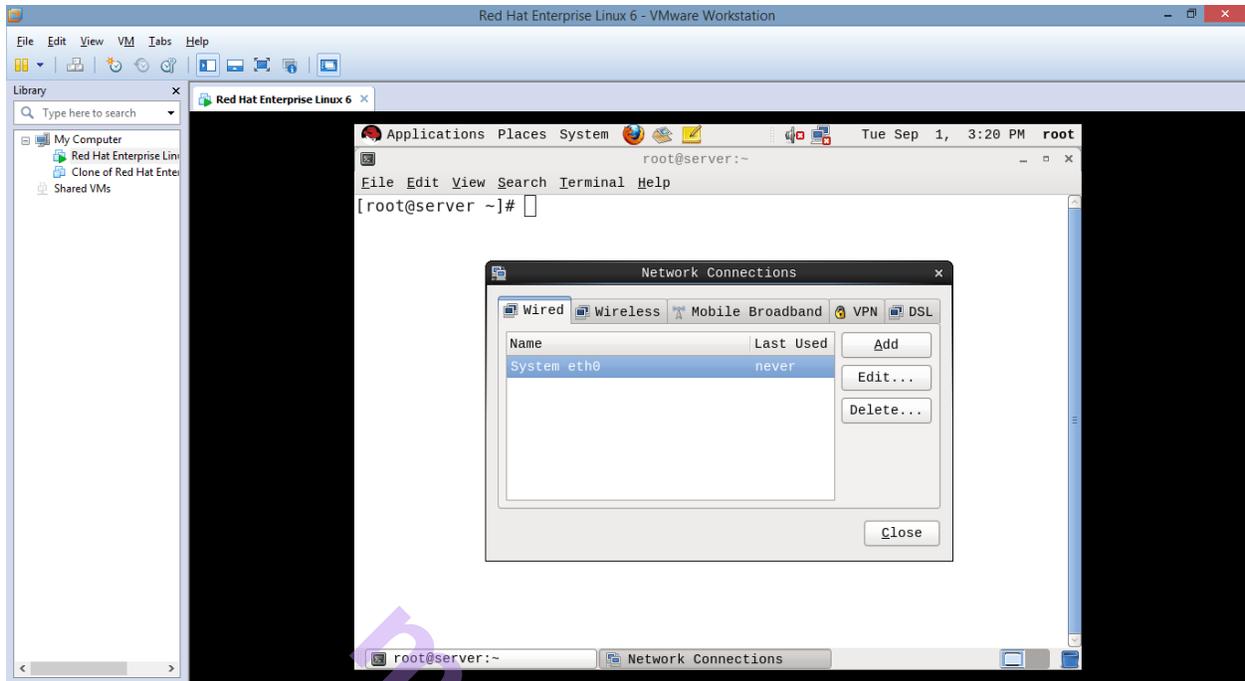
To do so follow the steps :

Right click on top of “Network symbol” -> Go to “Edit Connections” -> Select “eth0” -> Click on “Edit” button -> Select IPV4 -> Select “Manual” .

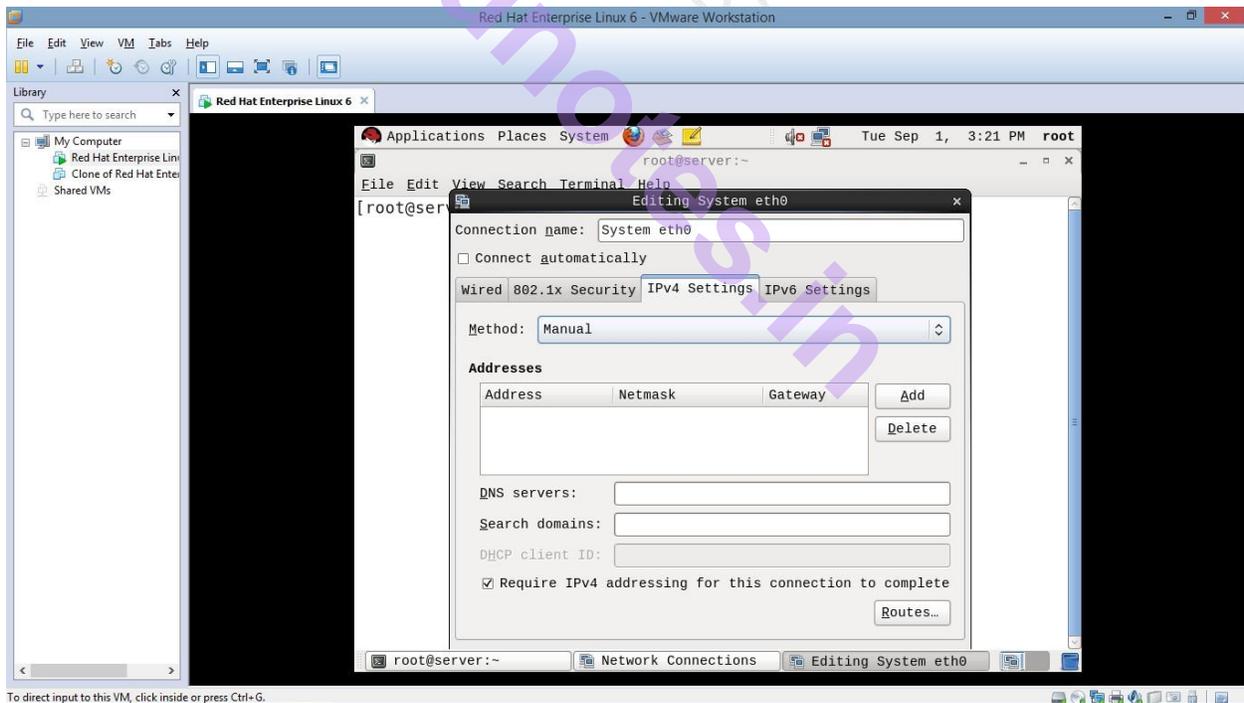
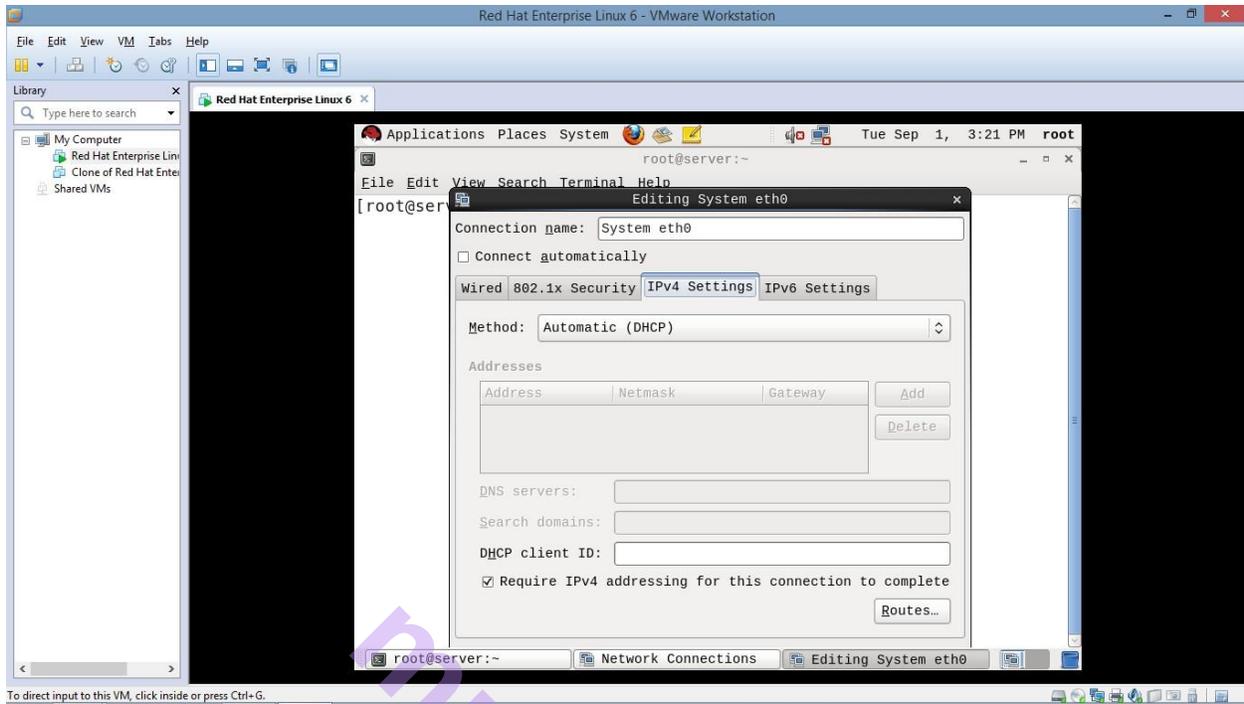
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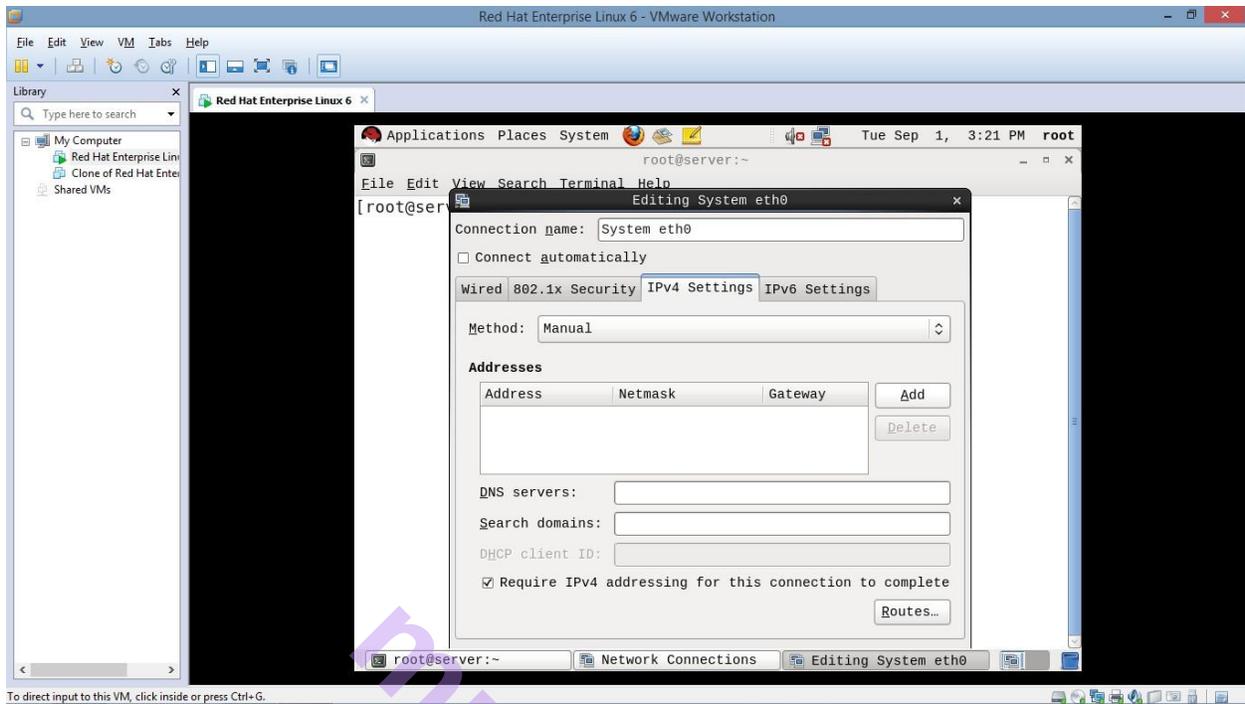
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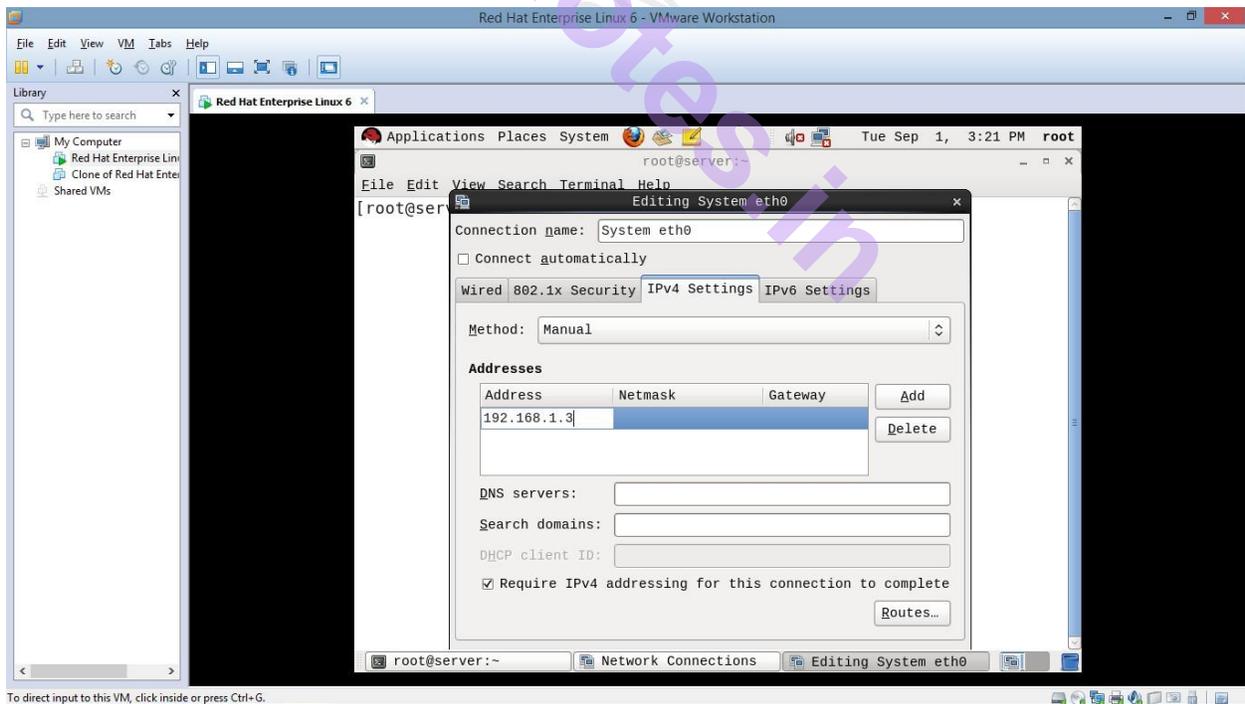
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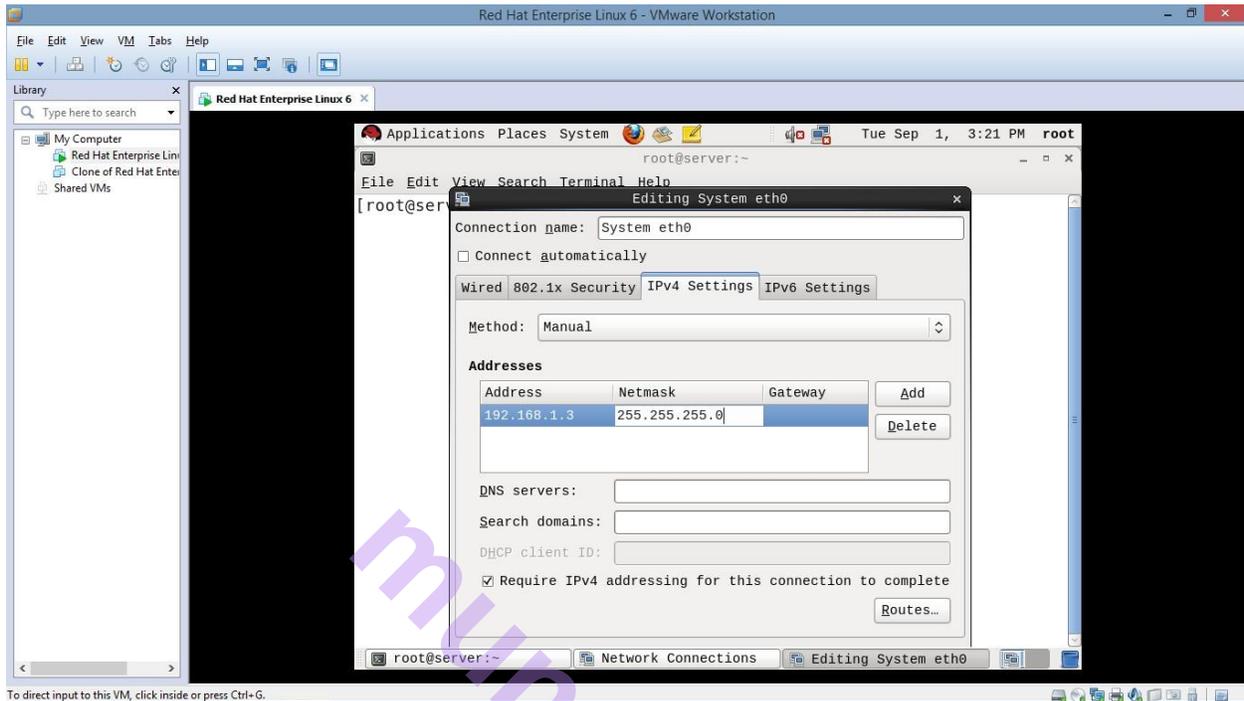


Now set IP Address to 192.168.1.3

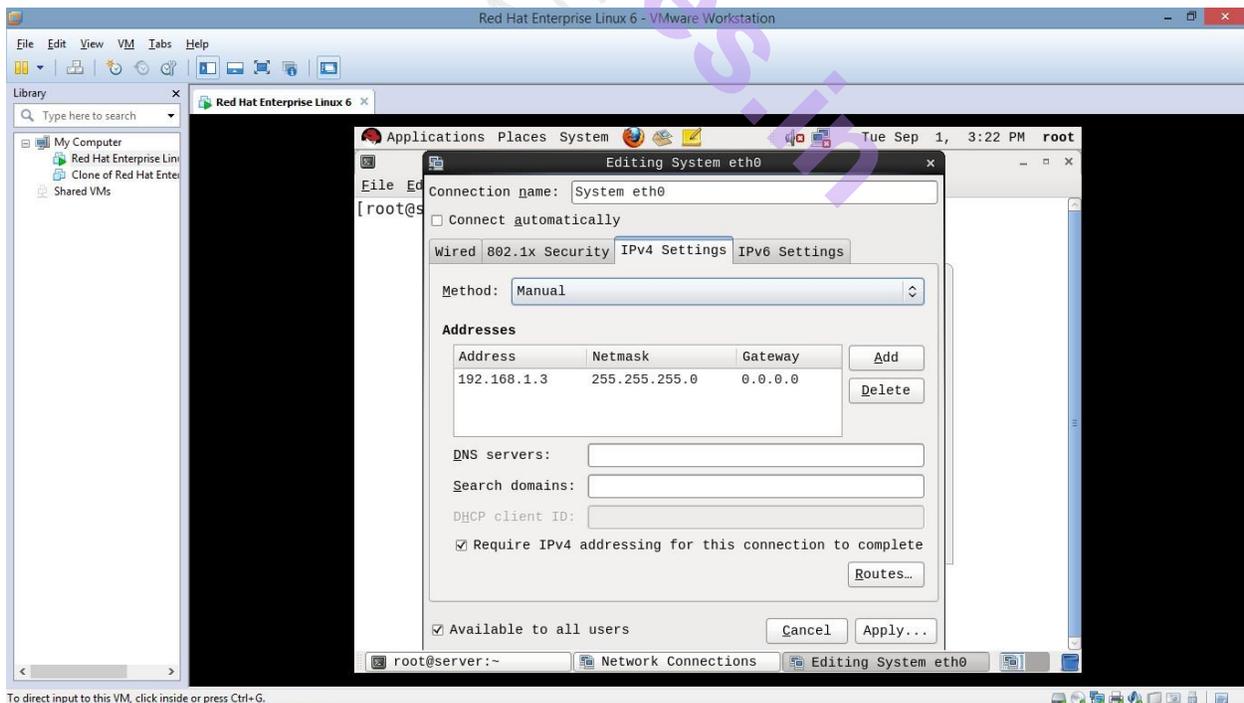


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Set the Netmask as 255.255.255.0

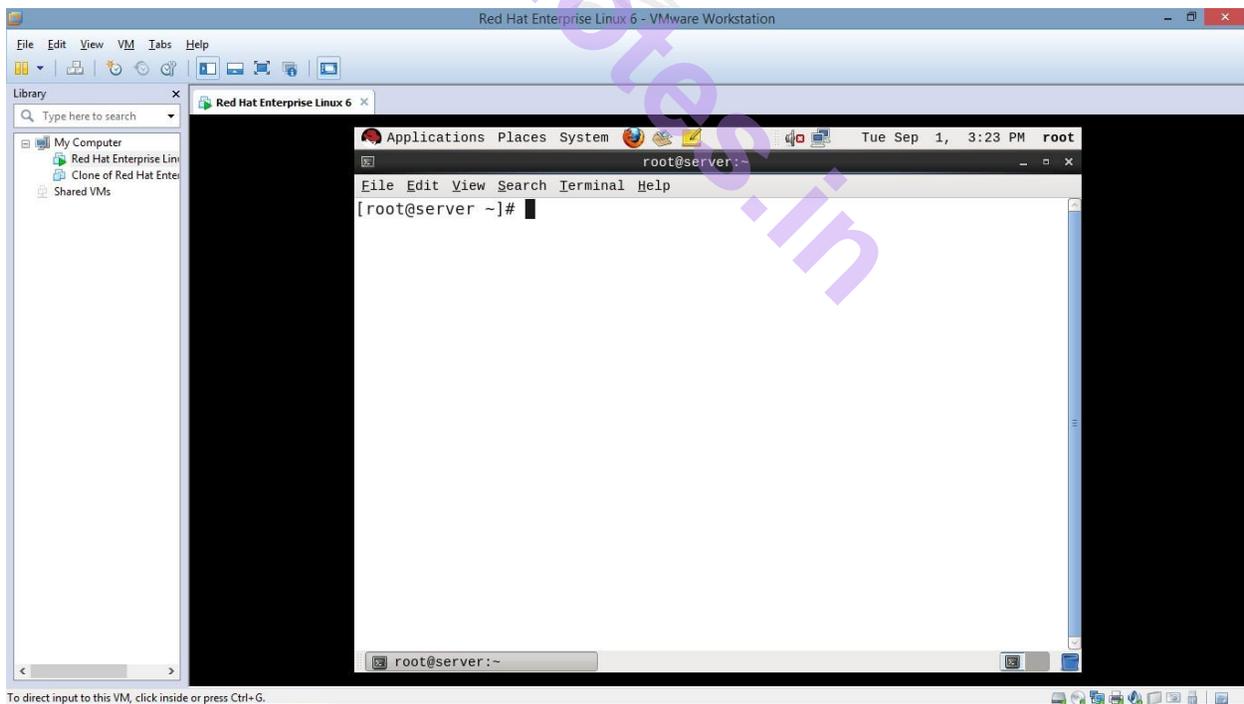
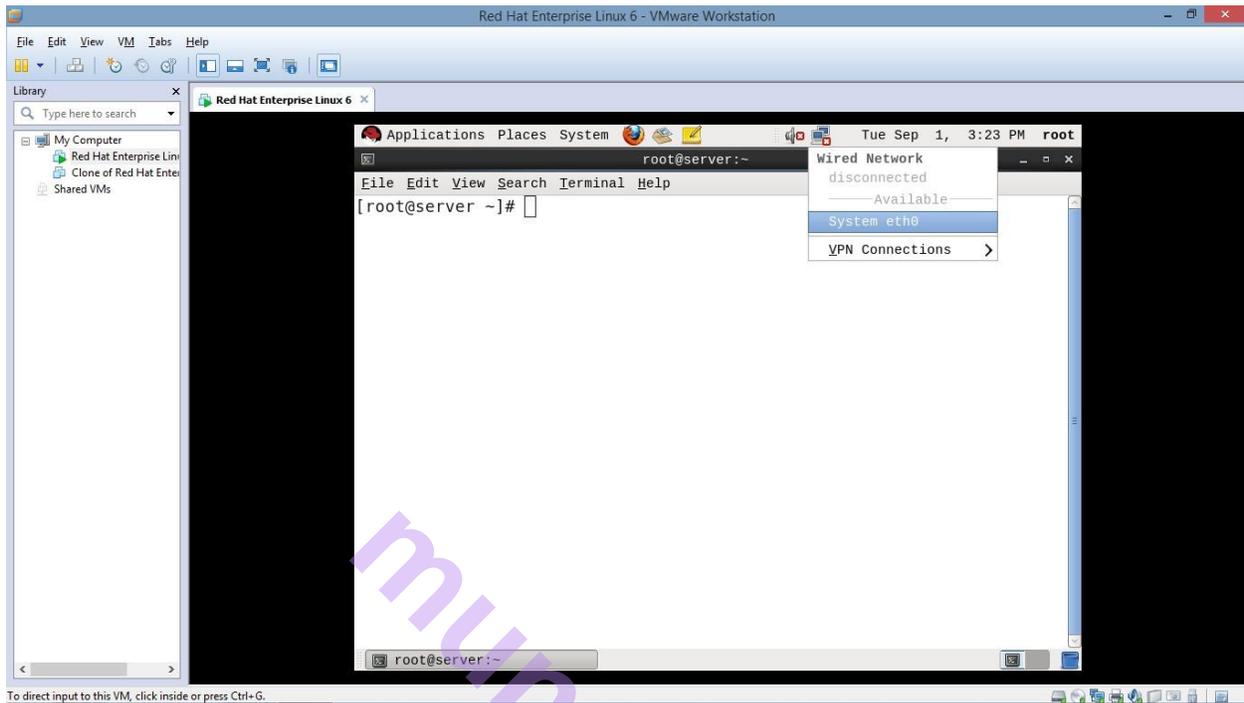


Click on “Apply” button -> Click on “Close” button.



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Now connect your network - > To do so double click on Network icon.



To check whether IP Address is set :

ifconfig

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```
File Edit View Search Terminal Help
[root@server ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:A6:40:2D
          inet addr:192.168.1.3  Bcast:192.168.1.255  Mask:255.255.255.
          0
          inet6 addr: fe80::20c:29ff:fea6:402d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:24 errors:0 dropped:0 overruns:0 frame:0
          TX packets:51 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2208 (2.1 KiB)  TX bytes:9681 (9.4 KiB)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:26 errors:0 dropped:0 overruns:0 frame:0
          TX packets:26 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1460 (1.4 KiB)  TX bytes:1460 (1.4 KiB)

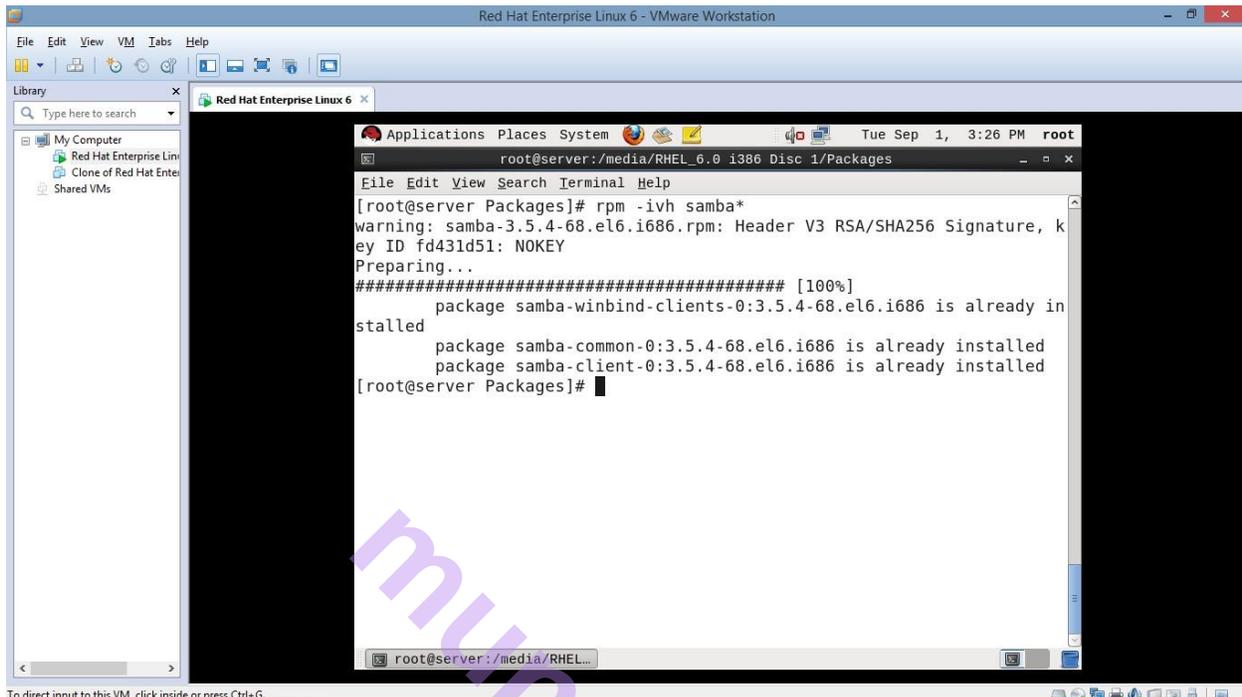
[root@server ~]#
```

To install the samba package :
cd /media/RHEL_6.0\i386\Disc\1\Packages

```
File Edit View Search Terminal Help
root@server:~/media/RHEL_6.0 i386 Disc 1/Packages
[root@server ~]# cd /media/RHEL_6.0 i386 Disc 1/Packages/
[root@server Packages]#
```

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Packages] # rpm -ivh samba*



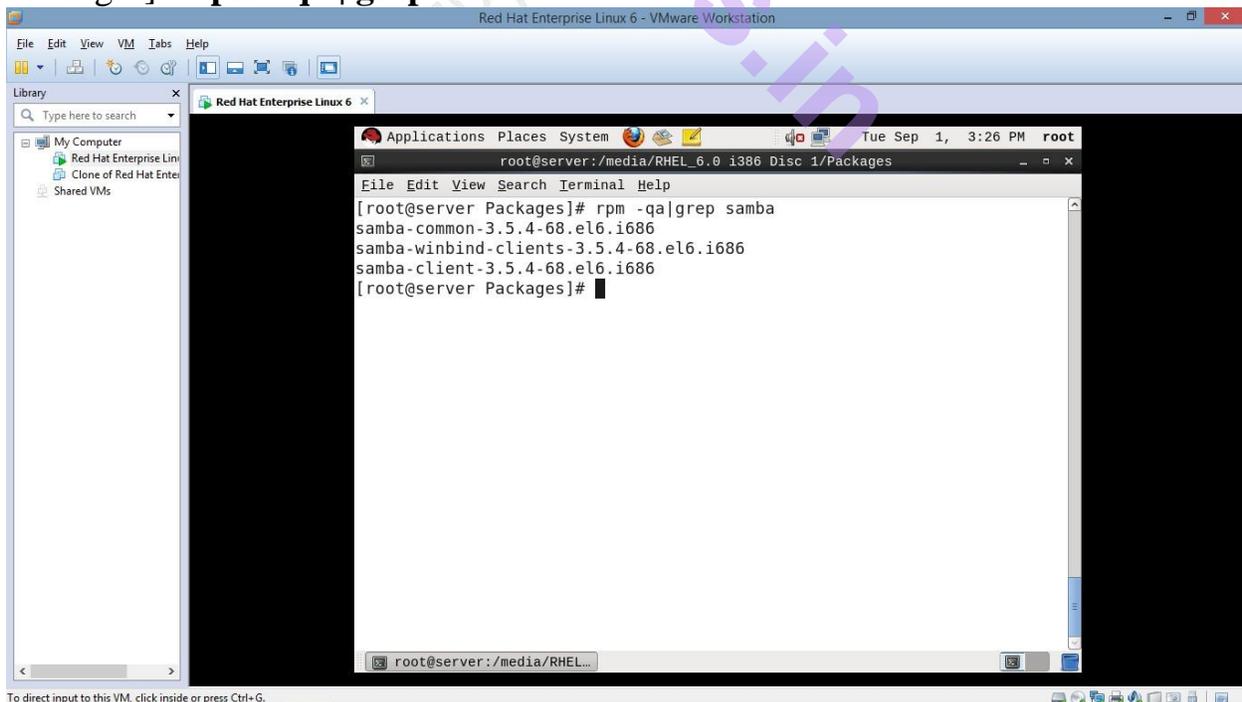
```
File Edit View Search Terminal Help
root@server:/media/RHEL_6.0 i386 Disc 1/Packages
[root@server Packages]# rpm -ivh samba*
warning: samba-3.5.4-68.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing...
##### [100%]
package samba-winbind-clients-0:3.5.4-68.el6.i686 is already installed
package samba-common-0:3.5.4-68.el6.i686 is already installed
package samba-client-0:3.5.4-68.el6.i686 is already installed
[root@server Packages]#
```

To verify service package of samba

Packages] # rpmquery -qa | grep samba

OR

Packages] # rpm -qa | grep samba



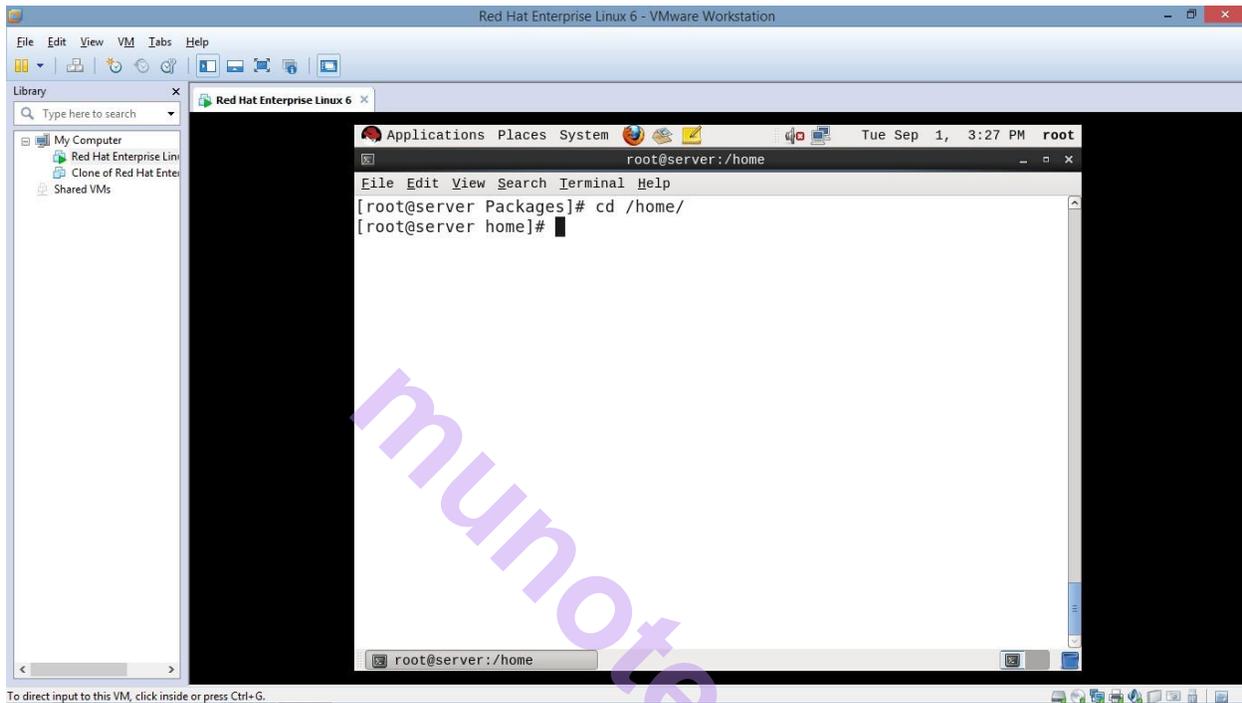
```
File Edit View Search Terminal Help
root@server:/media/RHEL_6.0 i386 Disc 1/Packages
[root@server Packages]# rpm -qa | grep samba
samba-common-3.5.4-68.el6.i686
samba-winbind-clients-3.5.4-68.el6.i686
samba-client-3.5.4-68.el6.i686
[root@server Packages]#
```

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The following package with the version number should be installed – “samba-3.5.4-68.el6.i686”.

Now go to your home directory:

cd /home



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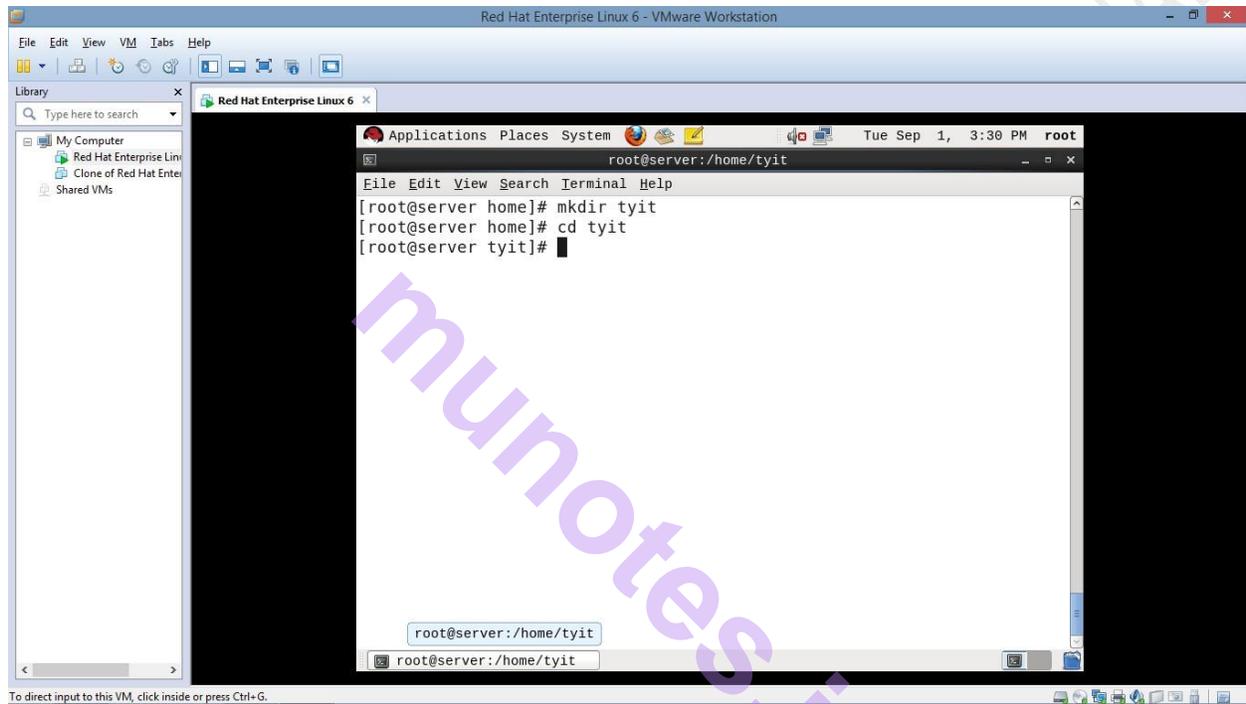
Now create a directory and create few files into it. You can also write the contents in the file.

This is a directory to be shared by samba.

mkdir tyit

Go inside tyit directory to create files into it

cd tyit (// change directory)



The screenshot shows a Red Hat Enterprise Linux 6 - VMware Workstation window. The terminal window is open, displaying the following commands and output:

```
root@server:/home/tyit
File Edit View Search Terminal Help
[root@server home]# mkdir tyit
[root@server home]# cd tyit
[root@server tyit]#
```

The terminal window title is "root@server:/home/tyit". The system clock shows "Tue Sep 1, 3:30 PM". The terminal window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal window has a title bar with "root@server:/home/tyit". The terminal window has a status bar with "root@server:/home/tyit".

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touch f1 f2 f3 (creating 3 files with touch command – 3 files (f1 , f2, f3) with zero byte size will be created)

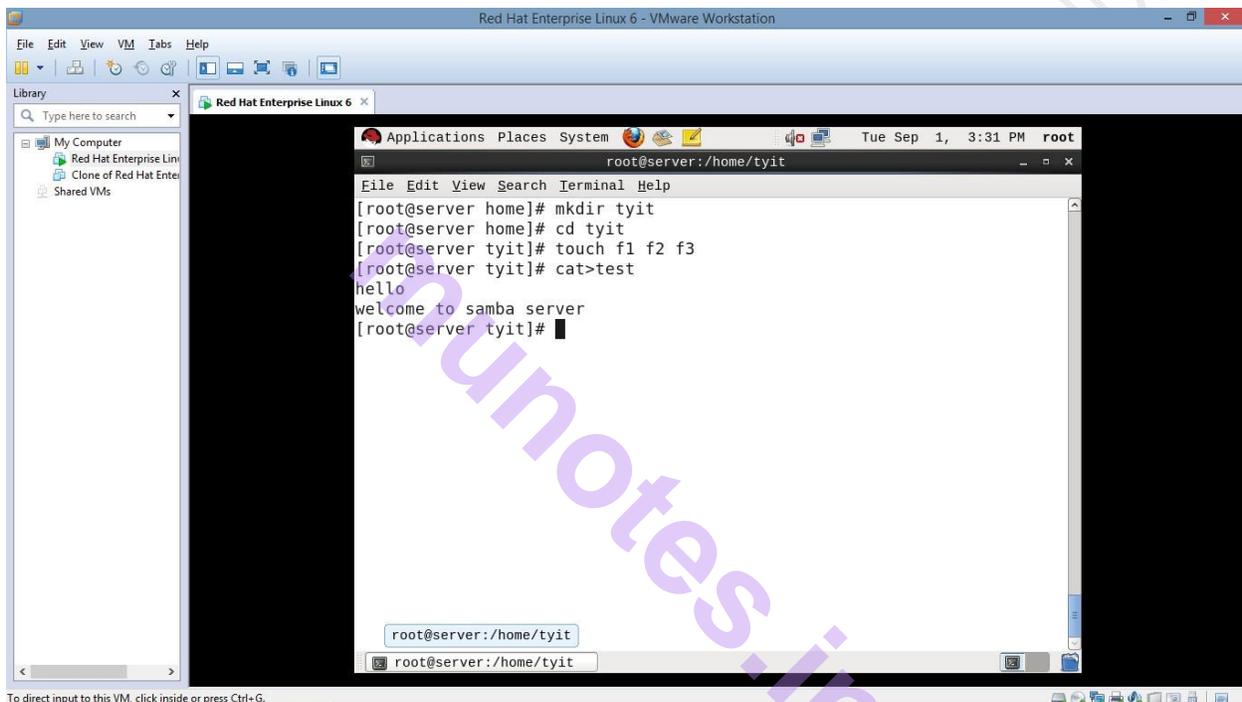
Creating a file named as ‘test’ with cat command

cat > test

// Write the contents

Hello my First Samba file to be shared

Press <ctrl+d> to save the file.



The screenshot shows a VMware Workstation window titled "Red Hat Enterprise Linux 6 - VMware Workstation". Inside the VM, a terminal window is open with the following commands and output:

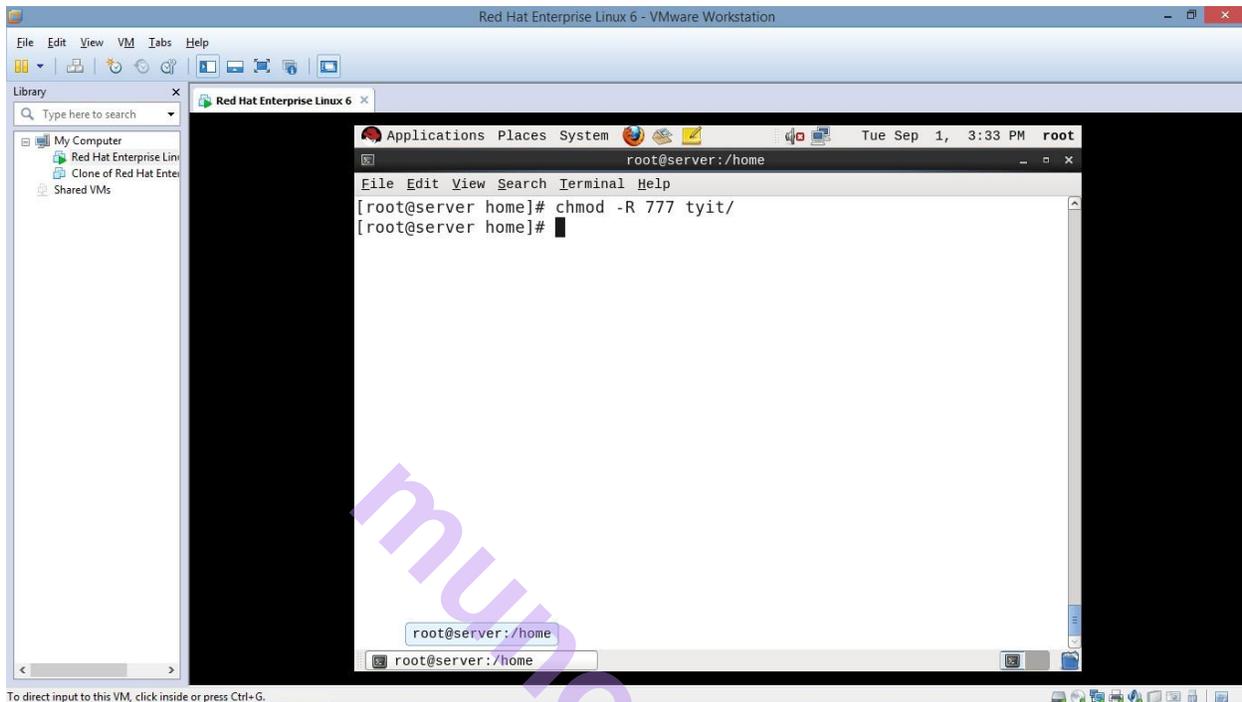
```
File Edit View Search Terminal Help
[root@server home]# mkdir tyit
[root@server home]# cd tyit
[root@server tyit]# touch f1 f2 f3
[root@server tyit]# cat>test
hello
welcome to samba server
[root@server tyit]#
```

The terminal window title is "root@server:/home/tyit". The system tray at the bottom shows the date and time as "Tue Sep 1, 3:31 PM" and the user as "root".

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Also give this directory full permission.

chmod -R 777 /tyit/

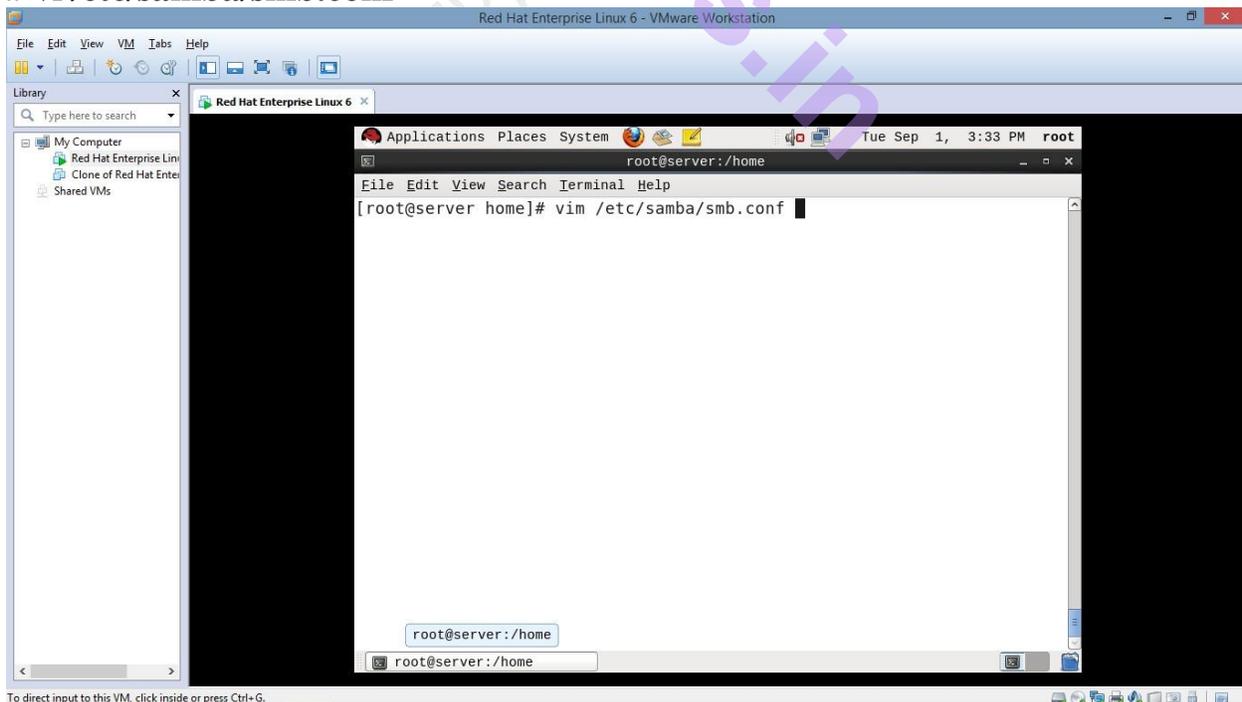


The screenshot shows a terminal window within a VMware Workstation environment. The terminal prompt is root@server:/home. The user has entered the command `chmod -R 777 tyit/` and the prompt has returned. A large watermark 'muntotes.in' is visible across the terminal area.

```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# chmod -R 777 tyit/
[root@server home]#
```

Open the samba configuration file :

vi /etc/samba/smb.conf



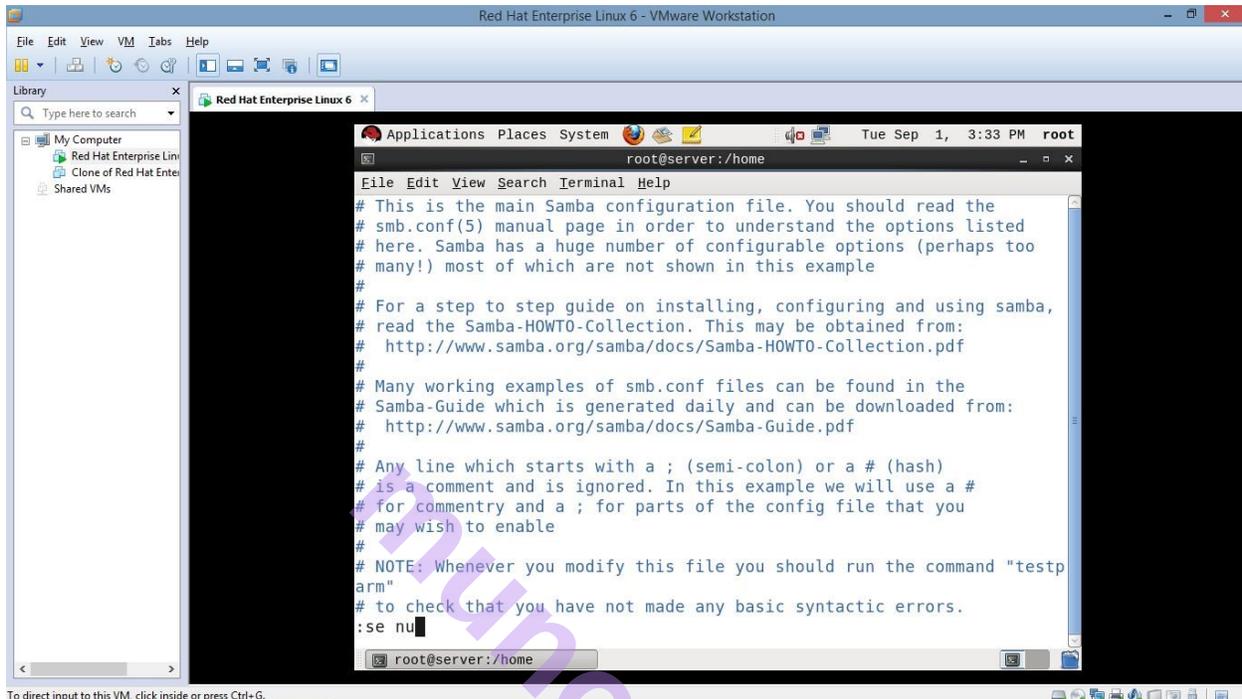
The screenshot shows a terminal window within a VMware Workstation environment. The terminal prompt is root@server:/home. The user has entered the command `vim /etc/samba/smb.conf` and the prompt has returned. A large watermark 'muntotes.in' is visible across the terminal area.

```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# vim /etc/samba/smb.conf
```

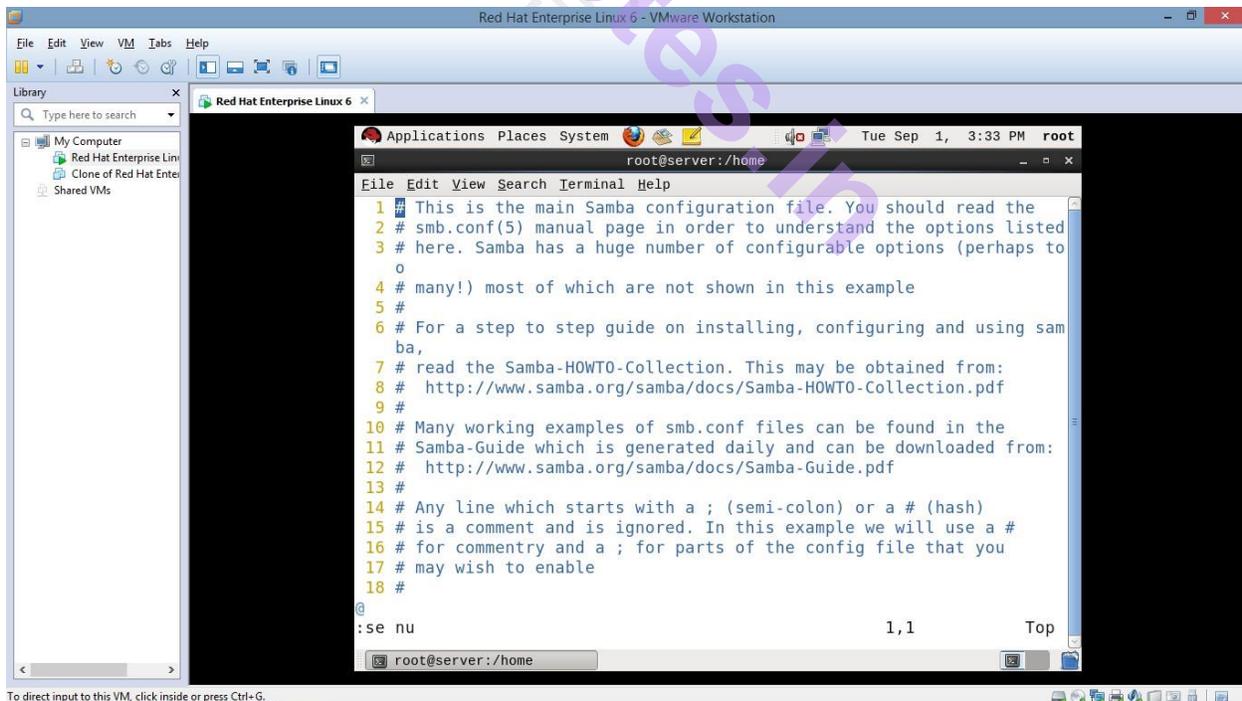
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Make the following changes:

To set the line numbers - :se nu



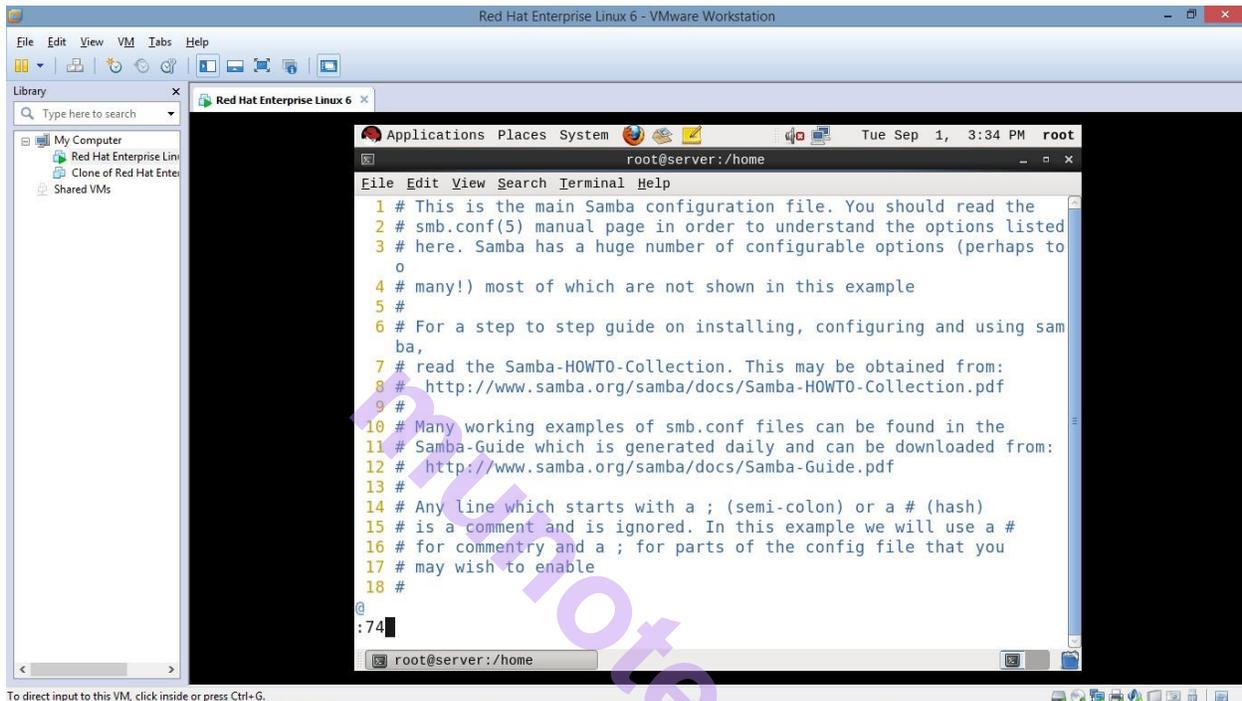
```
root@server:/home
File Edit View Search Terminal Help
# This is the main Samba configuration file. You should read the
# smb.conf(5) manual page in order to understand the options listed
# here. Samba has a huge number of configurable options (perhaps too
# many!) most of which are not shown in this example
#
# For a step to step guide on installing, configuring and using samba,
# read the Samba-HOWTO-Collection. This may be obtained from:
# http://www.samba.org/samba/docs/Samba-HOWTO-Collection.pdf
#
# Many working examples of smb.conf files can be found in the
# Samba-Guide which is generated daily and can be downloaded from:
# http://www.samba.org/samba/docs/Samba-Guide.pdf
#
# Any line which starts with a ; (semi-colon) or a # (hash)
# is a comment and is ignored. In this example we will use a #
# for commentry and a ; for parts of the config file that you
# may wish to enable
#
# NOTE: Whenever you modify this file you should run the command "testp
# arm"
# to check that you have not made any basic syntactic errors.
:se nu
```



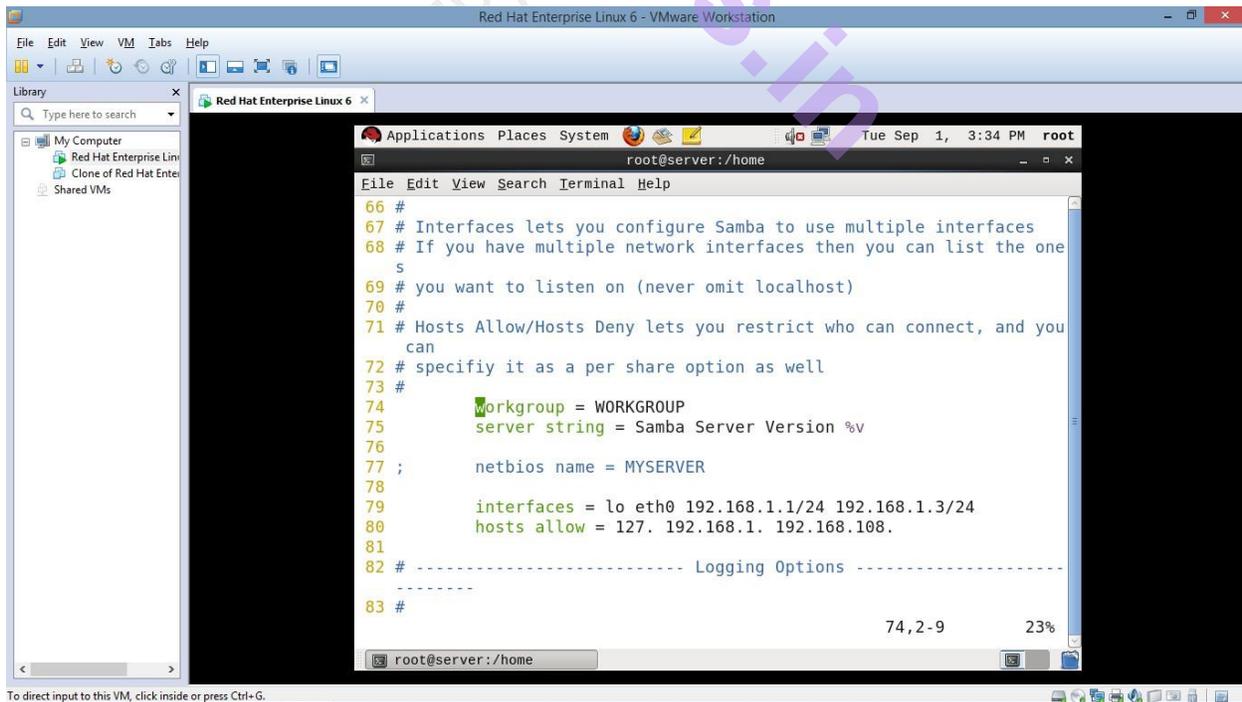
```
root@server:/home
File Edit View Search Terminal Help
1 # This is the main Samba configuration file. You should read the
2 # smb.conf(5) manual page in order to understand the options listed
3 # here. Samba has a huge number of configurable options (perhaps to
4 # many!) most of which are not shown in this example
5 #
6 # For a step to step guide on installing, configuring and using sam
7 # ba,
8 # read the Samba-HOWTO-Collection. This may be obtained from:
9 # http://www.samba.org/samba/docs/Samba-HOWTO-Collection.pdf
10 # Many working examples of smb.conf files can be found in the
11 # Samba-Guide which is generated daily and can be downloaded from:
12 # http://www.samba.org/samba/docs/Samba-Guide.pdf
13 #
14 # Any line which starts with a ; (semi-colon) or a # (hash)
15 # is a comment and is ignored. In this example we will use a #
16 # for commentry and a ; for parts of the config file that you
17 # may wish to enable
18 #
@
:se nu                                     1,1      Top
```

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- a) Line no 74: workgroup=MYGROUP To workgroup=WORKGROUP(windows workgroup)
- b) Line no 79: eth0 192.168.1.1/24 192.168.1.3/24
- c) Line no 80: 127. 192.168.1. 192.168.108.



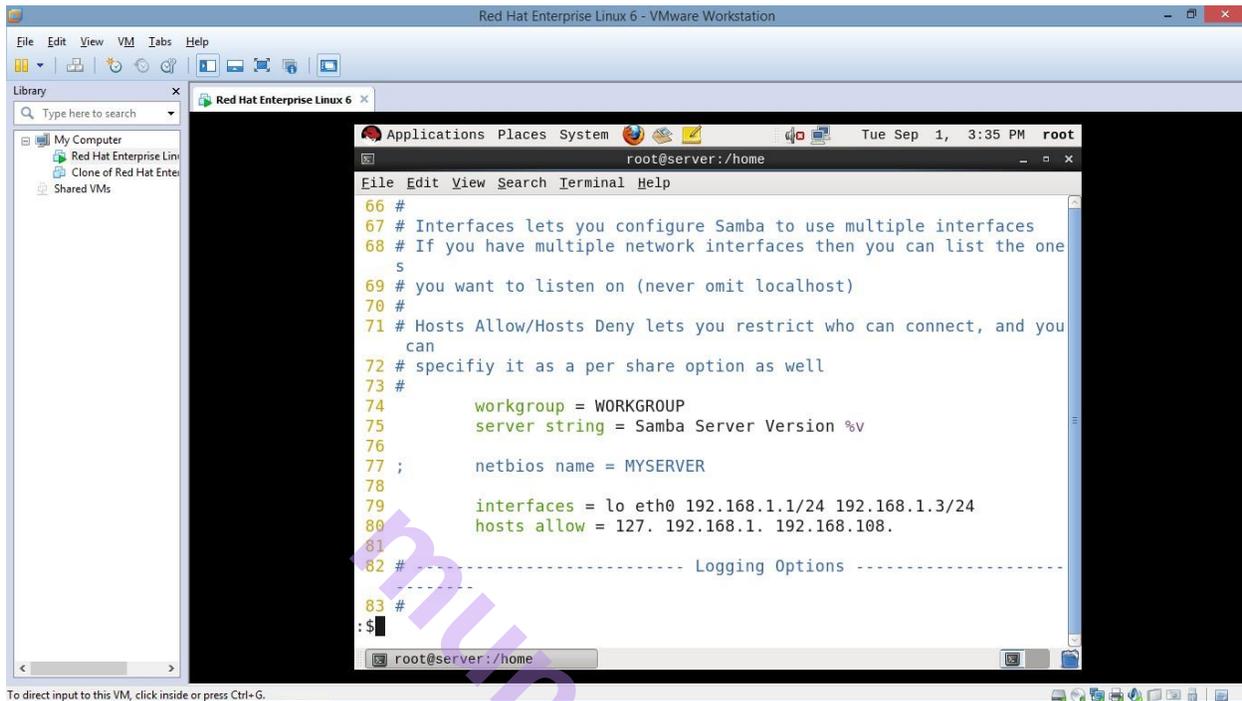
```
root@server:/home
File Edit View Search Terminal Help
1 # This is the main Samba configuration file. You should read the
2 # smb.conf(5) manual page in order to understand the options listed
3 # here. Samba has a huge number of configurable options (perhaps to
4 # many!) most of which are not shown in this example
5 #
6 # For a step to step guide on installing, configuring and using sam
7 # ba,
8 # read the Samba-HOWTO-Collection. This may be obtained from:
9 # http://www.samba.org/samba/docs/Samba-HOWTO-Collection.pdf
10 #
11 # Many working examples of smb.conf files can be found in the
12 # Samba-Guide which is generated daily and can be downloaded from:
13 # http://www.samba.org/samba/docs/Samba-Guide.pdf
14 #
15 # Any line which starts with a ; (semi-colon) or a # (hash)
16 # is a comment and is ignored. In this example we will use a #
17 # for commentry and a ; for parts of the config file that you
18 # may wish to enable
19 #
20 #
21 #
22 #
23 #
24 #
25 #
26 #
27 #
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30 #
31 #
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91 #
92 #
93 #
94 #
95 #
96 #
97 #
98 #
99 #
100 #
:74
```



```
root@server:/home
File Edit View Search Terminal Help
66 #
67 # Interfaces lets you configure Samba to use multiple interfaces
68 # If you have multiple network interfaces then you can list the one
69 # you want to listen on (never omit localhost)
70 #
71 # Hosts Allow/Hosts Deny lets you restrict who can connect, and you
72 # can
73 # specify it as a per share option as well
74 #
75 #
76 #
77 #
78 #
79 #
80 #
81 #
82 #
83 #
workgroup = WORKGROUP
server string = Samba Server Version %v
; netbios name = MYSERVER
interfaces = lo eth0 192.168.1.1/24 192.168.1.3/24
hosts allow = 127. 192.168.1. 192.168.108.
# ----- Logging Options -----
#
```

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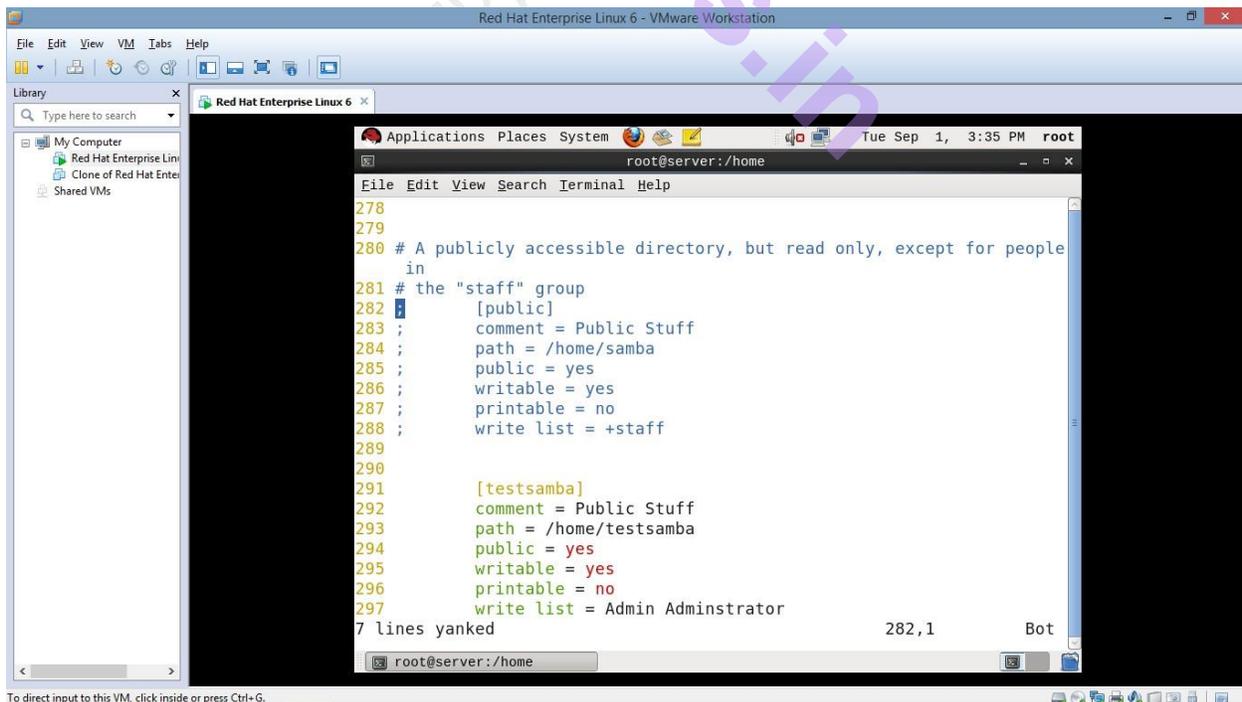
Now go to end of the file - > Press Esc -> :\$



```
File Edit View Search Terminal Help
66 #
67 # Interfaces lets you configure Samba to use multiple interfaces
68 # If you have multiple network interfaces then you can list the one
69 # you want to listen on (never omit localhost)
70 #
71 # Hosts Allow/Hosts Deny lets you restrict who can connect, and you
72 # can
73 # specify it as a per share option as well
74 #
75     workgroup = WORKGROUP
76     server string = Samba Server Version %v
77 ;
78     netbios name = MYSERVER
79
80     interfaces = lo eth0 192.168.1.1/24 192.168.1.3/24
81     hosts allow = 127. 192.168.1. 192.168.108.
82 # ----- Logging Options -----
83 #
:$
```

d) At the end of the file copy 7 lines and paste it.

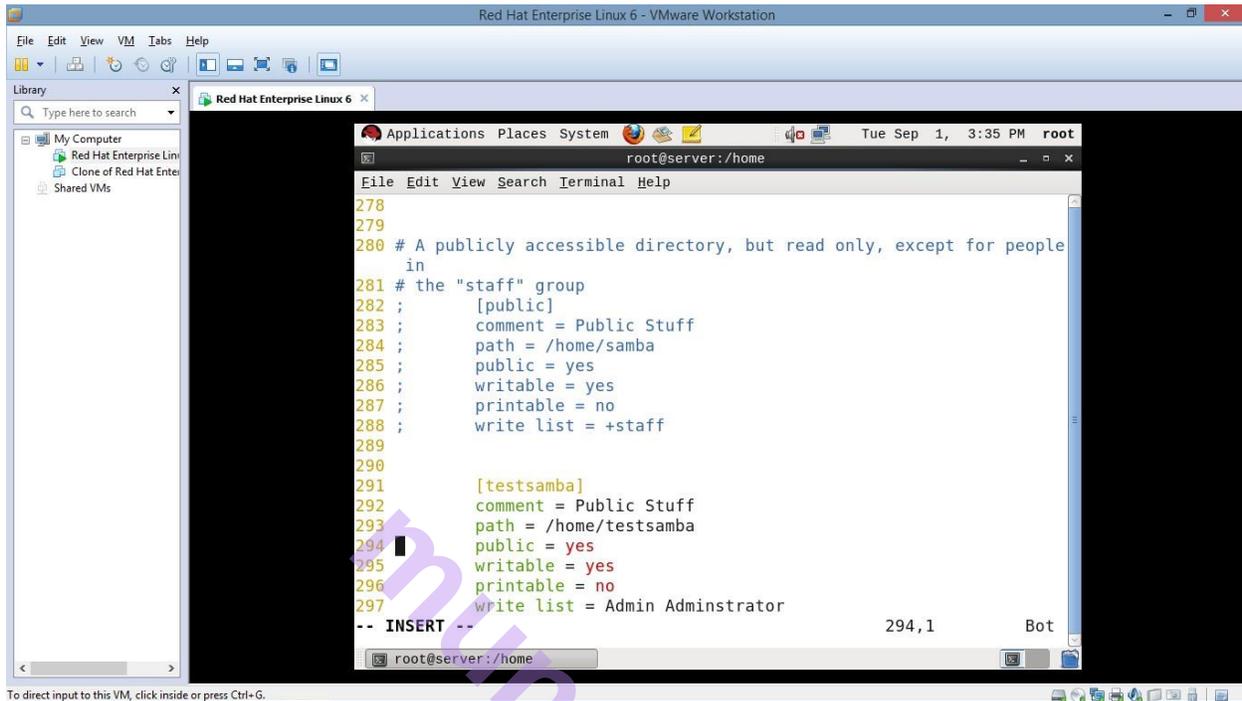
e) To copy 7 lines - type 7yy



```
File Edit View Search Terminal Help
278
279
280 # A publicly accessible directory, but read only, except for people
281 # in the "staff" group
282 [public]
283 ;   comment = Public Stuff
284 ;   path = /home/samba
285 ;   public = yes
286 ;   writable = yes
287 ;   printable = no
288 ;   write list = +staff
289
290
291     [testsamba]
292     comment = Public Stuff
293     path = /home/testsamba
294     public = yes
295     writable = yes
296     printable = no
297     write list = Admin Administrator
7 lines yanked                                282,1      Bot
root@server:/home
```

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Go to Insert mode -> press ' i ' -> press Enter and now paste it at the end

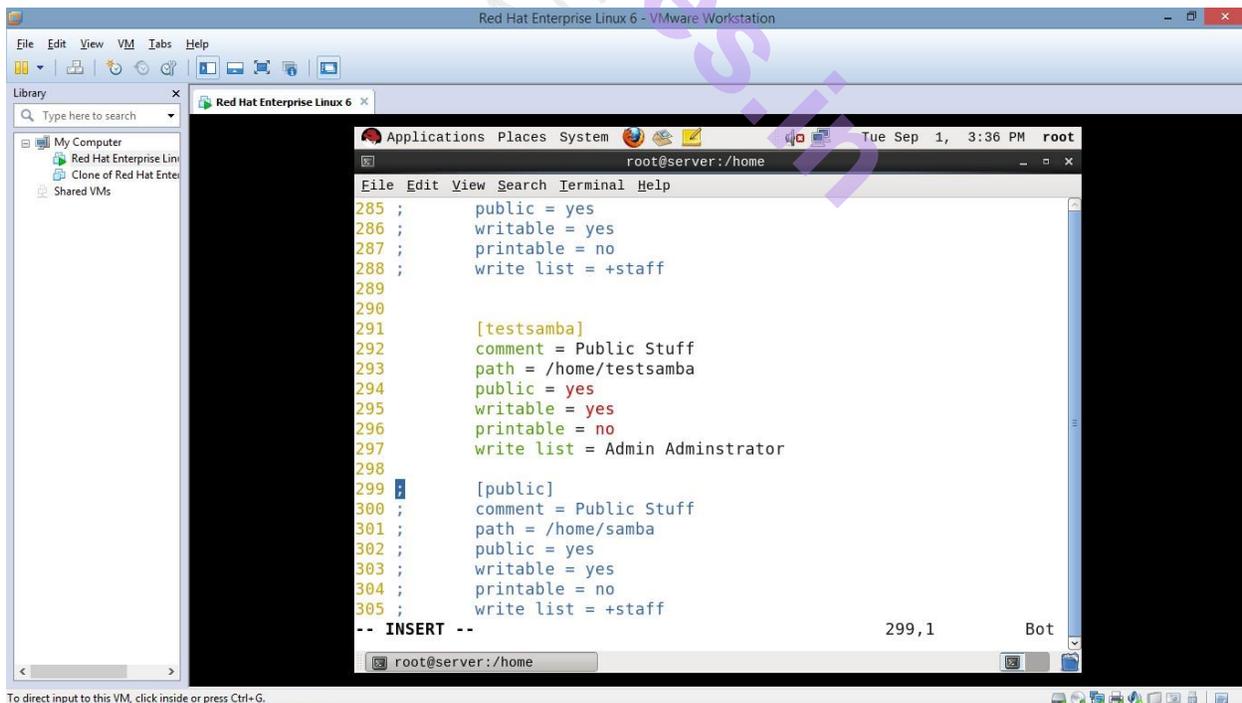


The screenshot shows a terminal window in Red Hat Enterprise Linux 6. The terminal displays the following content:

```
File Edit View Search Terminal Help
278
279
280 # A publicly accessible directory, but read only, except for people
    in
281 # the "staff" group
282 ;     [public]
283 ;     comment = Public Stuff
284 ;     path = /home/samba
285 ;     public = yes
286 ;     writable = yes
287 ;     printable = no
288 ;     write list = +staff
289
290
291     [testsamba]
292     comment = Public Stuff
293     path = /home/testsamba
294     public = yes
295     writable = yes
296     printable = no
297     write list = Admin Administrator
-- INSERT --                               294,1          Bot
root@server:/home
```

At the bottom of the terminal, the prompt is `root@server:/home`. The status bar at the bottom of the terminal window shows `294,1` and `Bot`.

To paste come out of Insert Mode – Press Esc Key -> press 'p'



The screenshot shows a terminal window in Red Hat Enterprise Linux 6. The terminal displays the following content:

```
File Edit View Search Terminal Help
285 ;     public = yes
286 ;     writable = yes
287 ;     printable = no
288 ;     write list = +staff
289
290
291     [testsamba]
292     comment = Public Stuff
293     path = /home/testsamba
294     public = yes
295     writable = yes
296     printable = no
297     write list = Admin Administrator
298
299     [public]
300 ;     comment = Public Stuff
301 ;     path = /home/samba
302 ;     public = yes
303 ;     writable = yes
304 ;     printable = no
305 ;     write list = +staff
-- INSERT --                               299,1          Bot
root@server:/home
```

At the bottom of the terminal, the prompt is `root@server:/home`. The status bar at the bottom of the terminal window shows `299,1` and `Bot`.

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Uncomment all the 7 lines and make the following changes.

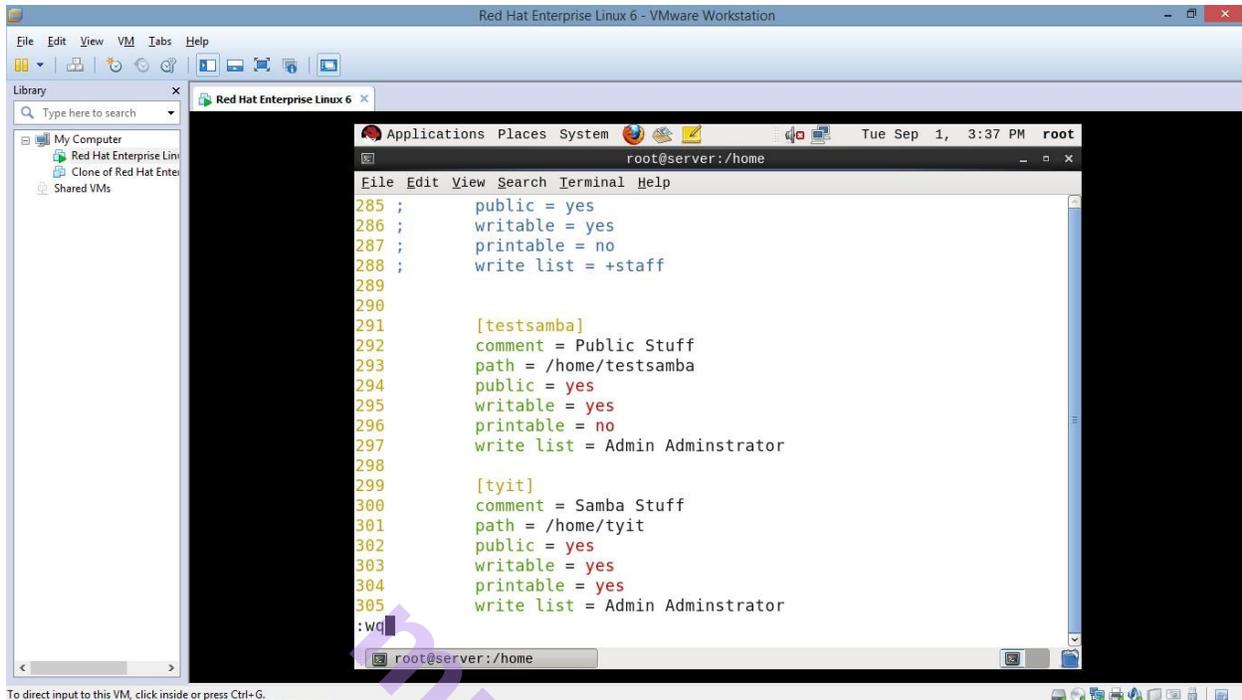
```
File Edit View Search Terminal Help
285 ;      public = yes
286 ;      writable = yes
287 ;      printable = no
288 ;      write list = +staff
289
290
291      [testsamba]
292      comment = Public Stuff
293      path = /home/testsamba
294      public = yes
295      writable = yes
296      printable = no
297      write list = Admin Administrator
298
299      [tyit]
300      comment = Samba Stuff
301      path = /home/tyit
302      public = yes
303      writable = yes
304      printable = yes
305      write list = Admin Administrator
-- INSERT --                               305,33-40      Bot
root@server:/home
```

After changes line should look as follows:

```
[tyit]
comment = samba stuff
path = /tyit
public=yes
writable =yes
;printable =yes
write list = Admin Administrator
```

Save the configuration file - > Press Esc Key and type :wq

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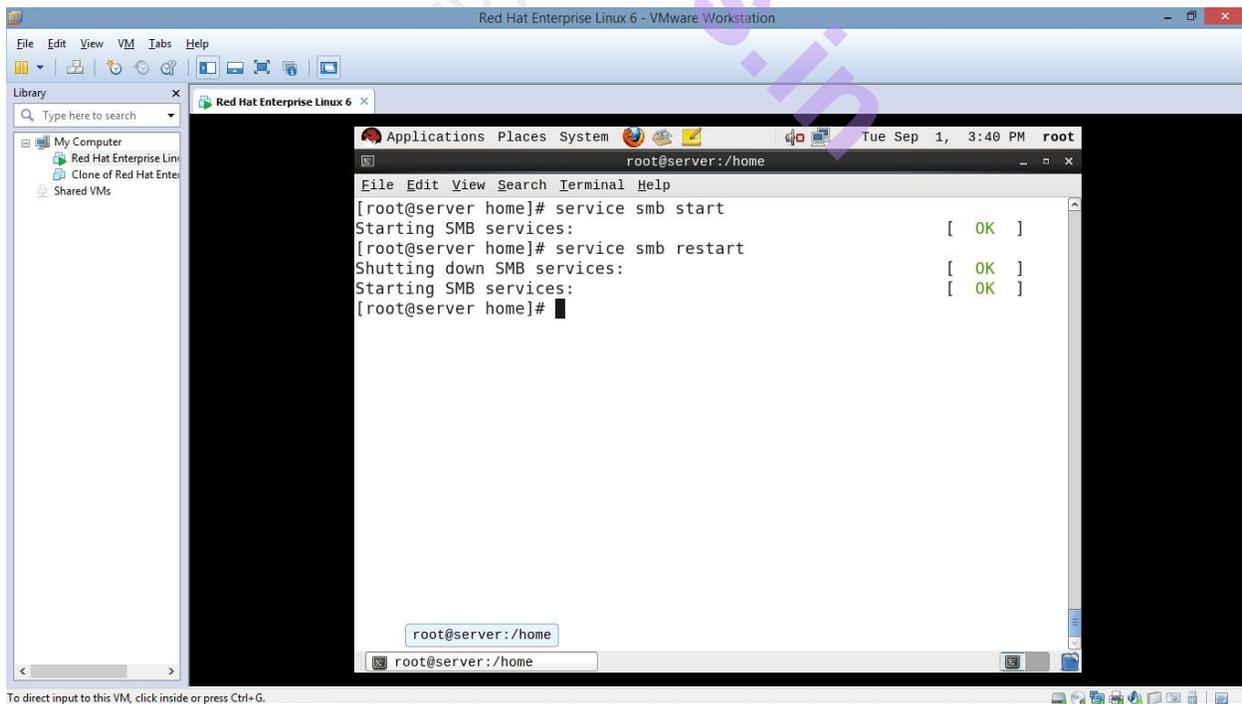


```
File Edit View Search Terminal Help
285 ;      public = yes
286 ;      writable = yes
287 ;      printable = no
288 ;      write list = +staff
289
290
291      [testsamba]
292      comment = Public Stuff
293      path = /home/testsamba
294      public = yes
295      writable = yes
296      printable = no
297      write list = Admin Administrator
298
299      [tyit]
300      comment = Samba Stuff
301      path = /home/tyit
302      public = yes
303      writable = yes
304      printable = yes
305      write list = Admin Administrator
:wq
```

Now start the smb service

```
#] service smb start
```

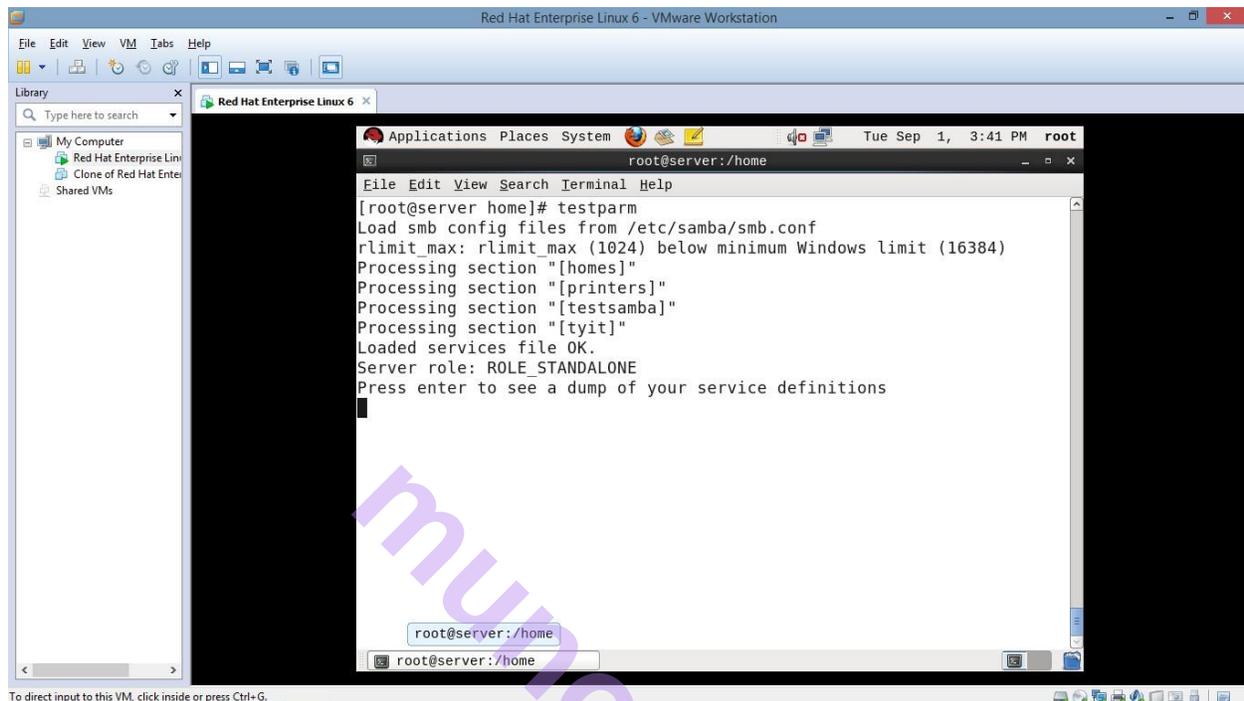
```
#] service smb restart
```



```
File Edit View Search Terminal Help
[root@server home]# service smb start
Starting SMB services:          [ OK ]
[root@server home]# service smb restart
Shutting down SMB services:   [ OK ]
Starting SMB services:        [ OK ]
[root@server home]#
```

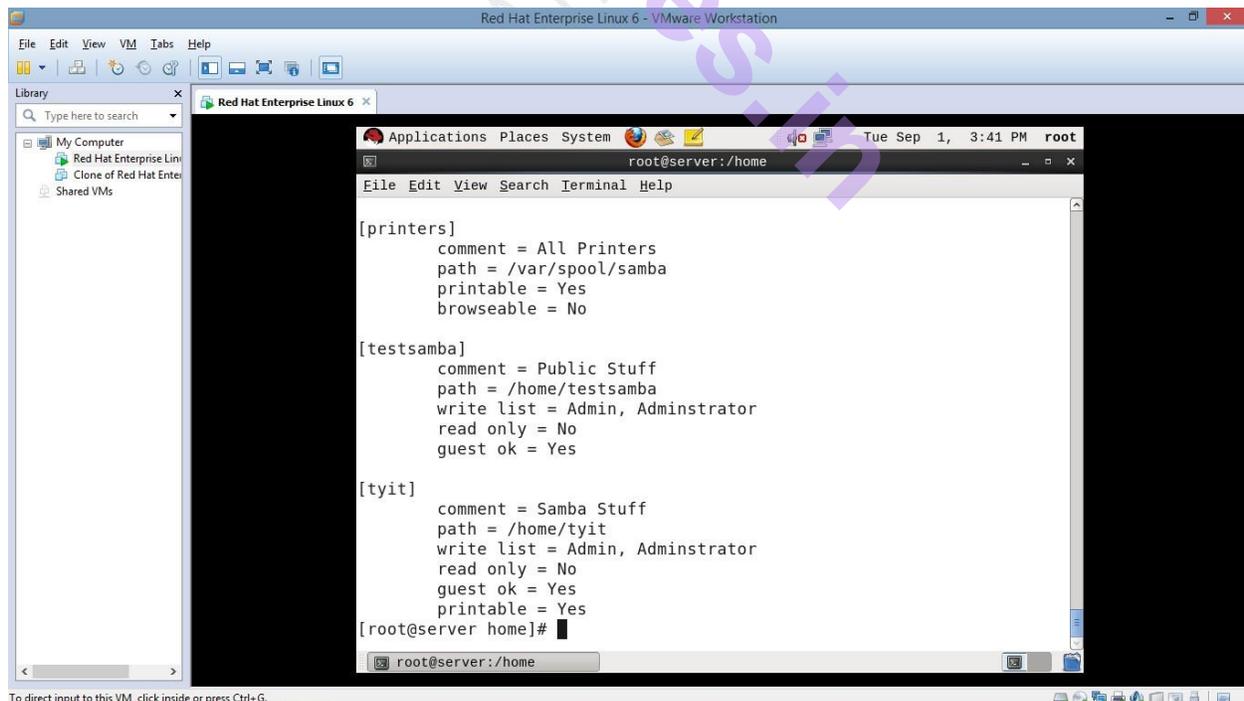
Linux Administration Practical Manual

Execute the command testparm to test the parameters



```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# testparm
Load smb config files from /etc/samba/smb.conf
rlimit_max: rlimit_max (1024) below minimum Windows limit (16384)
Processing section "[homes]"
Processing section "[printers]"
Processing section "[testsamba]"
Processing section "[tyit]"
Loaded services file OK.
Server role: ROLE_STANDALONE
Press enter to see a dump of your service definitions

```



```
root@server:/home
File Edit View Search Terminal Help
[printers]
  comment = All Printers
  path = /var/spool/samba
  printable = Yes
  browseable = No

[testsamba]
  comment = Public Stuff
  path = /home/testsamba
  write list = Admin, Administrator
  read only = No
  guest ok = Yes

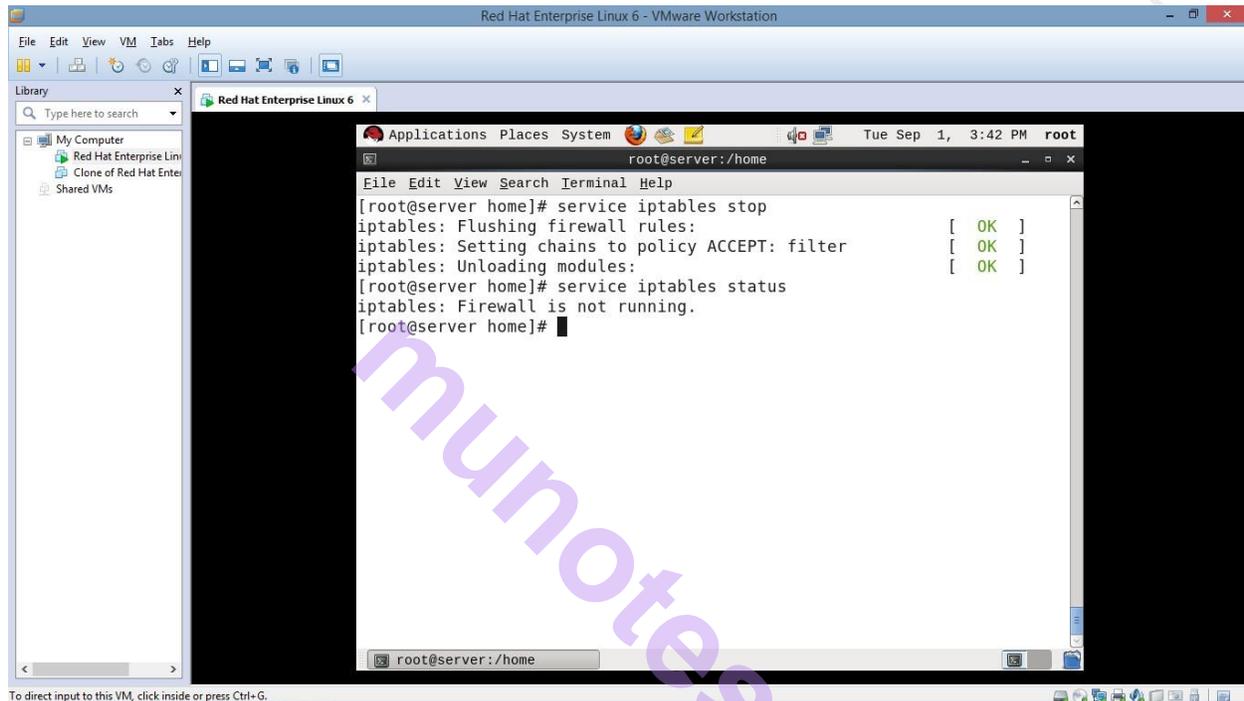
[tyit]
  comment = Samba Stuff
  path = /home/tyit
  write list = Admin, Administrator
  read only = No
  guest ok = Yes
  printable = Yes
[root@server home]#
```

Stop Firewalls

```
# service iptables stop
```

To check whether firewalls are stopped

```
# service iptables status
```



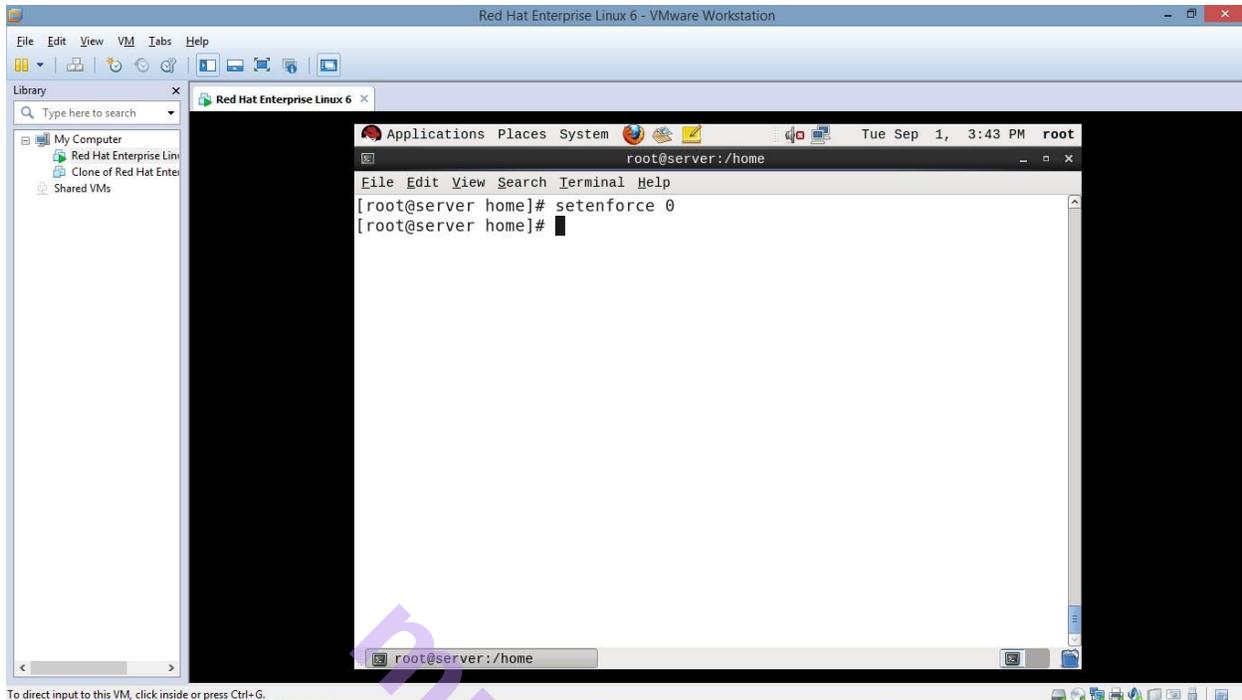
The screenshot shows a terminal window within a VMware Workstation environment. The terminal prompt is root@server:/home. The user has entered the command 'service iptables stop', which outputs three lines of status: 'iptables: Flushing firewall rules: [OK]', 'iptables: Setting chains to policy ACCEPT: filter [OK]', and 'iptables: Unloading modules: [OK]'. The user then enters 'service iptables status', which outputs 'iptables: Firewall is not running.' The terminal window is titled 'root@server:/home' and has a menu bar with 'File Edit View Search Terminal Help'. The VMware Workstation window title is 'Red Hat Enterprise Linux 6 - VMware Workstation'.

```
File Edit View Search Terminal Help
root@server:/home
[root@server home]# service iptables stop
iptables: Flushing firewall rules:      [ OK ]
iptables: Setting chains to policy ACCEPT: filter  [ OK ]
iptables: Unloading modules:           [ OK ]
[root@server home]# service iptables status
iptables: Firewall is not running.
[root@server home]#
```

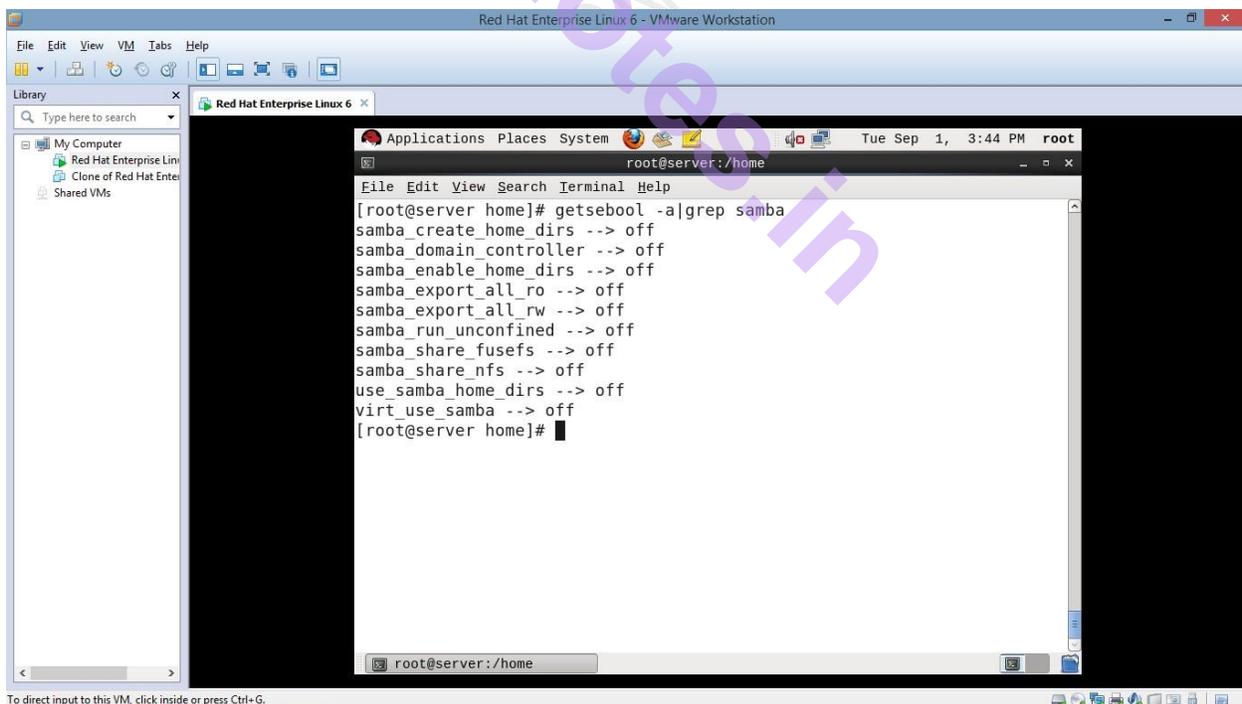
To give temporary read only permissions

```
# setenforce 0
```

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getsebool -a | grep samba

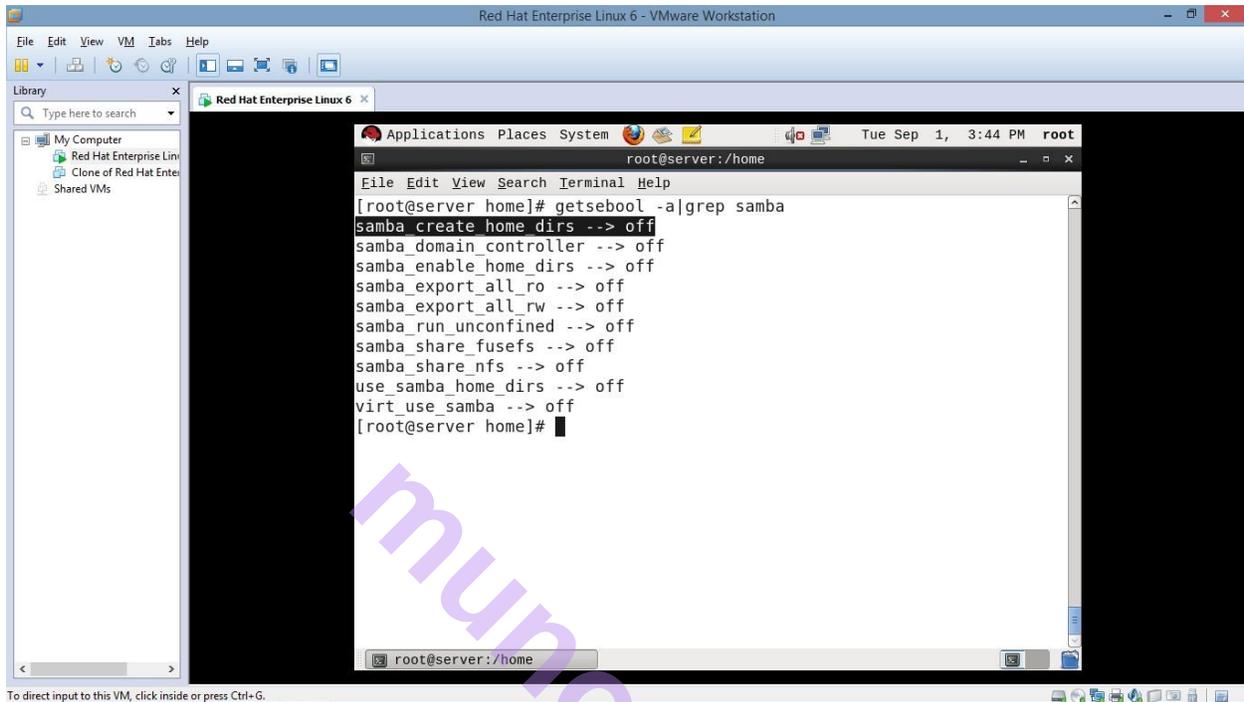


In this file home directory is off

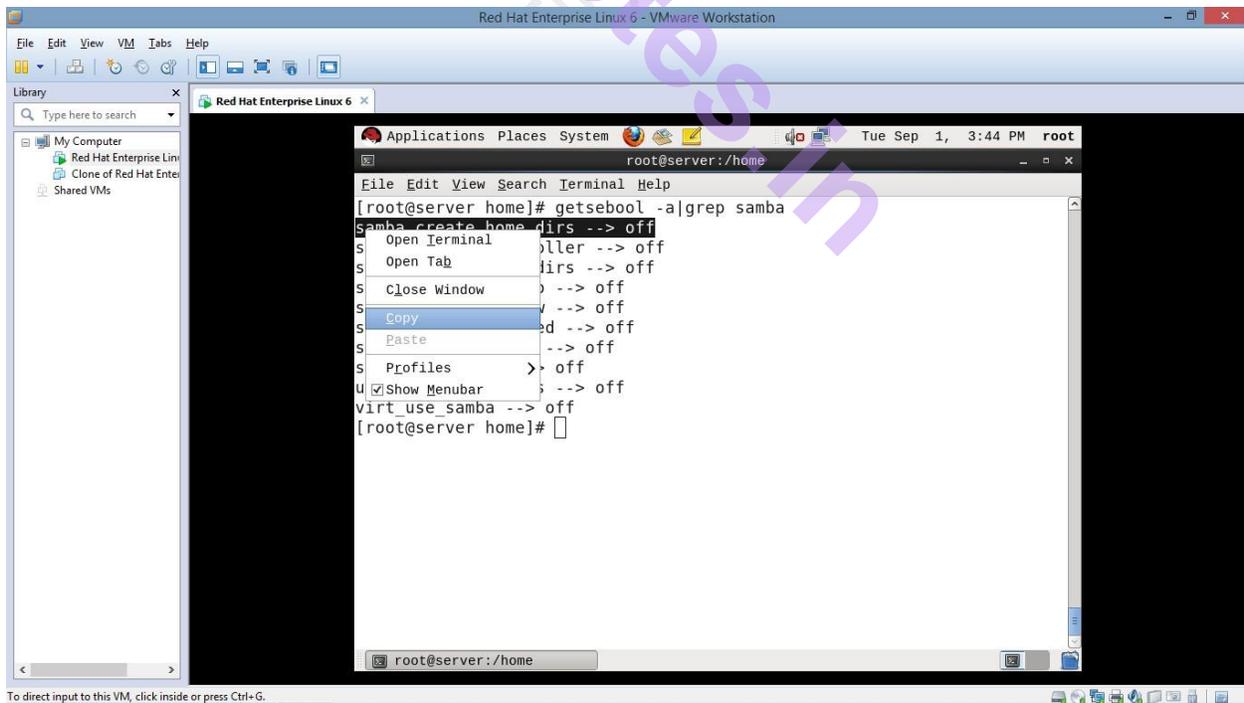
To make it on copy first line and paste with setsebool command as follows

Linux Administration Practical Manual

#setsebool samba_enable_home_dirs=1

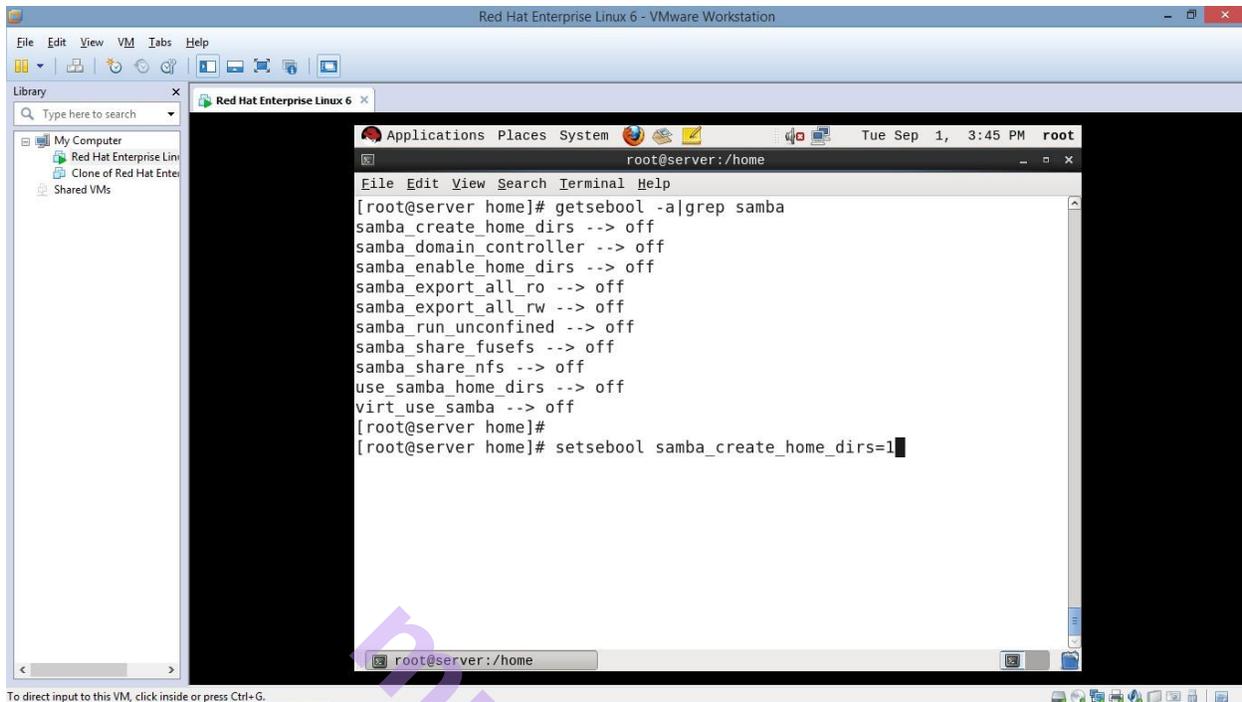


```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# getsebool -a|grep samba
samba_create_home_dirs --> off
samba_domain_controller --> off
samba_enable_home_dirs --> off
samba_export_all_ro --> off
samba_export_all_rw --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
use_samba_home_dirs --> off
virt_use_samba --> off
[root@server home]#
```



```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# getsebool -a|grep samba
samba_create_home_dirs --> off
samba_domain_controller --> off
samba_enable_home_dirs --> off
samba_export_all_ro --> off
samba_export_all_rw --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
use_samba_home_dirs --> off
virt_use_samba --> off
[root@server home]#
```

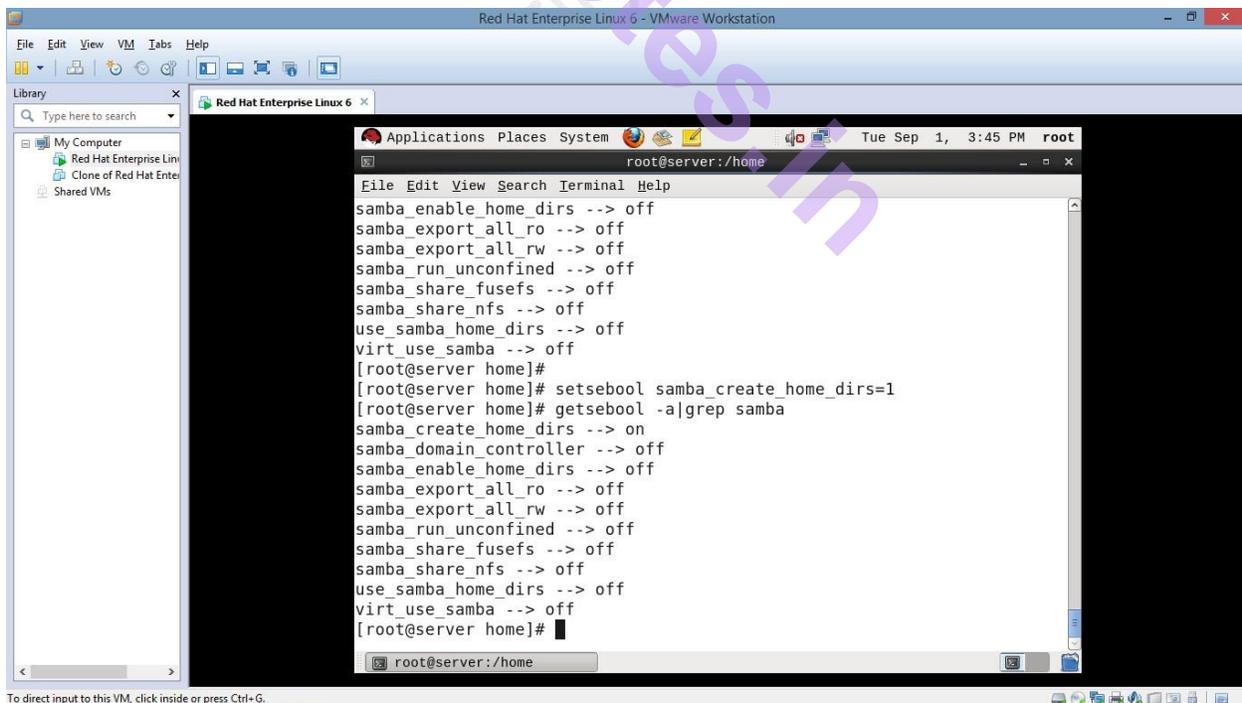
Linux Administration Practical Manual



```
File Edit View Search Terminal Help
root@server:/home
[root@server home]# getsebool -a|grep samba
samba_create_home_dirs --> off
samba_domain_controller --> off
samba_enable_home_dirs --> off
samba_export_all_ro --> off
samba_export_all_rw --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
use_samba_home_dirs --> off
virt_use_samba --> off
[root@server home]#
[root@server home]# setsebool samba_create_home_dirs=1
```

Now to check whether home directory is enabled:

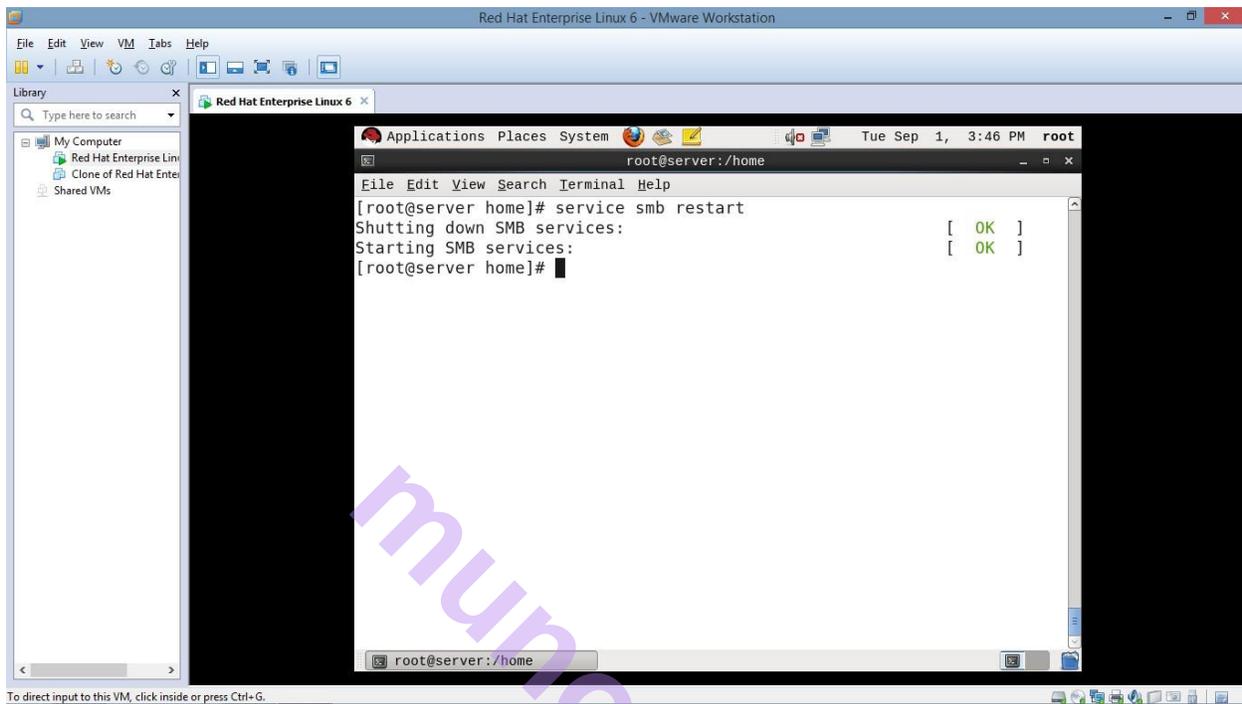
getsebool -a | grep samba



```
File Edit View Search Terminal Help
root@server:/home
samba_enable_home_dirs --> off
samba_export_all_ro --> off
samba_export_all_rw --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
use_samba_home_dirs --> off
virt_use_samba --> off
[root@server home]#
[root@server home]# setsebool samba_create_home_dirs=1
[root@server home]# getsebool -a|grep samba
samba_create_home_dirs --> on
samba_domain_controller --> off
samba_enable_home_dirs --> off
samba_export_all_ro --> off
samba_export_all_rw --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
use_samba_home_dirs --> off
virt_use_samba --> off
[root@server home]#
```

Restart the samba service

```
# service smb restart
```



The screenshot shows a terminal window within a VMware Workstation environment. The terminal prompt is root@server:/home. The user enters the command 'service smb restart'. The output shows 'Shutting down SMB services:' followed by '[OK]' and 'Starting SMB services:' followed by '[OK]'. The terminal prompt returns to root@server/home.

```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# service smb restart
Shutting down SMB services:          [ OK ]
Starting SMB services:              [ OK ]
[root@server home]#
```

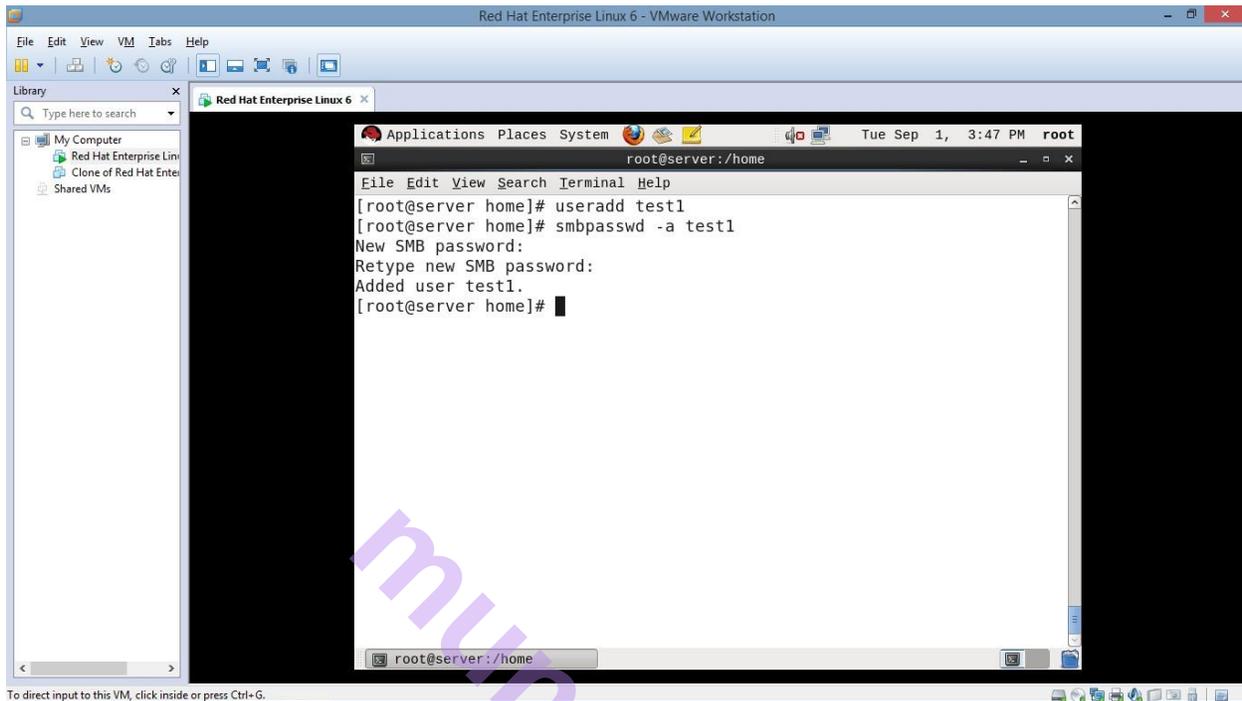
Create a samba user and assign password

```
# useradd test1
```

```
# smbpasswd -a test1
```

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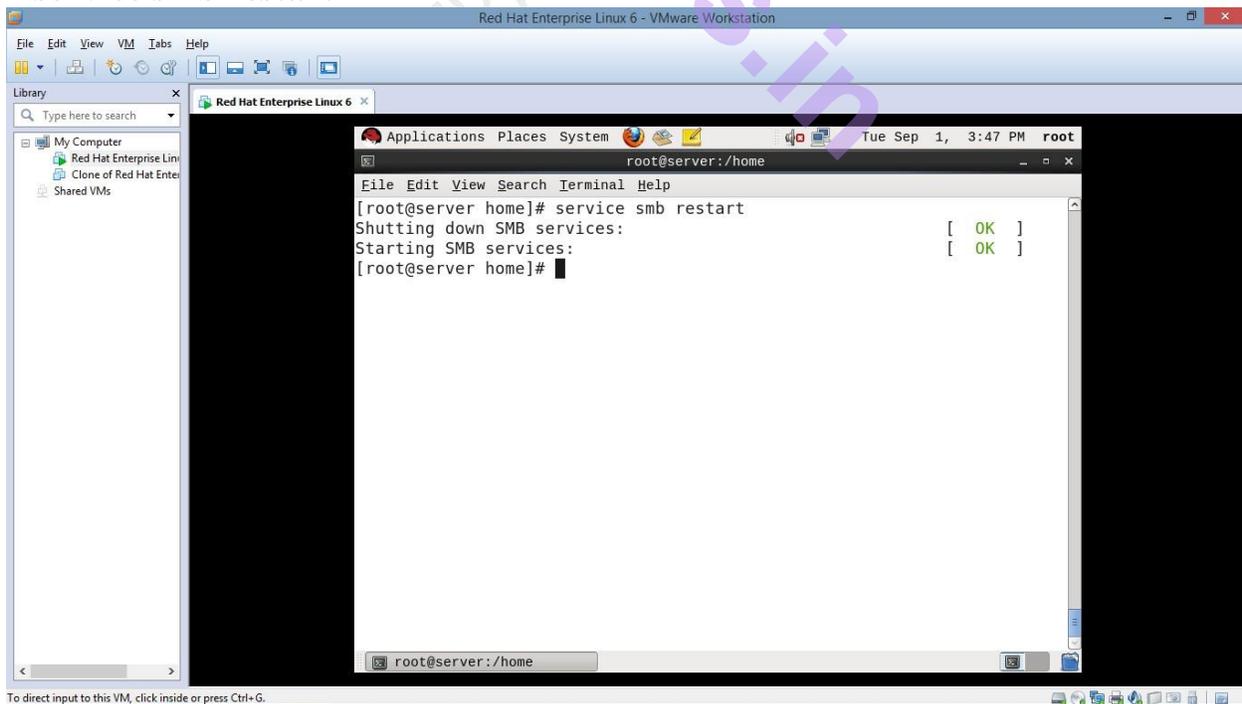
Enter the password and confirm password



```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# useradd test1
[root@server home]# smbpasswd -a test1
New SMB password:
Retype new SMB password:
Added user test1.
[root@server home]#
```

Restart the service

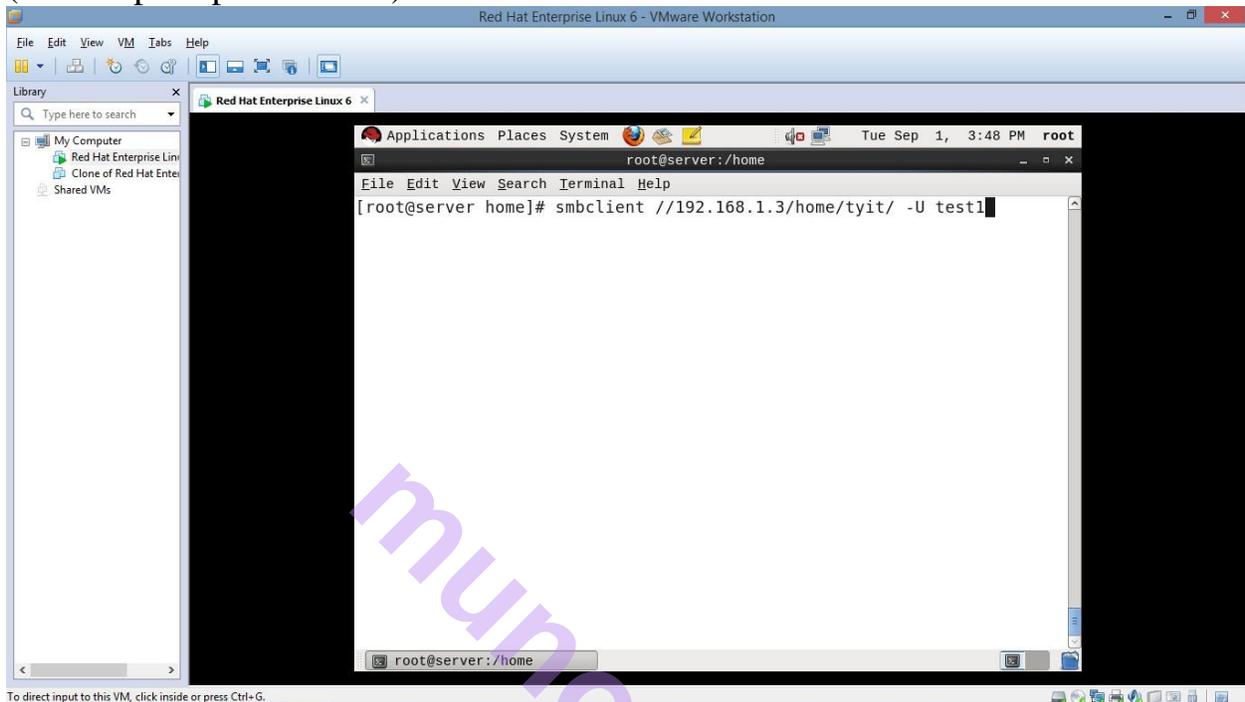
service smb restart



```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# service smb restart
Shutting down SMB services: [ OK ]
Starting SMB services: [ OK ]
[root@server home]#
```

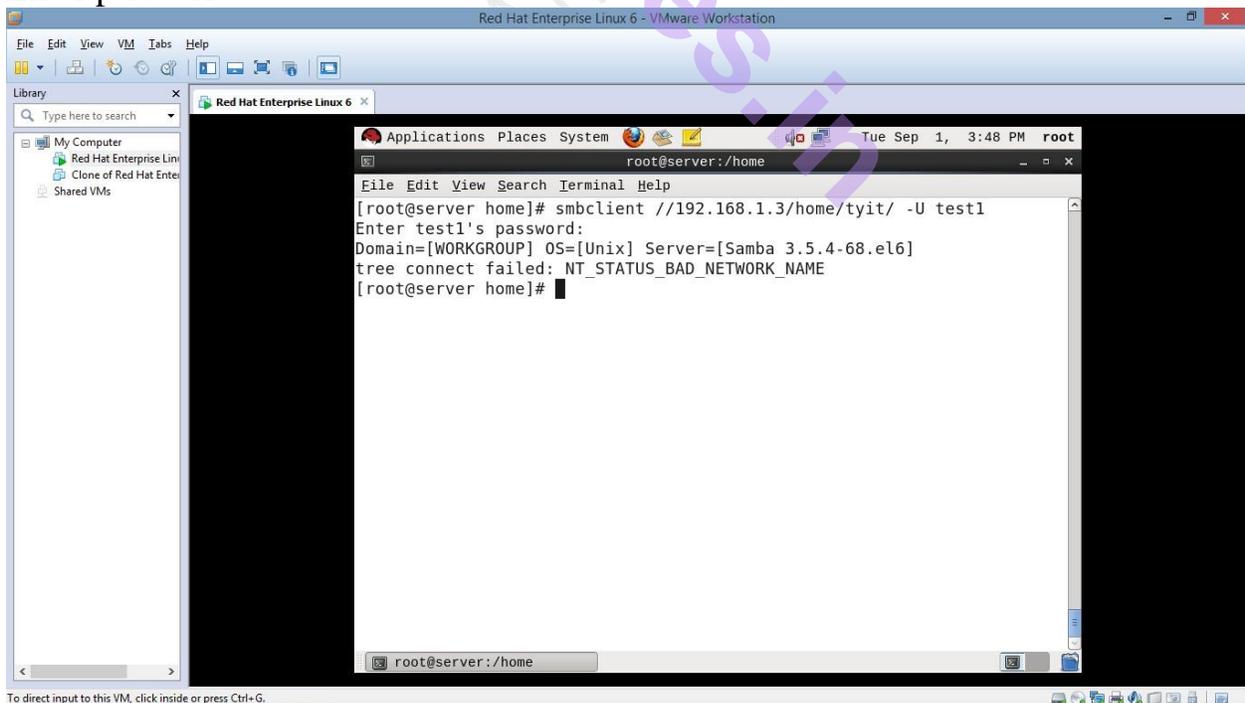
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#smbclient //192.168.1.3/home/tyit/ -U test1
(-U will prompt username)



```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# smbclient //192.168.1.3/home/tyit/ -U test1
```

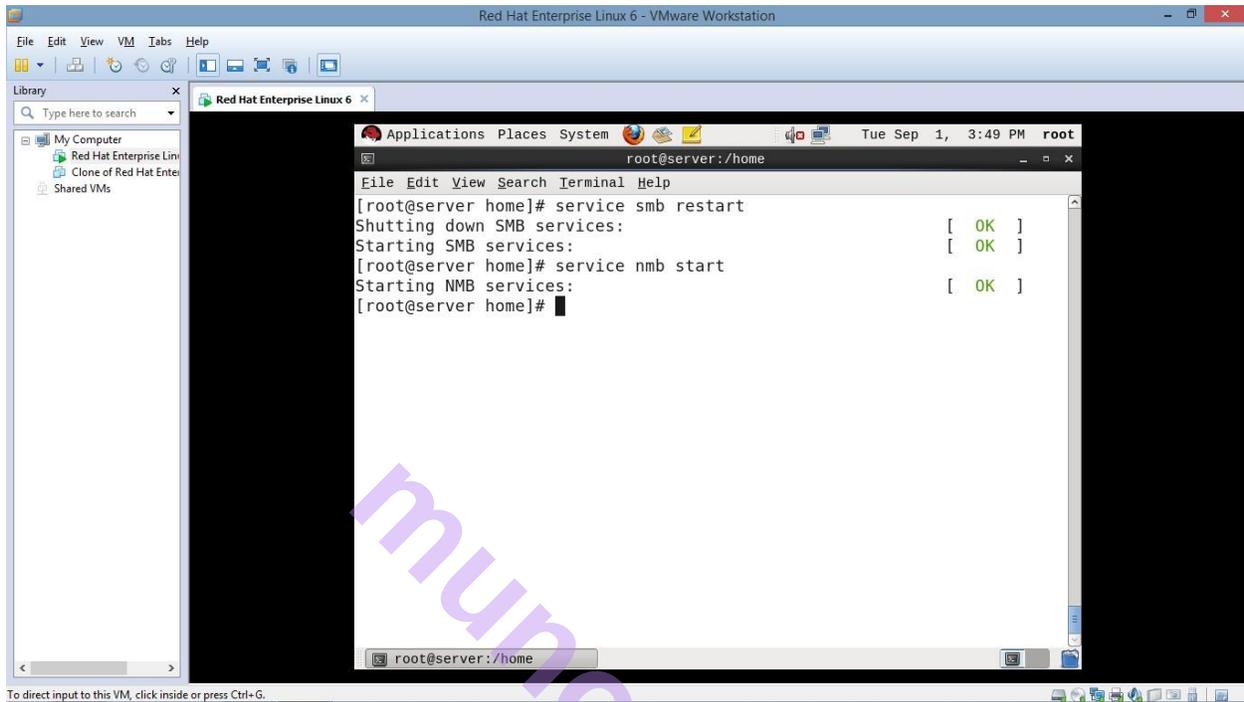
Enter password :



```
root@server:/home
File Edit View Search Terminal Help
[root@server home]# smbclient //192.168.1.3/home/tyit/ -U test1
Enter test1's password:
Domain=[WORKGROUP] OS=[Unix] Server=[Samba 3.5.4-68.el6]
tree connect failed: NT_STATUS_BAD_NETWORK_NAME
[root@server home]#
```

service smb restart

service nmb start (//start network services)



The screenshot shows a terminal window within a VMware Workstation environment. The terminal prompt is root@server:/home. The user has entered the following commands and received the following output:

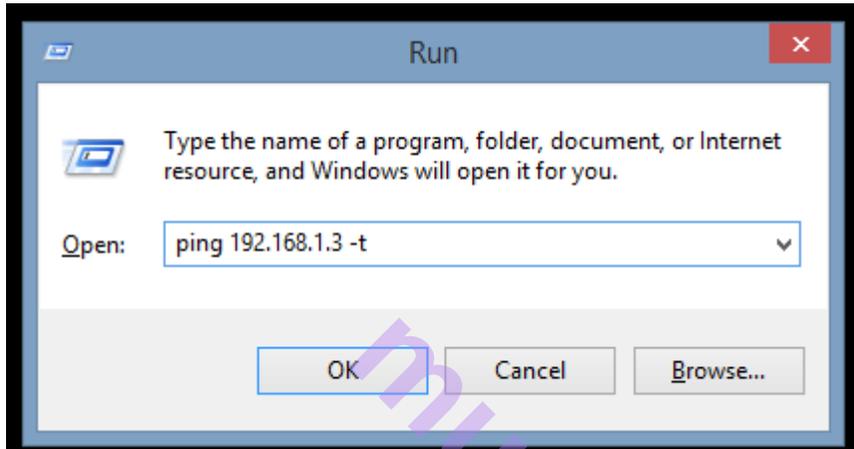
```
File Edit View Search Terminal Help
[root@server home]# service smb restart
Shutting down SMB services:           [ OK ]
Starting SMB services:                 [ OK ]
[root@server home]# service nmb start
Starting NMB services:                 [ OK ]
[root@server home]#
```

A large watermark "mupnotes.in" is overlaid diagonally across the terminal output. The terminal window title is "root@server:/home". The VMware Workstation window title is "Red Hat Enterprise Linux 6 - VMware Workstation".

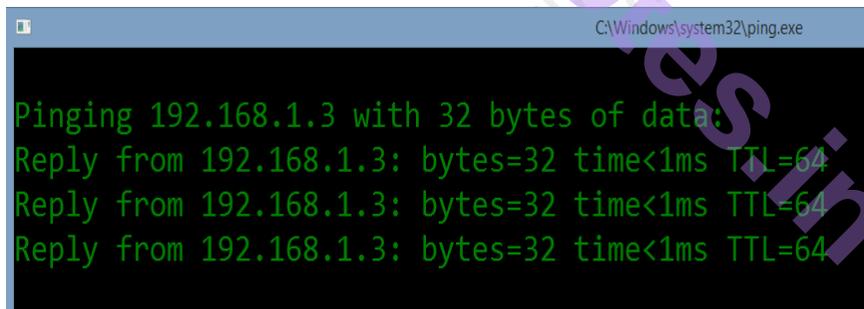
Go to Windows

Run Command

Type **ping 192.168.1.3 -t**



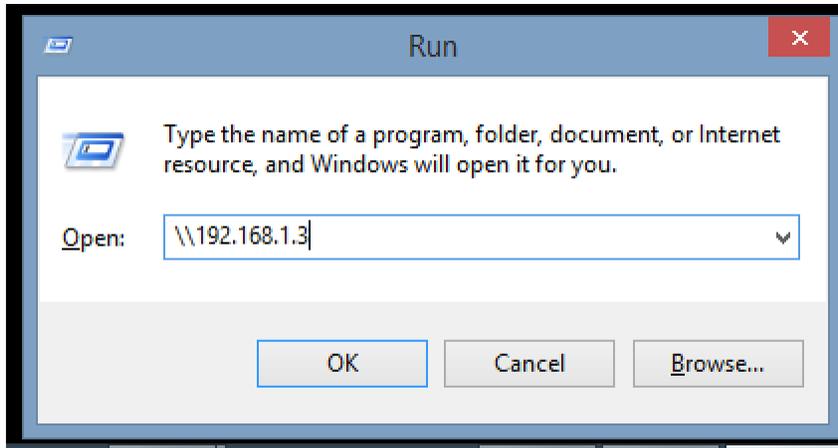
Check whether reply and response is working fine.



Close

Now to check whether files are been transferred from Samba to Windows

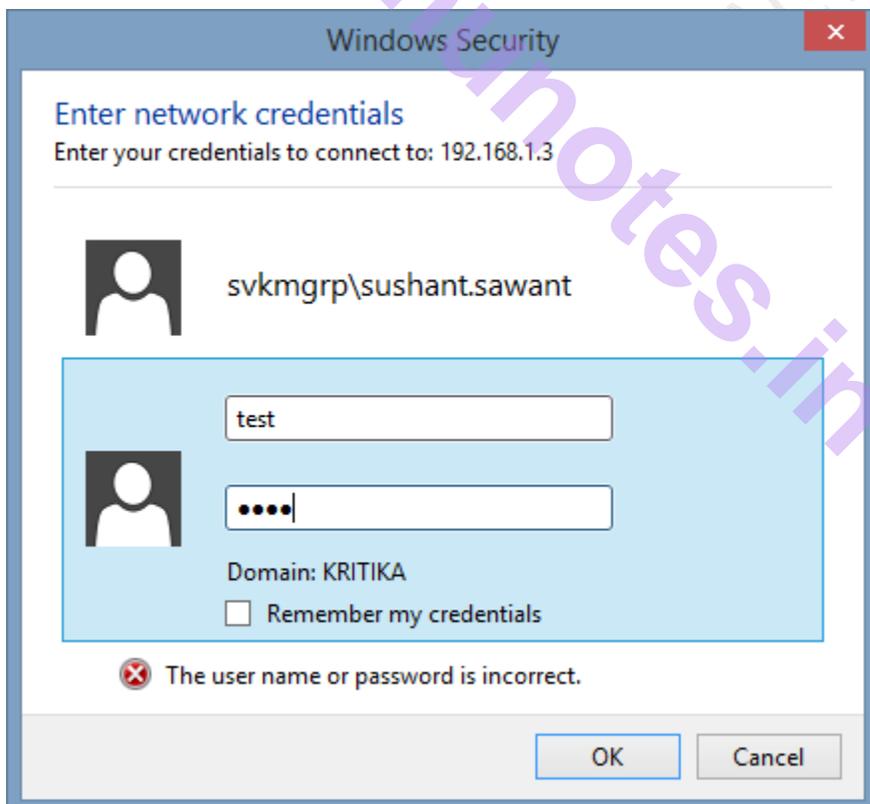
Run - > [\\192.168.1.3](http://192.168.1.3)



It will prompt one dialog box asking for username and password

Enter Username – test1

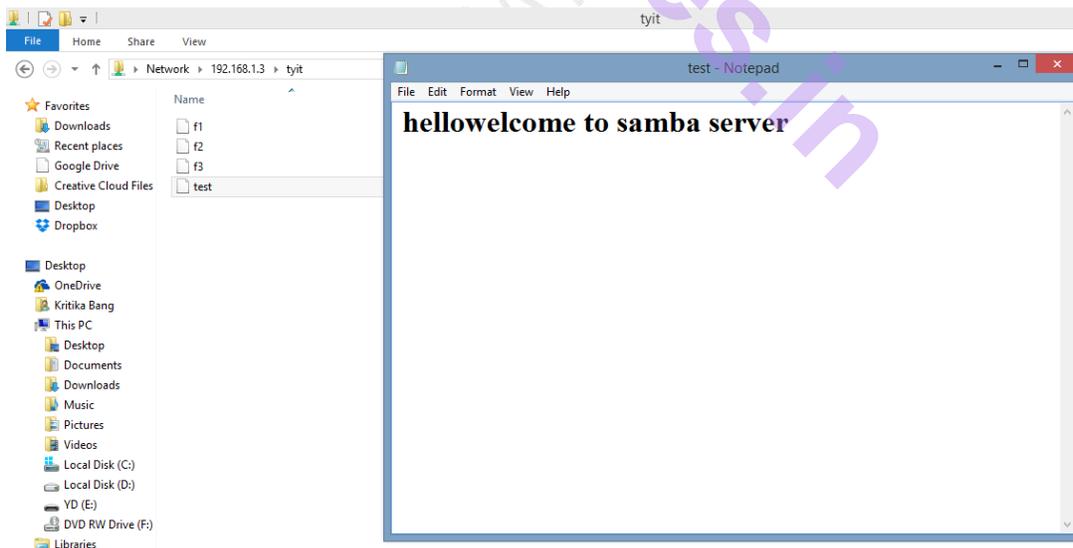
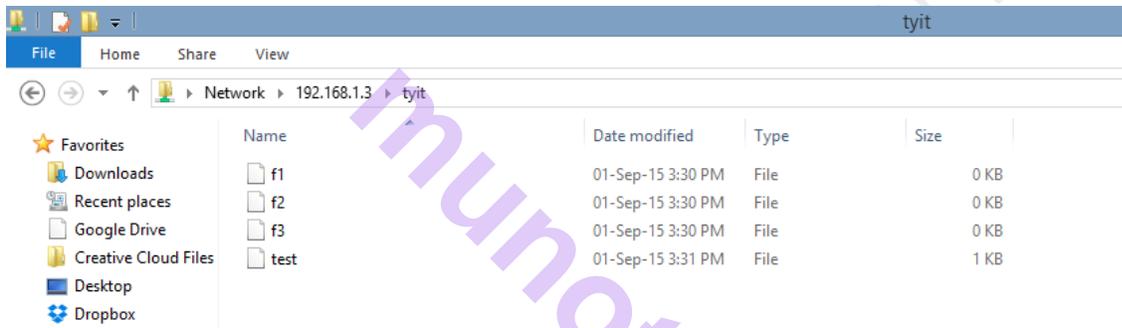
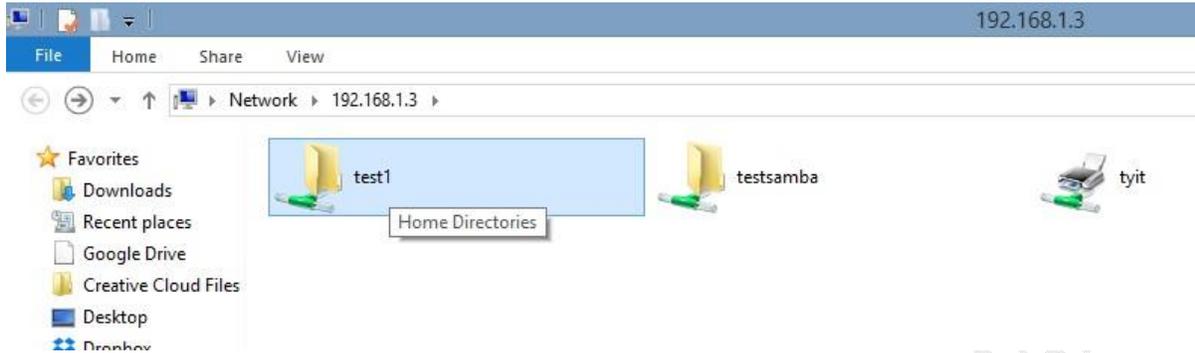
Enter Password - *****



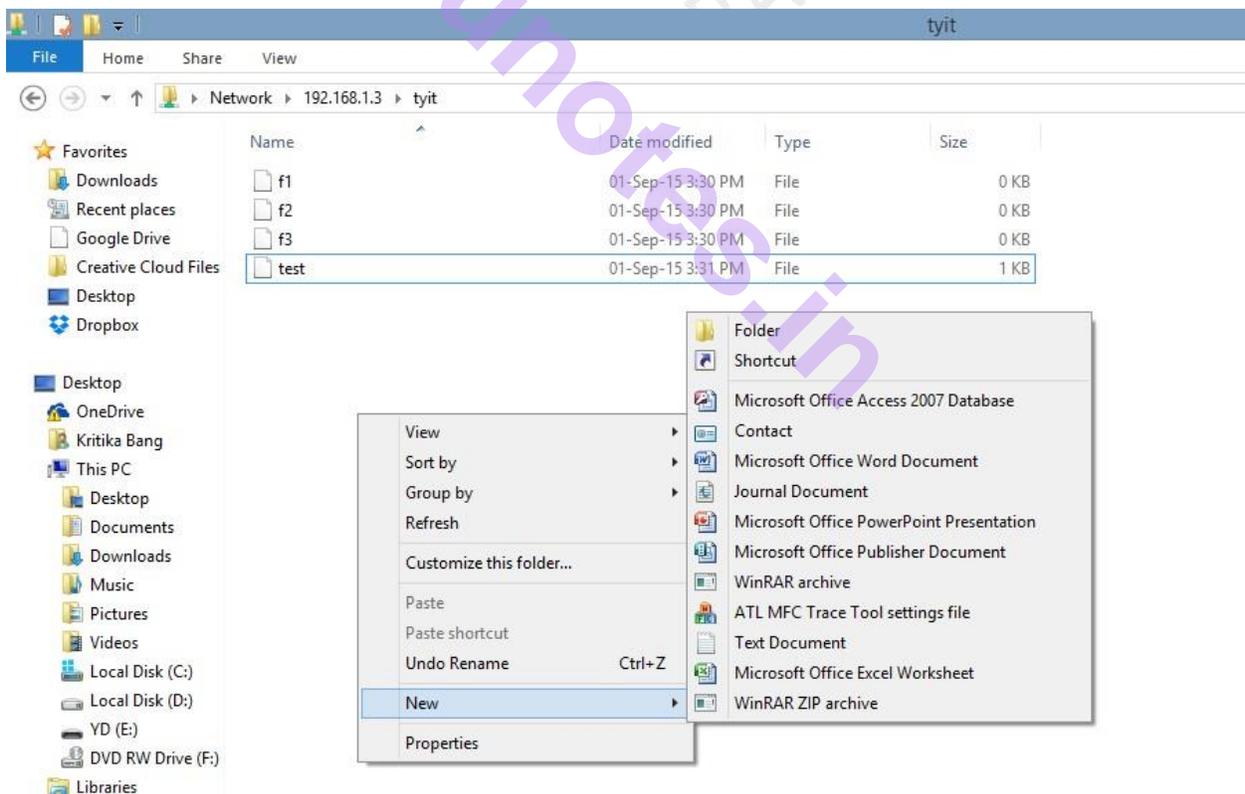
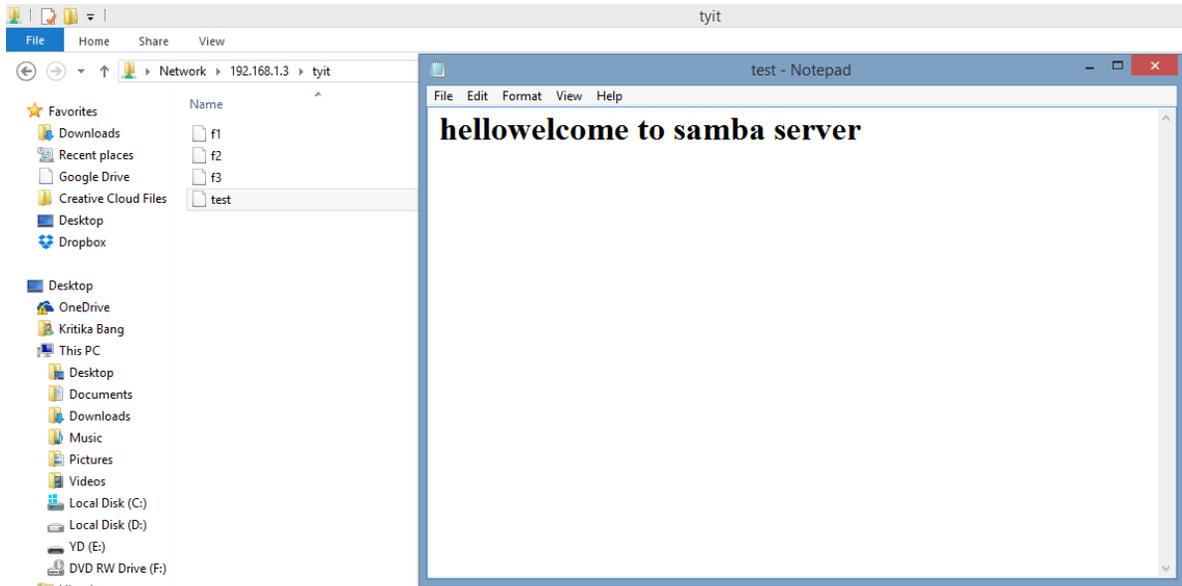
Now you will be able to see that files are transferred.

Now create a folder in Windows and check whether files from windows are

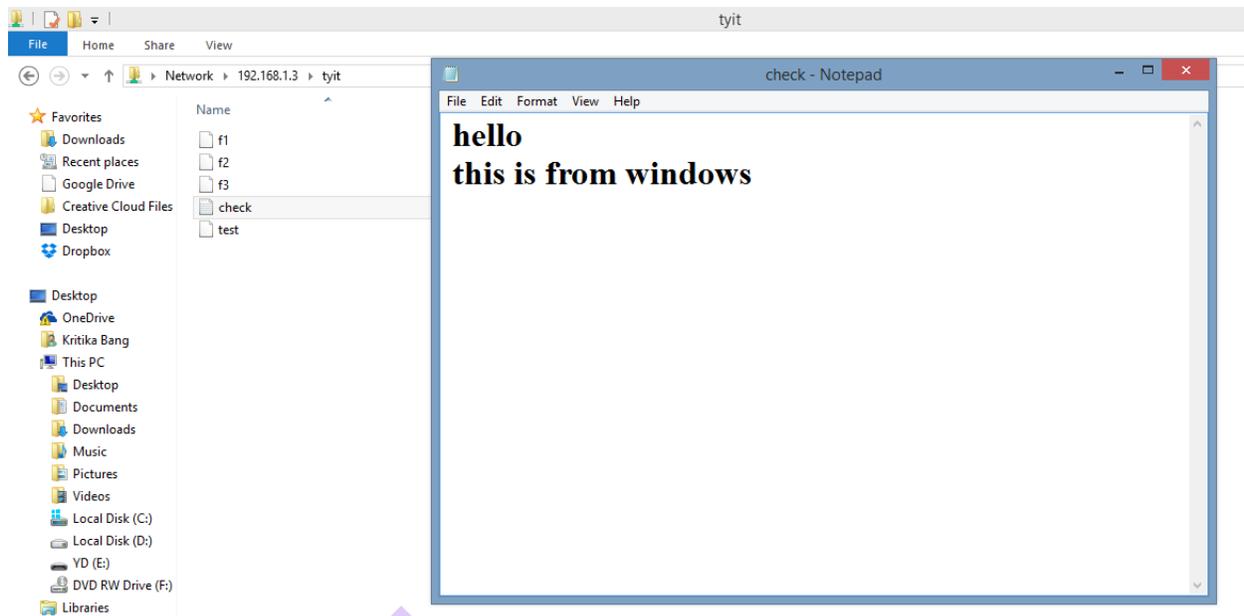
transferred to Linux



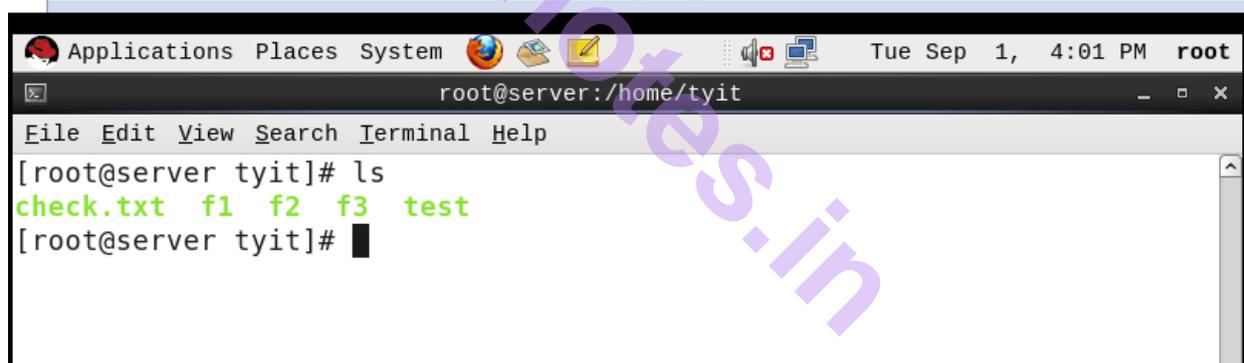
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In Linux – # ls



Files are transferred.

Summary : This practical shows how files are transferred from Linux to Windows and Windows to Linux.

Practical no 6: Configure DHCP server and client

DHCP, or Dynamic Host Configuration Protocol, allows an administrator to configure network settings for all clients on a central server. The DHCP clients request an IP address and other network settings from the DHCP server on the network. The DHCP server in turn leases the client an IP address within a given range or leases the client an IP address based on the MAC address of the client's network interface card (NIC). The information includes its IP address, along with the network's name server, gateway, and proxy addresses including the netmask. Nothing has to be configured manually on the local system, except to specify the DHCP server it should get its network configuration from. If an IP address is assigned according to the MAC address of the client's NIC, the same IP address can be leased to the client every time the client requests one. DHCP makes network administration easier and less prone to error.

Configure dhcp server

We will configure a dhcp server and will lease ip address to clients. we are using two systems one linux server one linux clients. dhcp rpm is required to configure dhcp server.

Step 1 :- First we have to check whether DHCP is available on our machine or not that we can check with rpm command.

```
#rpm -qa dhcp
```

Step 2:- If DHCP package is not installed. Use the following command to install DHCP Package.

First move to Package Folder.

```
#cd /media/RHEL/Package
```



```
Applications Places System Fri Aug 21, 6:38 PM root
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# rpm -qa | grep dhcp
[root@localhost ~]# cd /media/RHEL_6.0/i386/Disc\ 1/Packages/
```

```
#pwd
```

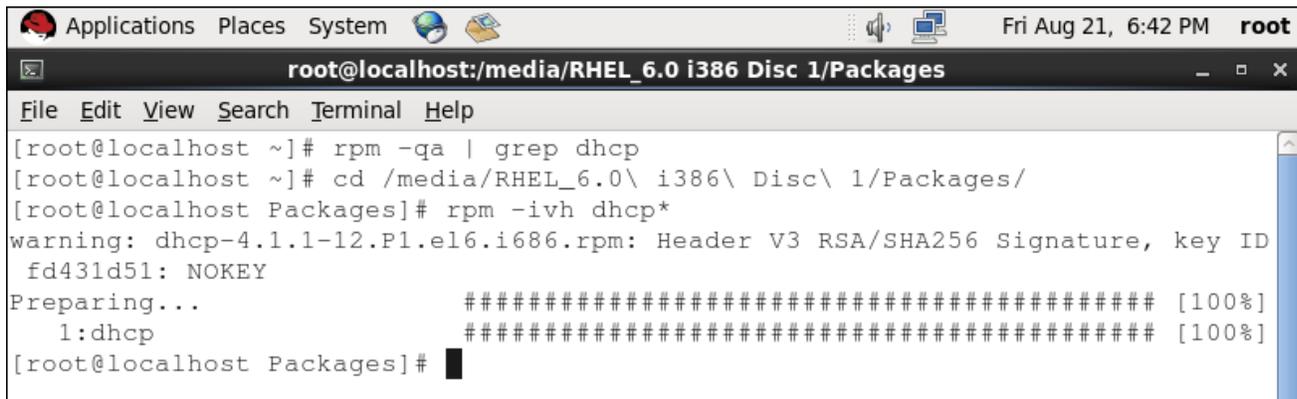
Output : -/media/RHEL/Package

Now install DHCP Package

```
#rpm -ivh DHCP*
```

NOTE :- rpm is executable command which is use to run rpm command, I for

install,v for verbose, h for hash format output or human readable format.



```
Applications Places System Fri Aug 21, 6:42 PM root
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost ~]# rpm -qa | grep dhcp
[root@localhost ~]# cd /media/RHEL_6.0\ i386\ Disc\ 1/Packages/
[root@localhost Packages]# rpm -ivh dhcp*
warning: dhcp-4.1.1-12.P1.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID
fd431d51: NOKEY
Preparing... ##### [100%]
 1:dhcp ##### [100%]
[root@localhost Packages]#
```

#rpm -qa | grep dhcp

```
[root@localhost Packages]# rpm -qa | grep dhcp
dhcp-4.1.1-12.P1.el6.i686
[root@localhost Packages]#
```

Step 3 :- Check the hostname of your linux system.

#hostname

```
[root@localhost Packages]# hostname
localhost.localdomain
[root@localhost Packages]#
```

Step 4:- Now check dhcpd service in system service it should be on

#setup

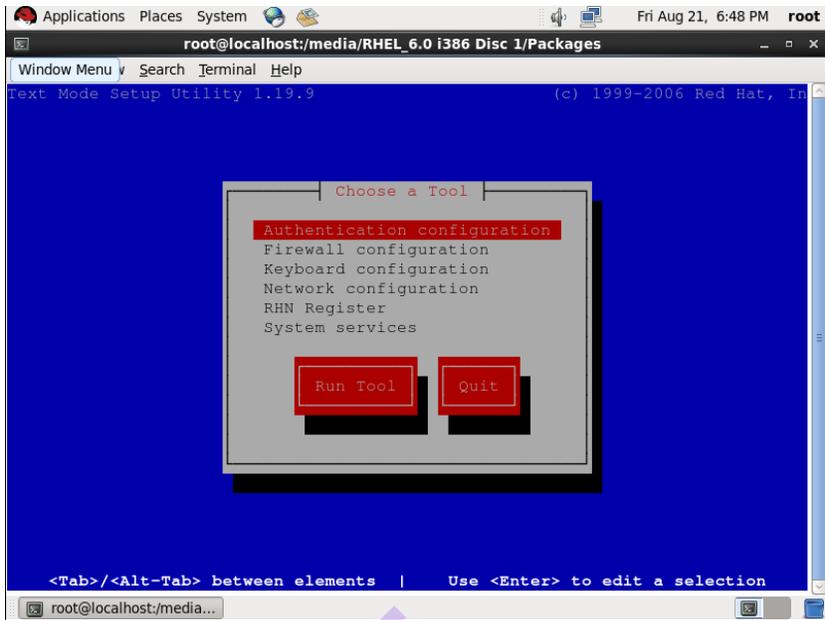
```
[root@localhost Packages]# hostname
localhost.localdomain
[root@localhost Packages]# setup
```

To assign IP to dhcp server

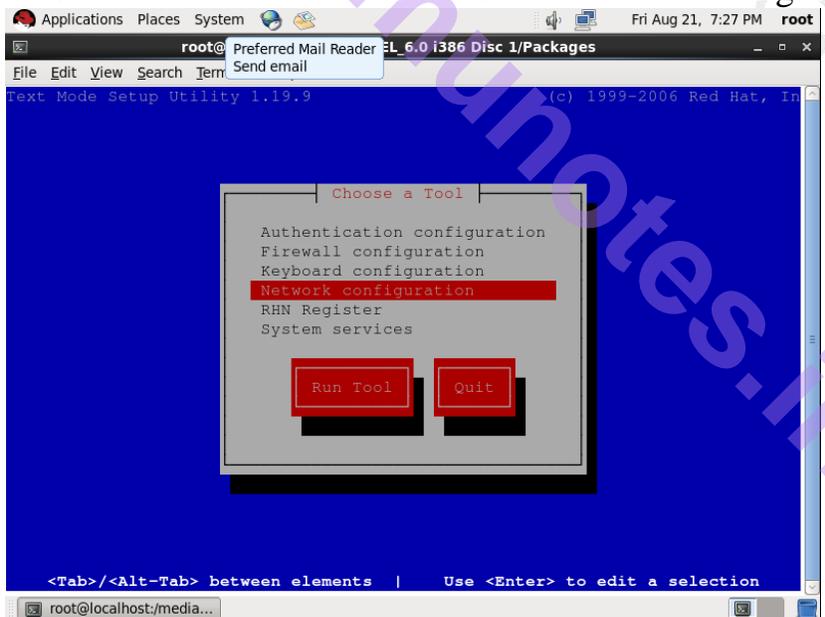
DHCP server have a static a IP address. First configure the IP address 192.168.1.3 with netmask of 255.255.255.0 on server.

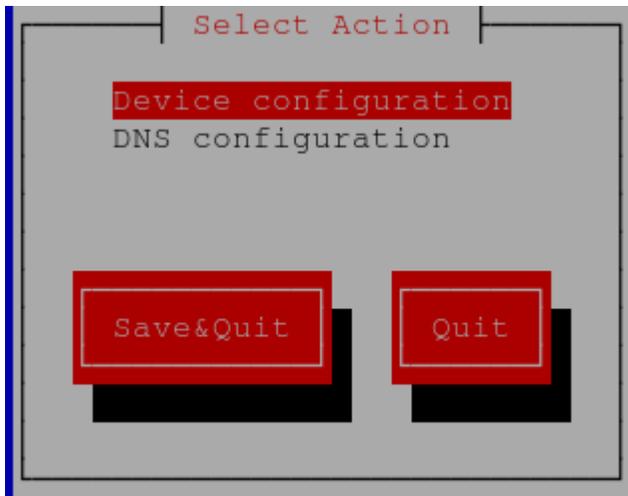
Run setup command form root user

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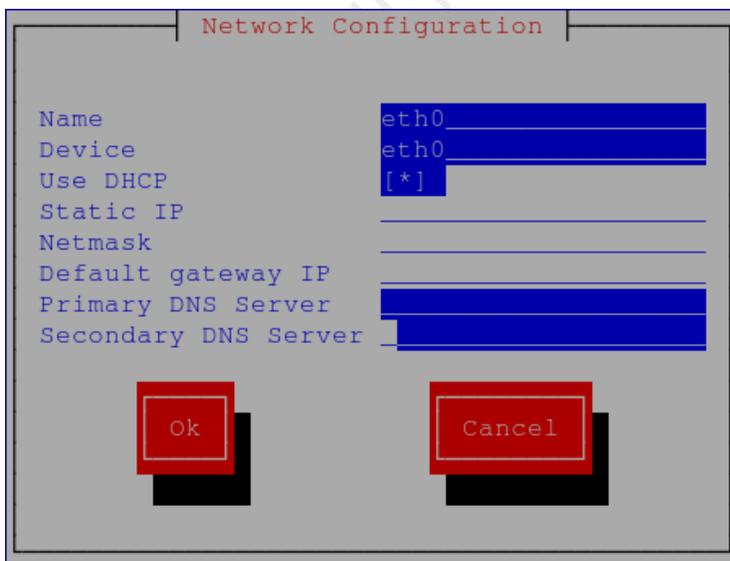
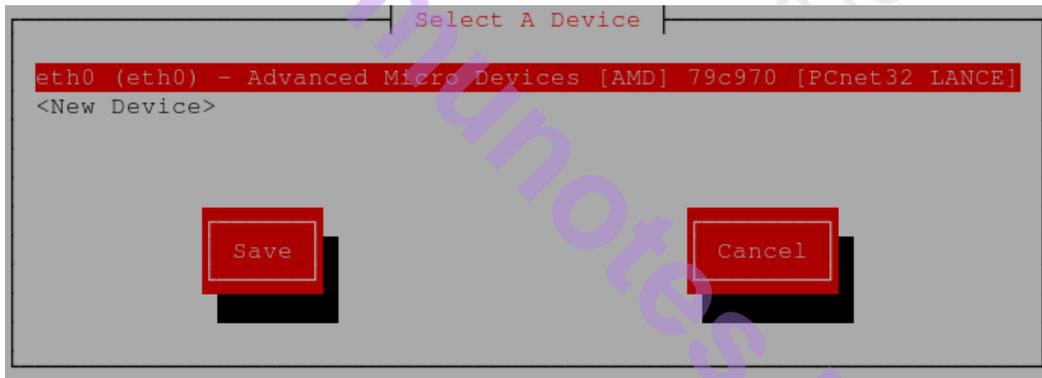


This will launch a new window select network configuration.



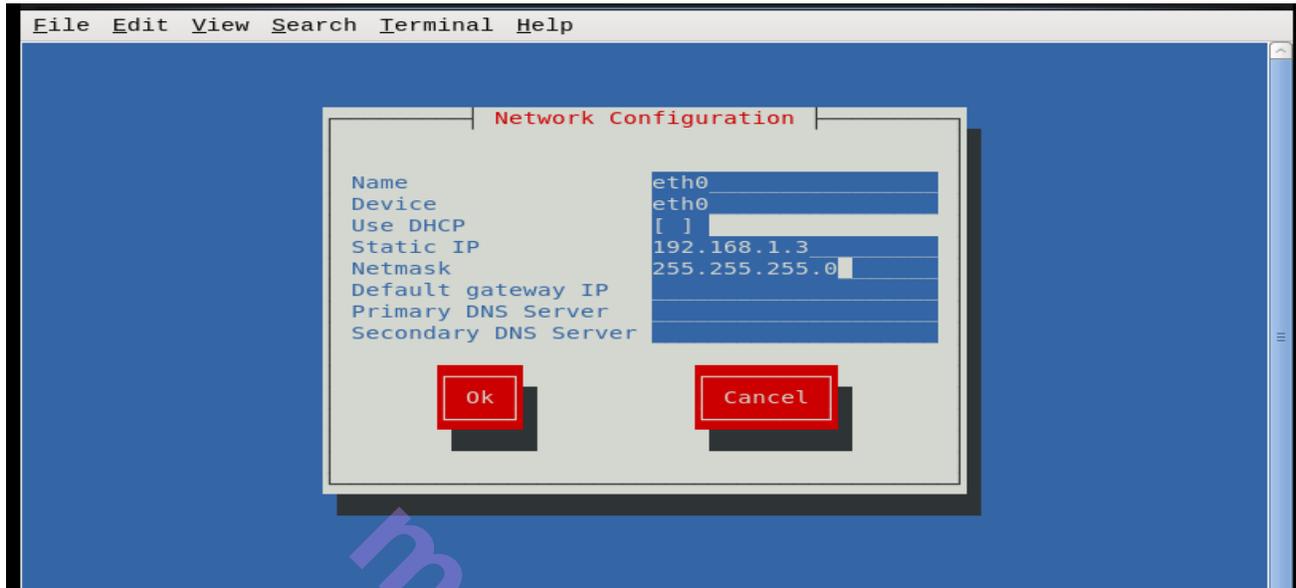


Now a new window will show you all available LAN card select your LAN card (if you don't see any LAN card here mean you don't have install driver)



Select Use DHCP Option and remove the [*] dhcpd option. now enter static IP

Address.



Click on OK, quit and again quit to come back on root prompt.

Step 5:- Restart the network service so new ip address can take place on LAN card

To disable network we use following command

```
#ifdown eth0
```

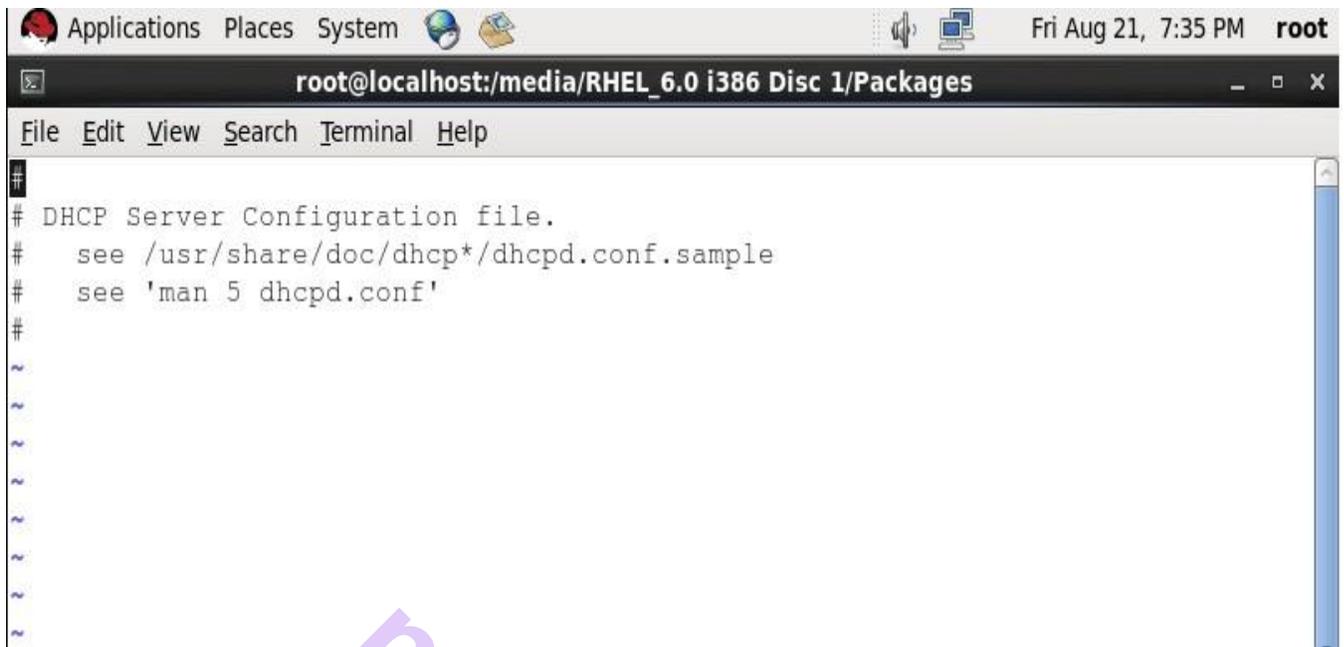
To disable network we use following command

```
#ifup eth0
```

Step 6 :- main configuration file of dhcp server is dhcpd.conf. This file located on /etc directory. If this file is not present there or you have corrupted this file, then copy new file first, if ask for overwrite press “y”.

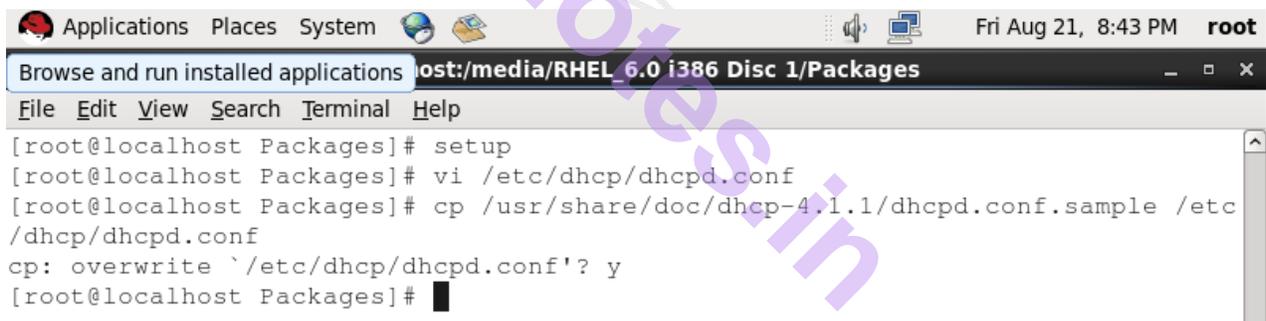


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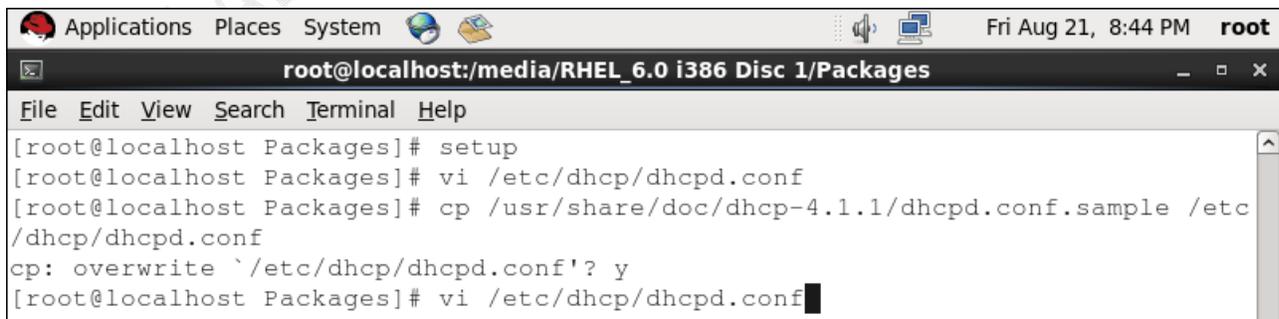
```
Applications Places System Fri Aug 21, 7:35 PM root
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
#
# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp*/dhcpd.conf.sample
#   see 'man 5 dhcpd.conf'
#
~
~
~
~
~
~
~
```

by default when you install DHCP Package it will create dhcpd.conf.sample file in /usr directory (/usr/sample/doc/dhcp-4.1.2/dhcpd.conf.sample) now copy the file to /etc directory and replace with the old file.



```
Applications Places System Fri Aug 21, 8:43 PM root
Browse and run installed applications root:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# setup
[root@localhost Packages]# vi /etc/dhcp/dhcpd.conf
[root@localhost Packages]# cp /usr/share/doc/dhcp-4.1.1/dhcpd.conf.sample /etc
/dhcp/dhcpd.conf
cp: overwrite `/etc/dhcp/dhcpd.conf'? y
[root@localhost Packages]# █
```

Step 7 :- Now open /etc/dhcp/dhcpd.conf

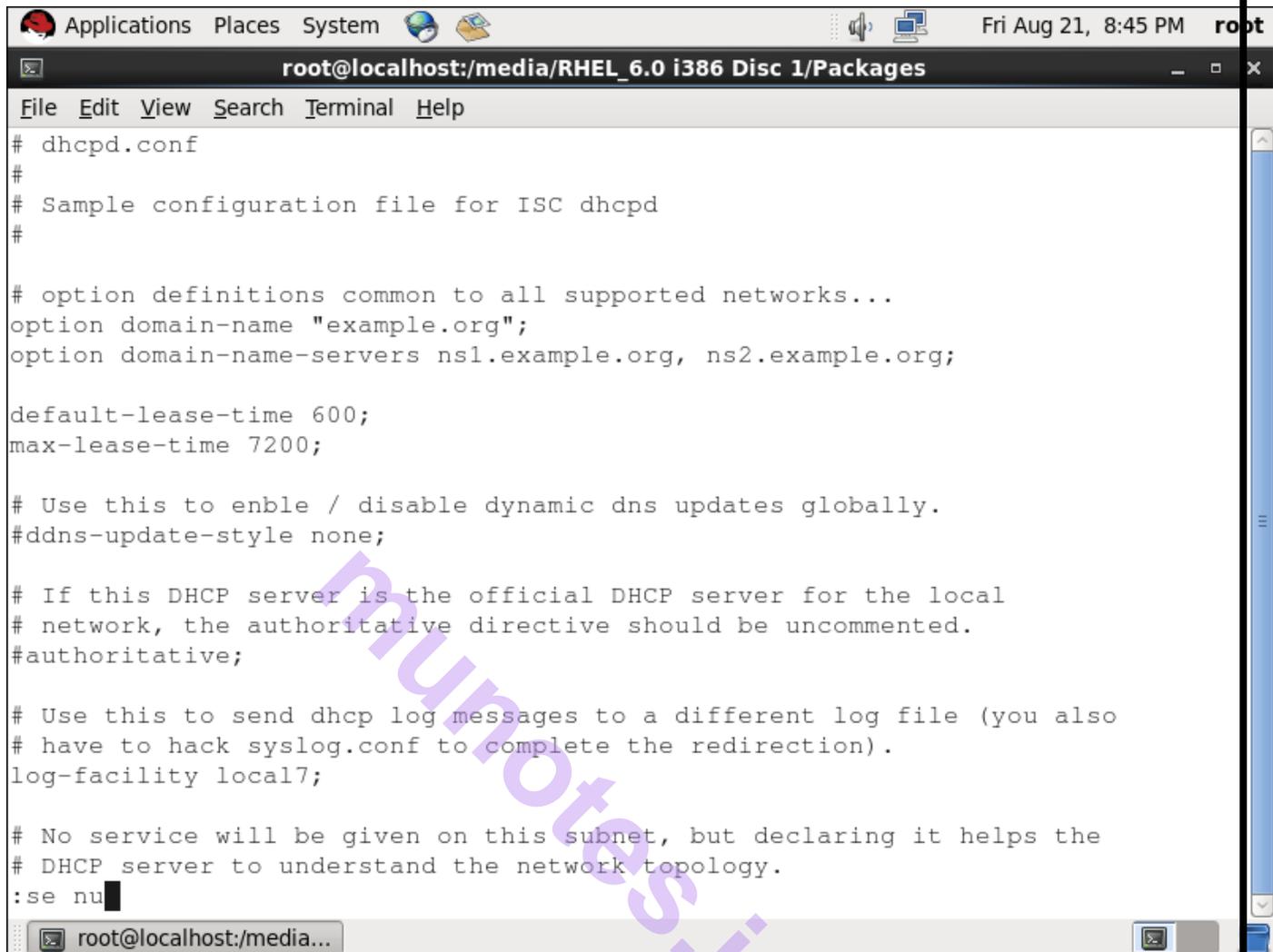


```
Applications Places System Fri Aug 21, 8:44 PM root
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# setup
[root@localhost Packages]# vi /etc/dhcp/dhcpd.conf
[root@localhost Packages]# cp /usr/share/doc/dhcp-4.1.1/dhcpd.conf.sample /etc
/dhcp/dhcpd.conf
cp: overwrite `/etc/dhcp/dhcpd.conf'? y
[root@localhost Packages]# vi /etc/dhcp/dhcpd.conf █
```

#vi /etc/dhcp/dhcpd.conf

default entry is this file look like this.

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```
Applications Places System Fri Aug 21, 8:45 PM root
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
# dhcpd.conf
#
# Sample configuration file for ISC dhcpd
#
# option definitions common to all supported networks...
option domain-name "example.org";
option domain-name-servers ns1.example.org, ns2.example.org;
default-lease-time 600;
max-lease-time 7200;
# Use this to enable / disable dynamic dns updates globally.
#ddns-update-style none;
# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
#authoritative;
# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
log-facility local7;
# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.
:se nu
```

Change option domain-name “example.org” to option domain-name “Your Machine Domain-name for e.g tyit.com”

Change option domain-name-servers ns1.example.org, ns2.example.org; to option fully qualify domain-name-server “Your Machine Domain-name for e.g server.tyit.com”;

Step 8 :- Uncomment line no. 18 # authoritative (Remove # mark)

```
16 # If this DHCP server is the official DHCP server for the local
17 # network, the authoritative directive should be uncommented.
18 #authoritative;
--
```

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```
16 # If this DHCP server is the official DHCP server for the local
17 # network, the authoritative directive should be uncommented.
18 authoritative;
```

Authoritative says that the DHCP server is authenticated server and DHCP client can connect to DHCP server, if the option is not uncommented the DHCP client not able to connect to DHCP Server.

Step 9 :- Comment Line No 27 and 28

Change these lines no 32

```
Subnet 10.254.239.0 netmask 255.255.255.224
```

```
{
```

```
Range 10.254.239.10 10.254.239.20;
```

```
Option routers rtr-239-0-1.example.org,rtr-239-0-2.example.org
```

```
}
```

Following lines after changes

```
Subnet 198.168.1.0 netmask 255.255.255.0 (subnet ip is the first IP of your
network.)
```

```
{
```

```
Range 192.168.1.10 192.168.1.20; (Range means the range of IP Address server
want to assign to DHCP Client)
```

```
#Option routers rtr-239-0-1.example.org,rtr-239-0-2.example.org
```

```
}
```

Save the file.

```
27 #subnet 10.152.187.0 netmask 255.255.255.0 {
28 #}
29
30 # This is a very basic subnet declaration.
31
32 subnet 192.168.1.0 netmask 255.255.255.0 {
33     range 192.168.1.10 192.168.1.20;
34 # option routers rtr-239-0-1.example.org, rtr-239-0-2.example.org;
35 }
36
37 # This declaration allows BOOTP clients to get dynamic addresses,
38 # which we don't really recommend.
39
40 subnet 10.254.239.32 netmask 255.255.255.224 {
41     range dynamic-bootp 10.254.239.40 10.254.239.60;
42     option broadcast-address 10.254.239.31;
```

-- INSERT --

34,2

26%

root@localhost:~/media/R...

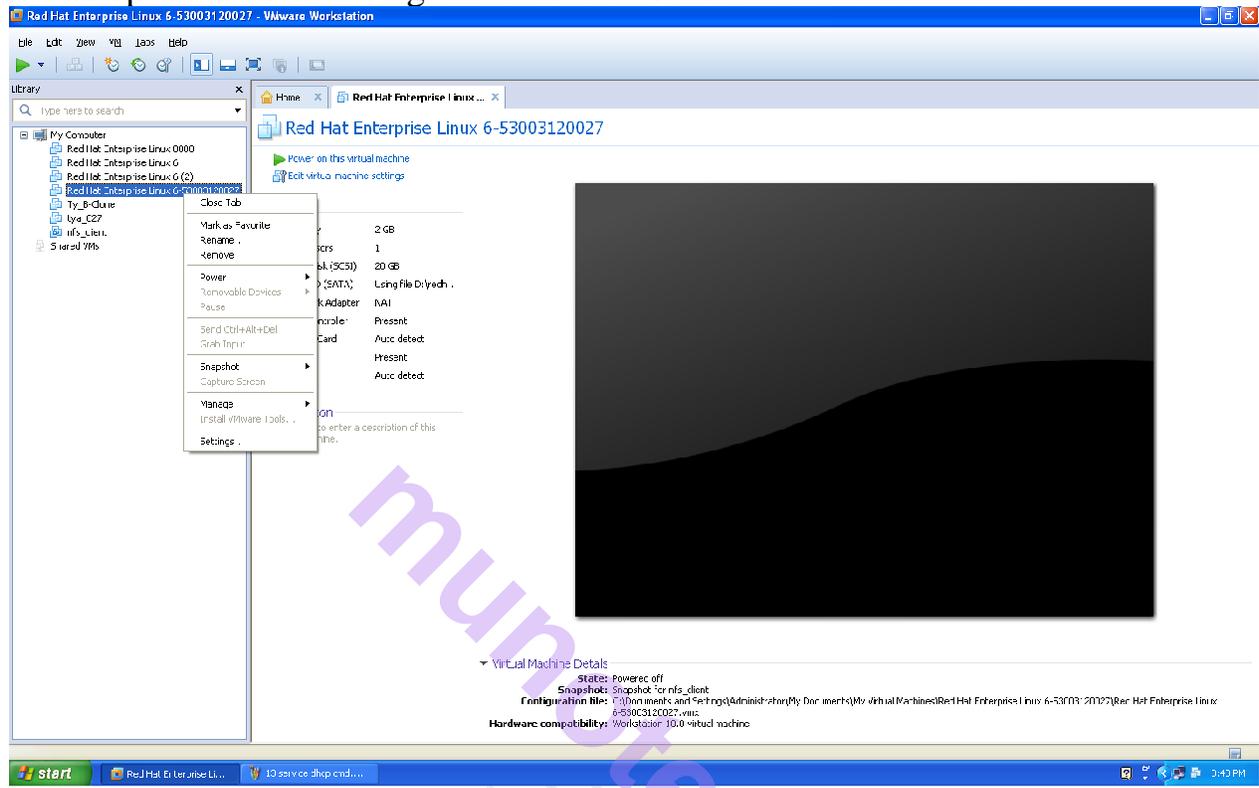
```
#service dhcpd start
#service dhcpd restart
#chkconfig dhcp on
#chkconfig --list dhcp
#service iptables stop
#setenforce 0
```

```
[root@localhost Packages]# service dhcpd status
dhcpd is stopped
[root@localhost Packages]# service dhcpd start
Starting dhcpd: [ OK ]
[root@localhost Packages]# service dhcpd restart
Shutting down dhcpd: [ OK ]
Starting dhcpd: [ OK ]
[root@localhost Packages]# chkconfig --list dhcpd
dhcpd          0:off  1:off  2:off  3:off  4:off  5:off  6:off
[root@localhost Packages]# chkconfig dhcpd on
[root@localhost Packages]# chkconfig --list dhcpd
dhcpd          0:off  1:off  2:on   3:on   4:on   5:on   6:off
[root@localhost Packages]# █
```

DHCP Client

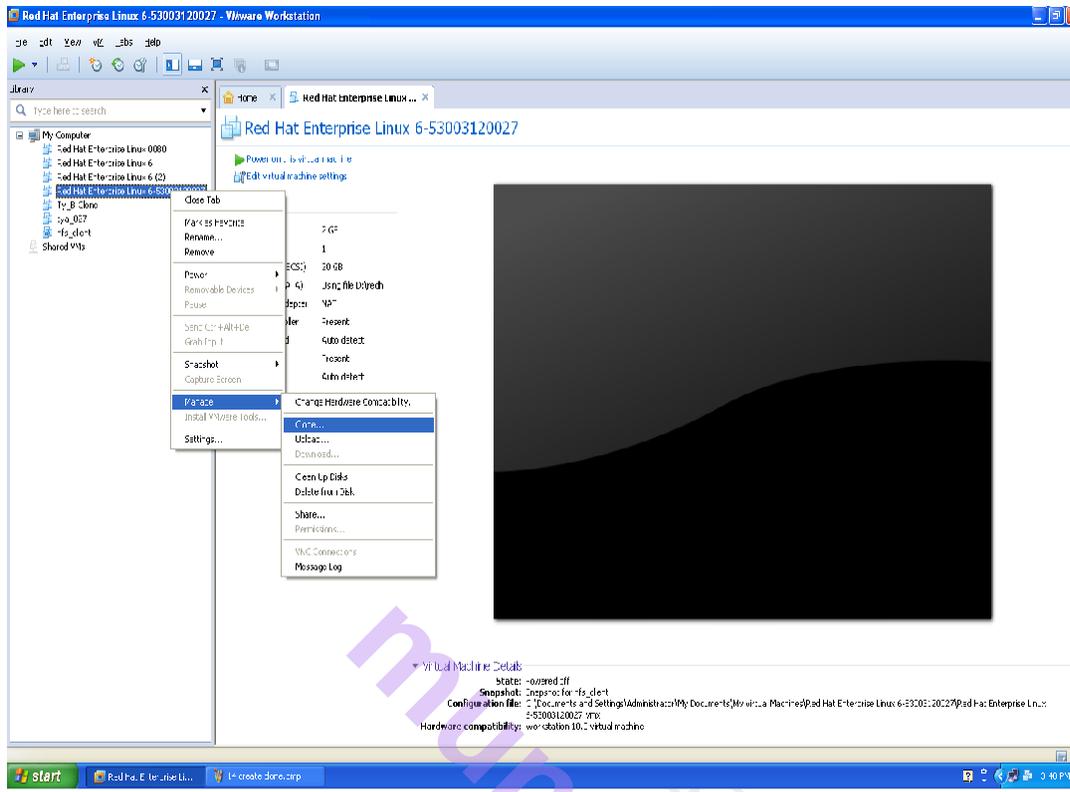
How to create Clone Machine :-

First stop DHCP server. Right click on DHCP server virtual machine.

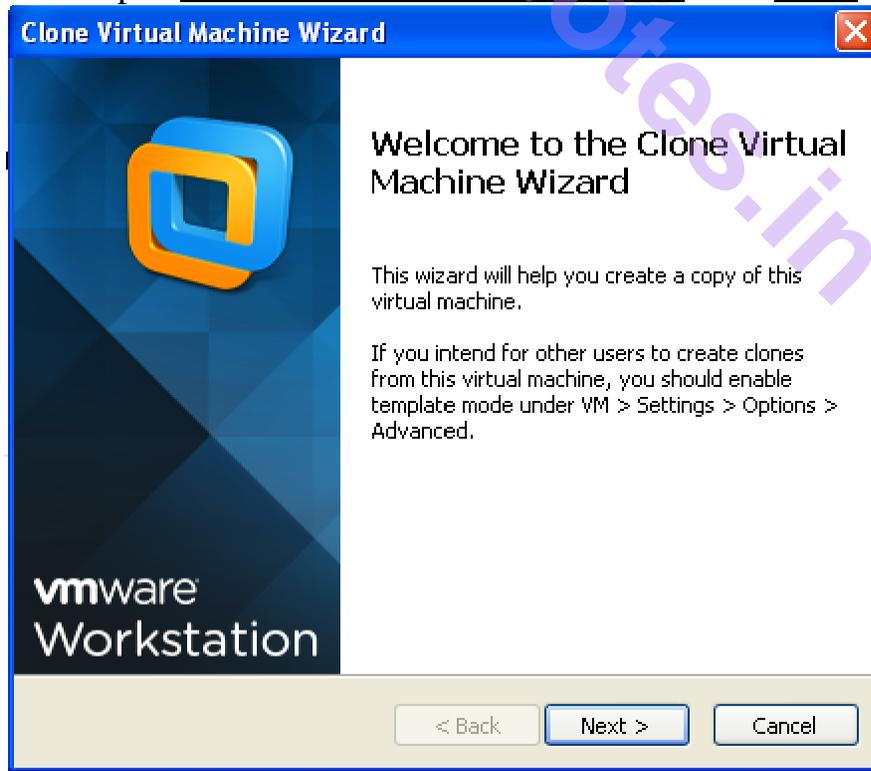


Go to manage and select clone option

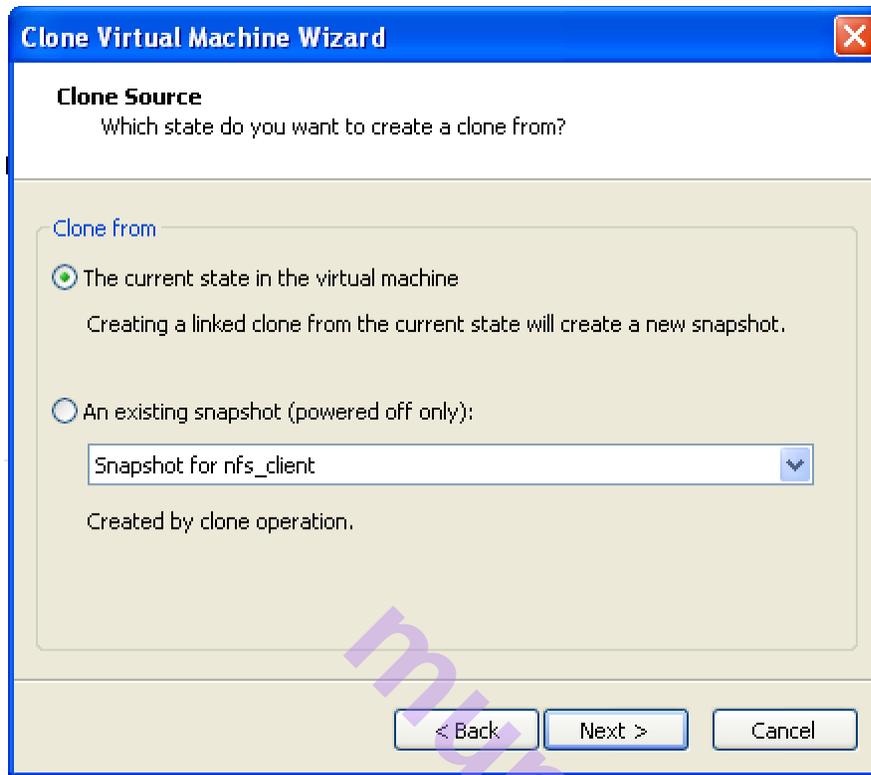
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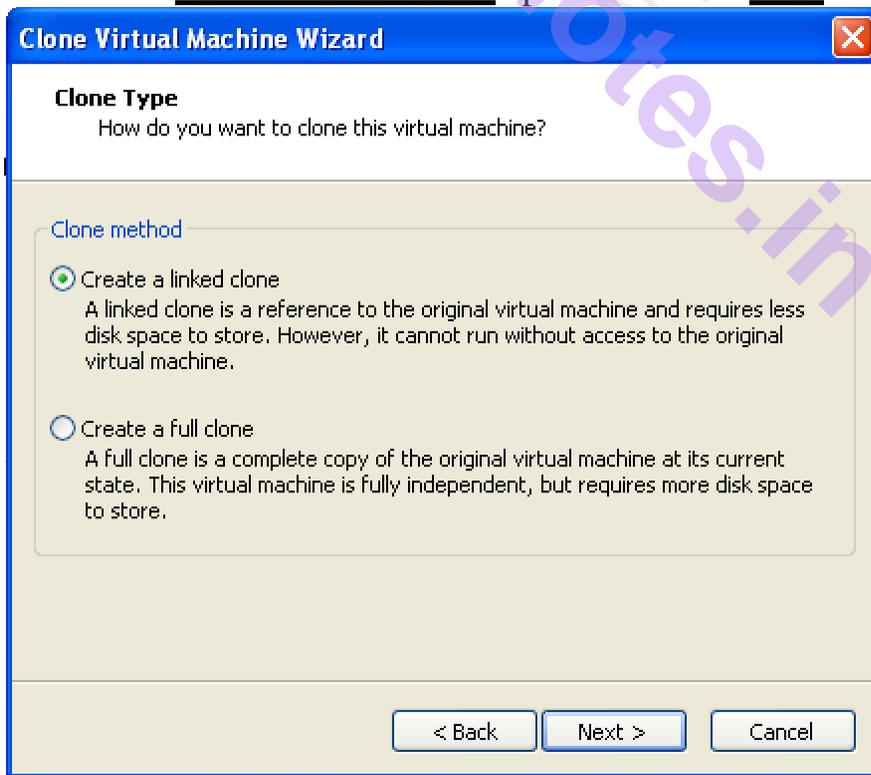
It will open **Clone Virtual Machine Wizard** Click **Next** to proceed.



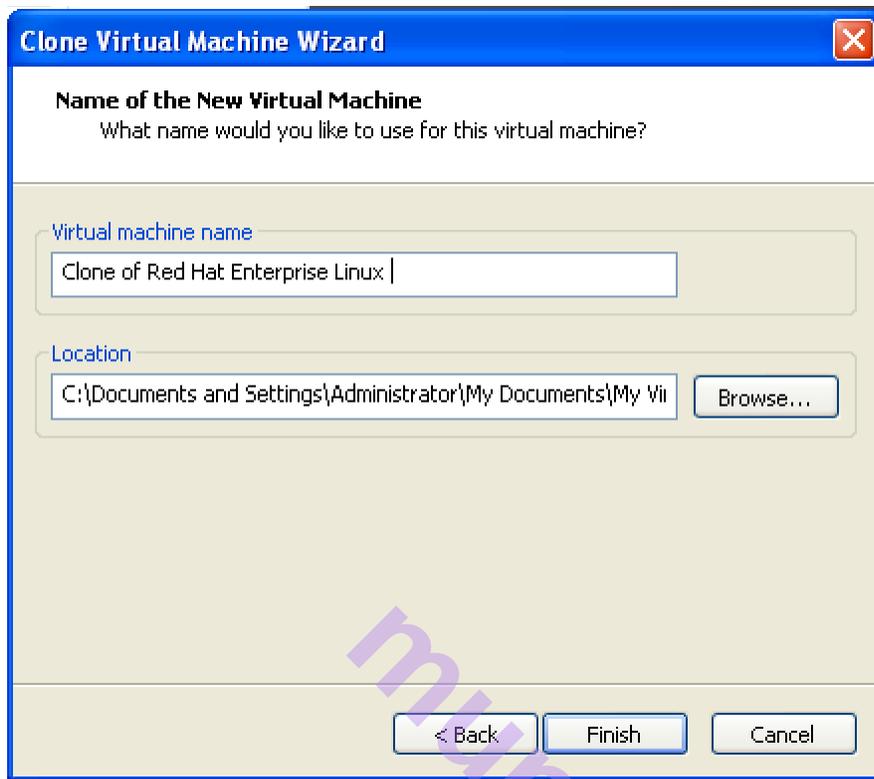
Here select the first option **The Current State in the virtual machine** and click **Next** to Proceed.



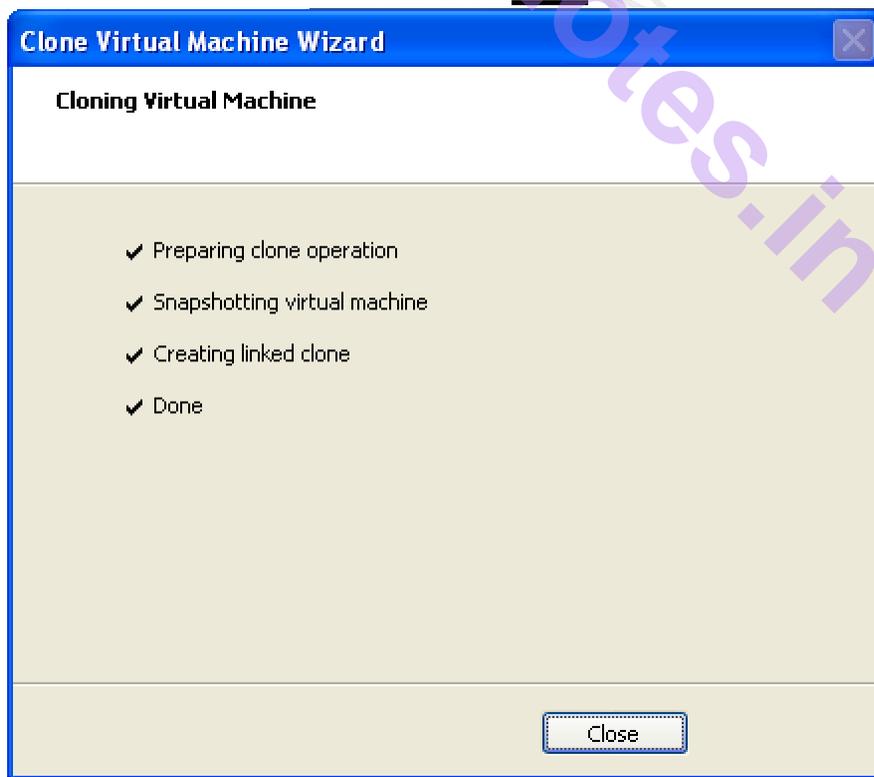
Now select **Create a Full Clone** Option and click **Next**.



Now Provide name to your Virtual Machine or set it default **Clone of Red Hat Enterprise Linux**



Once the clone is created click on **close**



Now our clone machine is ready to use. First start DHCP Server and then start Clone/client virtual machine.

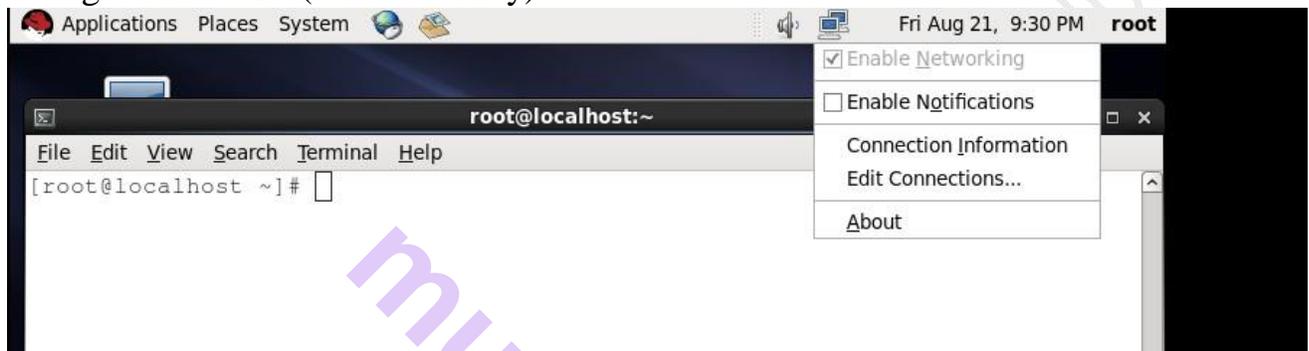
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Now we are on client machine and we will check whether through dhcp, ip address can be given to our client machine or not before that we have to check currently our machine is configured manual or dhcp.

Through wizard we will check on network

Right click on Network icon at right top corner on desktop → Edit Connection → Select system eth0

→ Click on Edit button → select IPv4 setting option → see the method manual Change it to DHCP (Automatically)



Editing Auto eth1

Connection name: Auto eth1

Connect automatically

Wired 802.1x Security IPv4 Settings IPv6 Settings

Device MAC address: 00:0C:29:F2:A6:6D

Cloned MAC address:

MTU: automatic bytes

Available to all users

Cancel Apply...

Editing Auto eth1

Connection name: Auto eth1

Connect automatically

Wired 802.1x Security IPv4 Settings IPv6 Settings

Method: Automatic (DHCP)

Address: Automatic (DHCP) addresses only

Manual

Link-Local Only

Shared to other computers

Disabled

DNS servers:

Search domains:

DHCP client ID:

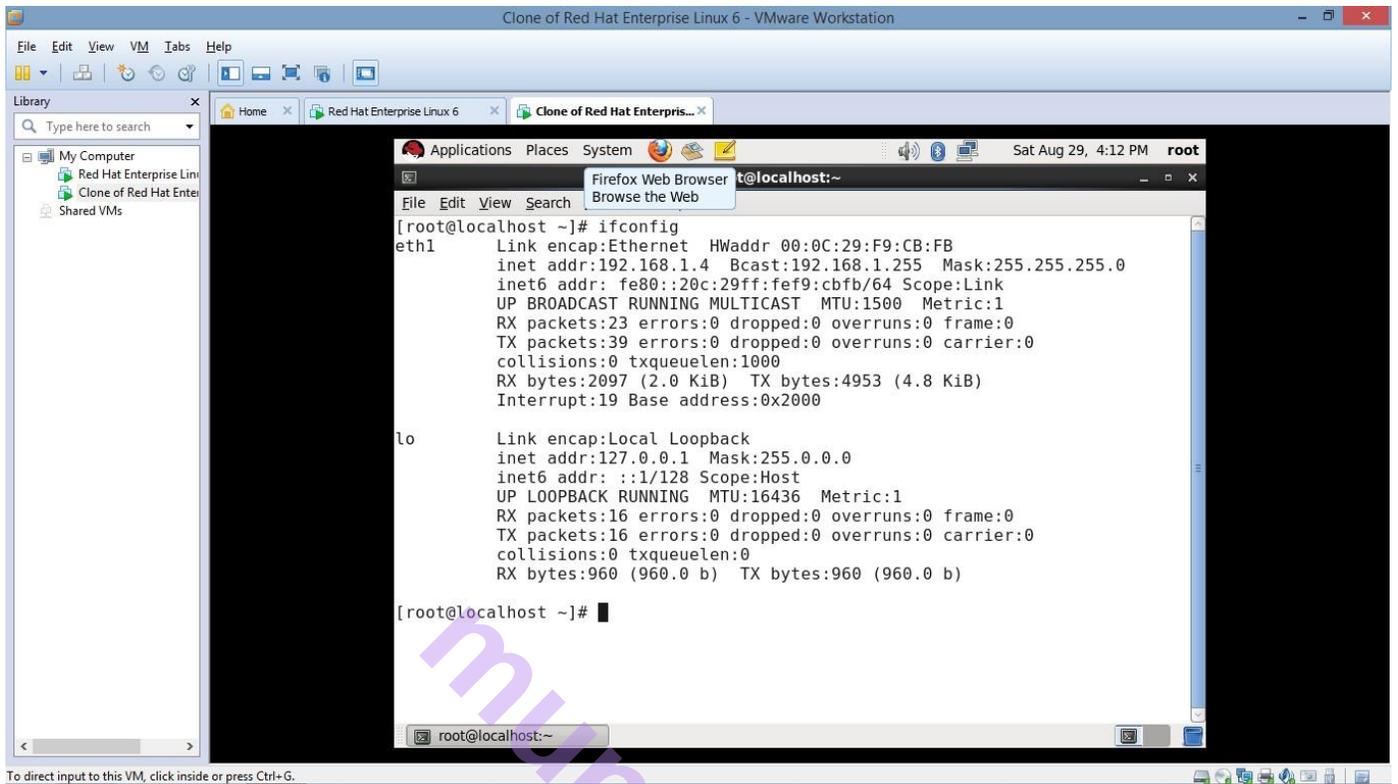
Require IPv4 addressing for this connection to complete

Routes...

Available to all users

Cancel Apply...

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```
Clone of Red Hat Enterprise Linux 6 - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
Red Hat Enterprise Linux
Clone of Red Hat Enterprise Linux
Shared VMs
Applications Places System Firefox Web Browser
Sat Aug 29, 4:12 PM root
File Edit View Search Browse the Web
[root@localhost ~]# ifconfig
eth1      Link encap:Ethernet  HWaddr 00:0C:29:F9:CB:FB
          inet addr:192.168.1.4  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe9:cbfb/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:23 errors:0 dropped:0 overruns:0 frame:0
          TX packets:39 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2097 (2.0 KiB)  TX bytes:4953 (4.8 KiB)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:16 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:960 (960.0 b)  TX bytes:960 (960.0 b)

[root@localhost ~]#
```

ifconfig

OR

This command is used to check network configuration and IP address.

#vi /etc/sysconfig/network-scripts/ifcfg-eth0

Change BOOTPROTO = dhcp

Save the file.

#service network restart

Now use ifconfig command to check whether dhcp client gets the IP address and all network information from dhcp client or not.

Practical No.7: Configuring DNS Server

- Name address resolution is simply the conversion of people friendly names into computer friendly numbers.
- It means that every interface on the network has a unique group of numbers called as IP address.
- These group of numbers present to the computers in the network but it is difficult for the users to by heart, learn or remember them.
- DNS makes possible for the users to enter the names and then these names get converted into numbers.
- The main function of name address resolution is to create an efficient user and computer interaction.
- For this name address resolution there is need that how to install and configure the Domain Name System.
- To understand, take a look on the domain and understand its working. For eg. example.com.
- In the above eg: The first part of the domain name is the name of the company or institution or an organization. The next part after the period/dot is a called as top-level domain (TLD).

There are many TLD listed below

- .com - A TLD used to register a business
- .edu – A TLD for educational institution
- .name – A TLD used to register sites for individuals
- .gov – A TLD given to government
- .mil – A TLD used for military
- .org – A TLD used by a non-commercial organization

Following files are used while Configuring DNS Server.

- ➔ named.conf – It is main Configuration file that contains global properties and other sources. It is found in / etc/ directory.
- ➔ named.ca – The file contains the name and address of root servers. Used for the purpose of caching of forward zone. It is found in /var/named.
- ➔ named.local – The file provides information for resolving the loopback address for the local host. Also called as named.empty, used for the purpose of caching of reverse zone.

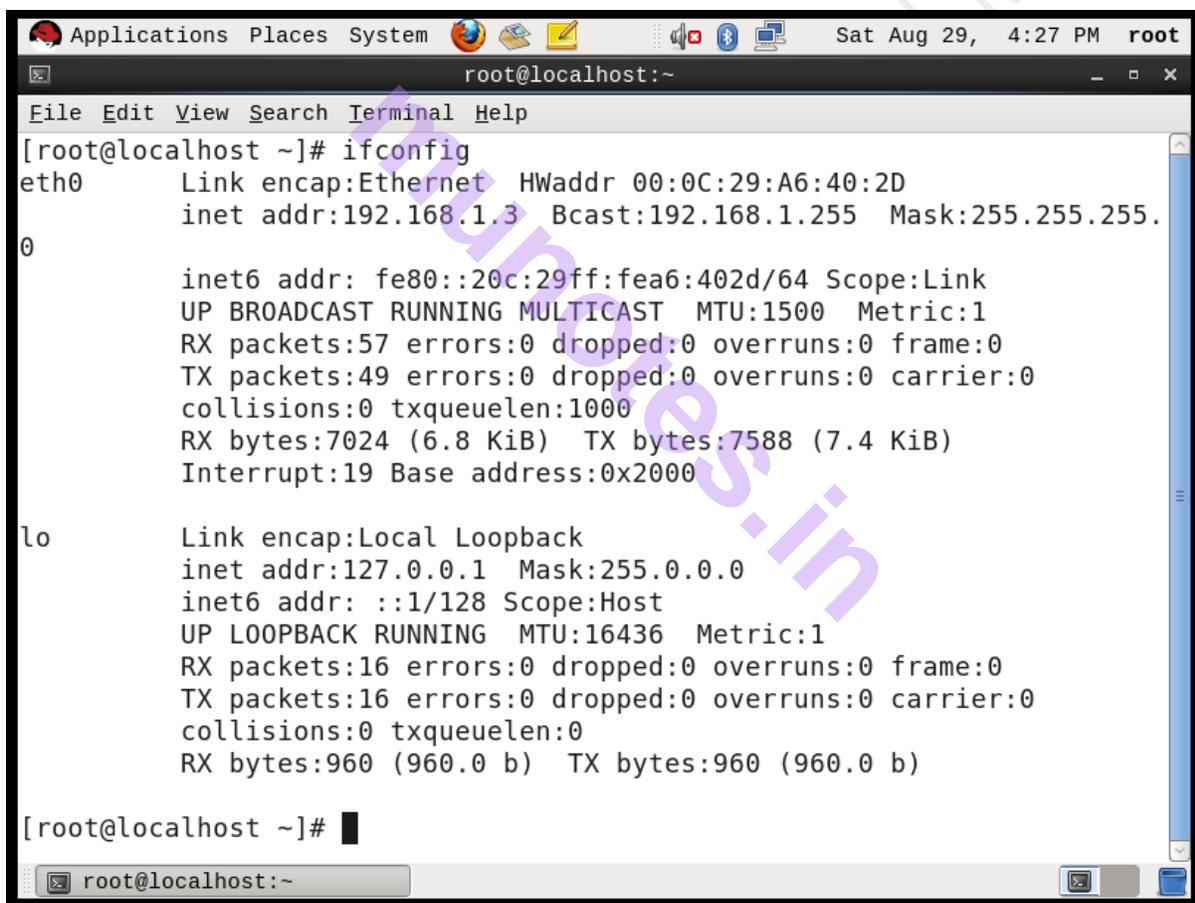
It is found in /var/named/

The 2 additional files required for the master domain server are:

- (i) zone – This file contains the names and addresses of hosts in the local domain and maps names to IP address.
- (ii) reverse.zone – This file provides information to map ip-address to names Hence reverse.

DNS Configuration

1) root@server ~]#ifconfig



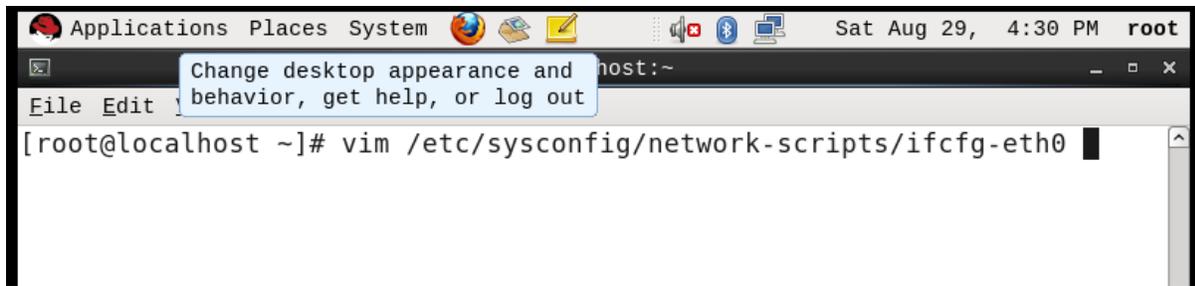
```
Applications Places System Sat Aug 29, 4:27 PM root
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:A6:40:2D
          inet addr:192.168.1.3  Bcast:192.168.1.255  Mask:255.255.255.
0
          inet6 addr: fe80::20c:29ff:fea6:402d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:57 errors:0 dropped:0 overruns:0 frame:0
          TX packets:49 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:7024 (6.8 KiB)  TX bytes:7588 (7.4 KiB)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:16 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:960 (960.0 b)  TX bytes:960 (960.0 b)

[root@localhost ~]#
```

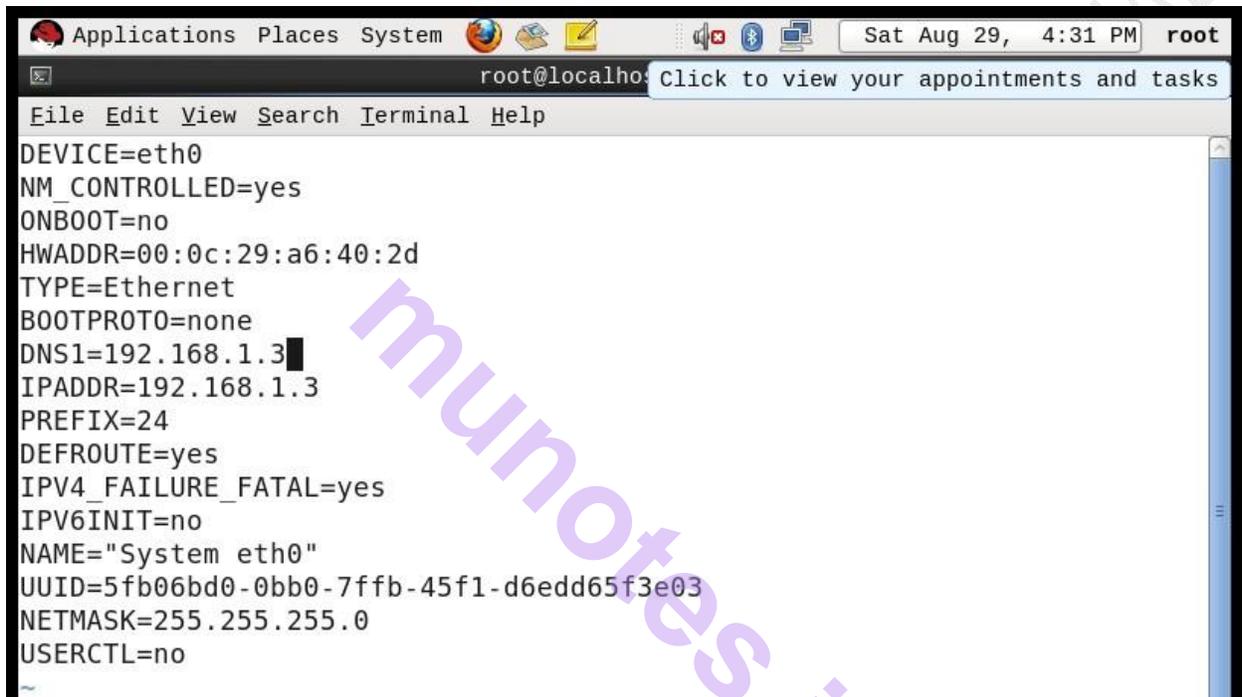
2) root@server ~]#vim /etc/sysconfig/network-script/ifcfg – etho

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A terminal window showing the command to edit the network configuration file. The terminal prompt is root@localhost:~. The command entered is vim /etc/sysconfig/network-scripts/ifcfg-eth0. A tooltip is visible over the terminal window with the text: "Change desktop appearance and behavior, get help, or log out".

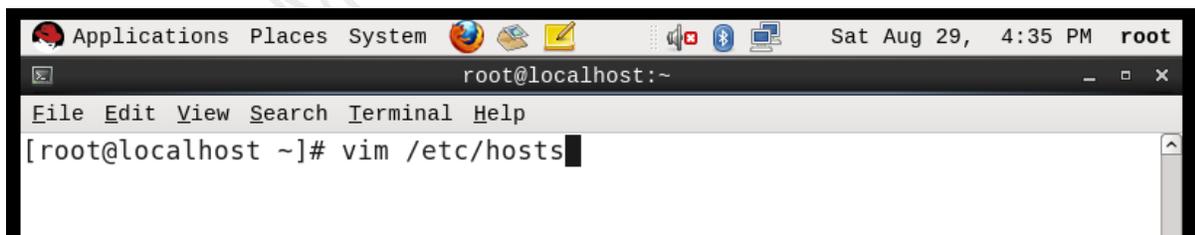
```
root@localhost:~# vim /etc/sysconfig/network-scripts/ifcfg-eth0
```



A terminal window showing the contents of the /etc/sysconfig/network-scripts/ifcfg-eth0 file. The terminal prompt is root@localhost:~. The file contents are displayed as follows:

```
DEVICE=eth0
NM_CONTROLLED=yes
ONBOOT=no
HWADDR=00:0c:29:a6:40:2d
TYPE=Ethernet
BOOTPROTO=none
DNS1=192.168.1.3
IPADDR=192.168.1.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME="System eth0"
UUID=5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
NETMASK=255.255.255.0
USERCTL=no
~
```

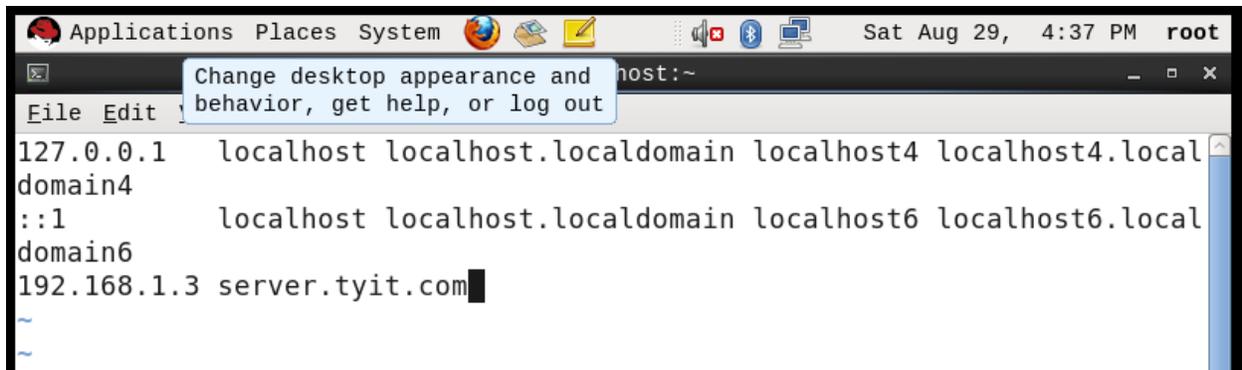
3) root@server ~]#vim /etc/hosts



A terminal window showing the command to edit the /etc/hosts file. The terminal prompt is root@localhost:~. The command entered is vim /etc/hosts.

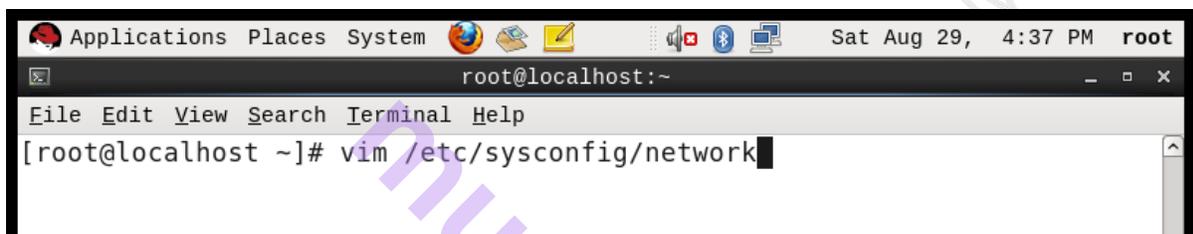
```
root@localhost:~# vim /etc/hosts
```

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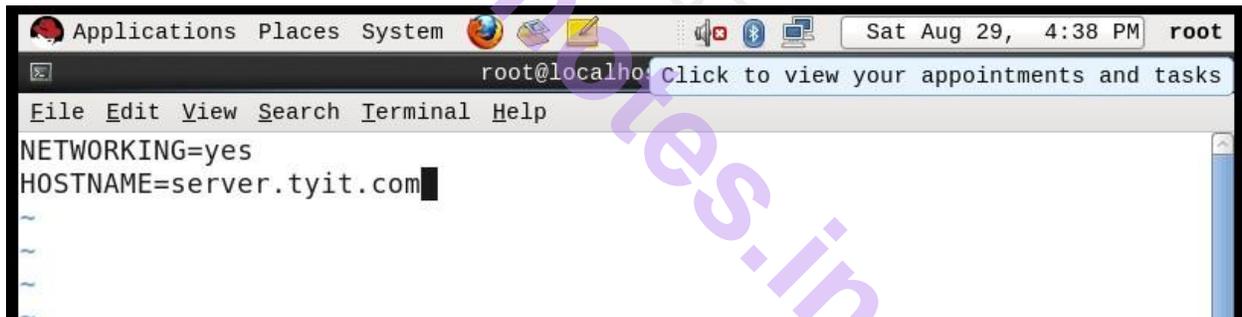


```
Applications Places System Sat Aug 29, 4:37 PM root
Change desktop appearance and behavior, get help, or log out
File Edit
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.local
domain4
::1 localhost localhost.localdomain localhost6 localhost6.local
domain6
192.168.1.3 server.tyit.com
```

4) root@server ~] #vim /etc/sysconfig/network

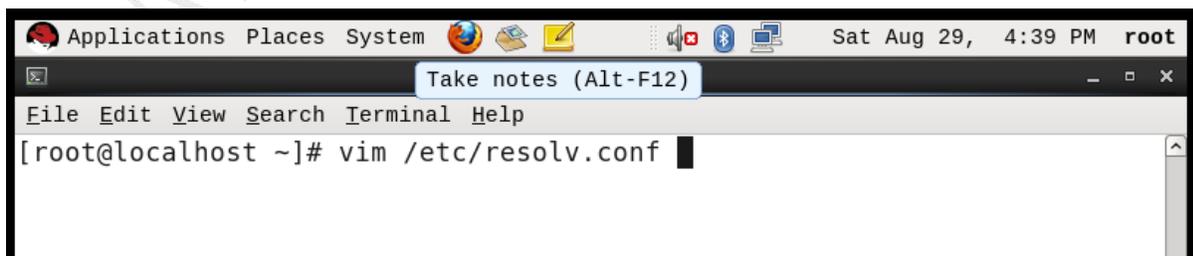


```
Applications Places System Sat Aug 29, 4:37 PM root
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# vim /etc/sysconfig/network
```



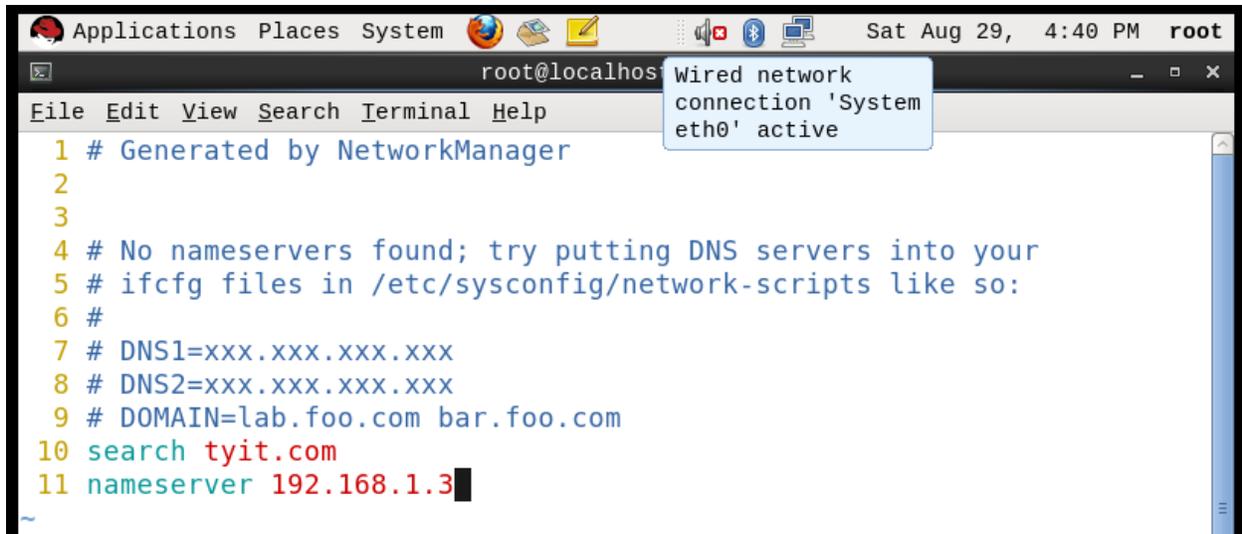
```
Applications Places System Sat Aug 29, 4:38 PM root
root@localhost:~
File Edit View Search Terminal Help
NETWORKING=yes
HOSTNAME=server.tyit.com
```

5) root@server ~] #vim /etc/resolv.conf



```
Applications Places System Sat Aug 29, 4:39 PM root
Take notes (Alt-F12)
File Edit View Search Terminal Help
[root@localhost ~]# vim /etc/resolv.conf
```

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The screenshot shows a terminal window titled 'root@localhost' with a menu bar (File, Edit, View, Search, Terminal, Help) and a system tray at the top. The terminal content is as follows:

```
1 # Generated by NetworkManager
2
3
4 # No nameservers found; try putting DNS servers into your
5 # ifcfg files in /etc/sysconfig/network-scripts like so:
6 #
7 # DNS1=xxx.xxx.xxx.xxx
8 # DNS2=xxx.xxx.xxx.xxx
9 # DOMAIN=lab.foo.com bar.foo.com
10 search tyit.com
11 nameserver 192.168.1.3
```

A tooltip is visible over the terminal, stating: 'Wired network connection 'System eth0' active'.

6) **root@server ~]service network restart**

7) **To install bind package :-**

Desktop -> CD -> Package -> bind -> install

```
File Edit View Search Terminal Help
[root@localhost ~]# cd /media/RHEL_6.0\ i386\ Disc\ 1/Packages/
[root@localhost Packages]# rpm -q bind
package bind is not installed
[root@localhost Packages]# rpm -ivh bind*
warning: bind-9.7.0-5.P2.el6.i686.rpm: Header V3 RSA/SHA256 Signature,
key ID fd431d51: NOKEY
Preparing...
##### [100%]
    package bind-libs-32:9.7.0-5.P2.el6.i686 is already installed
    package bind-utils-32:9.7.0-5.P2.el6.i686 is already installed
[root@localhost Packages]# rpm -q bind
package bind is not installed
[root@localhost Packages]# rpm -ivh bind-9.7.0-5.P2.el6.i686.rpm
warning: bind-9.7.0-5.P2.el6.i686.rpm: Header V3 RSA/SHA256 Signature,
key ID fd431d51: NOKEY
Preparing...
##### [100%]
    1:bind
##### [100%]
```

root@server ~]vim /etc/named.conf.

- Line no.11 :- Listen – on port 53 {192.168.1.3}

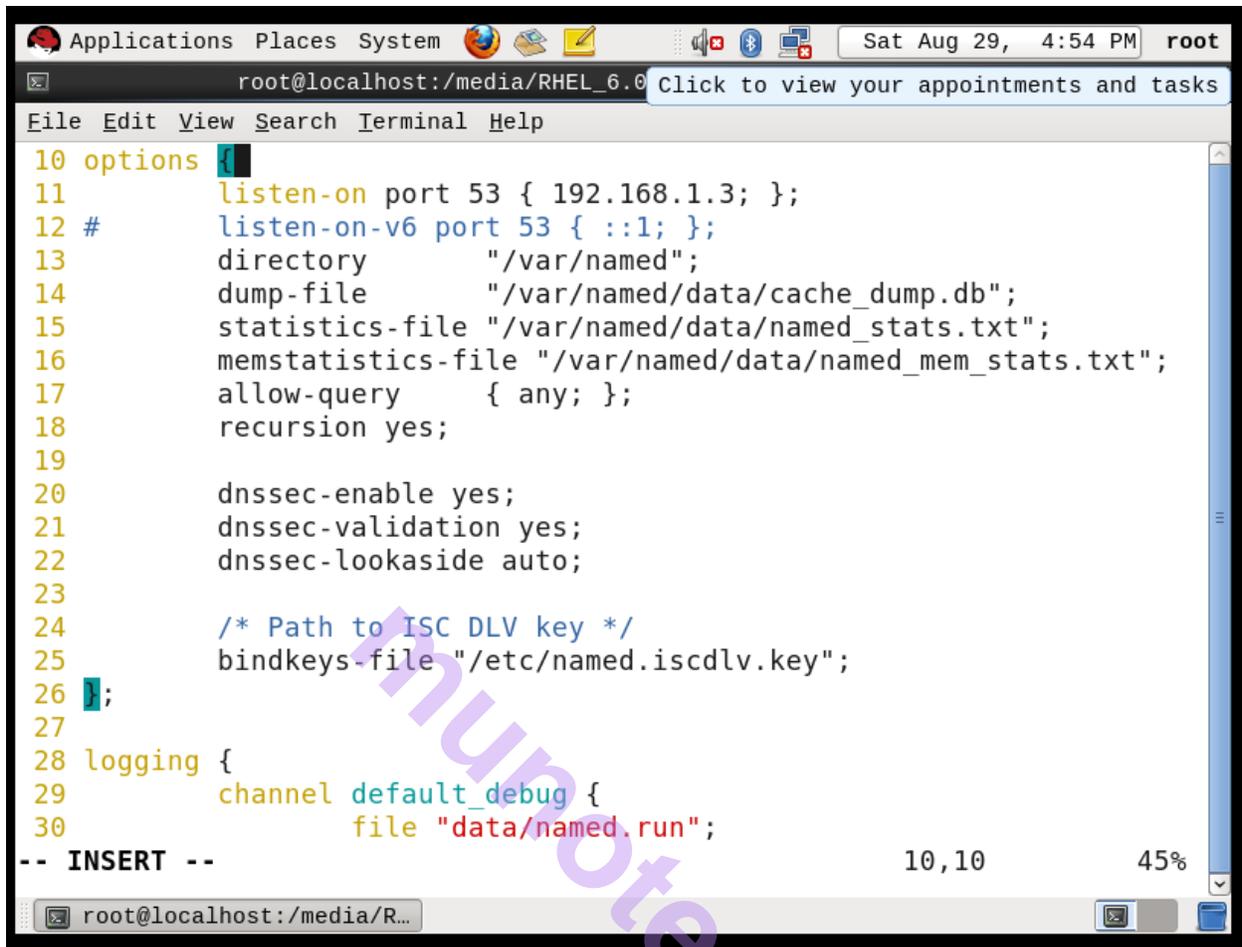
Change this from 127.0.0.1 to current
Machine IP address.

- Line no.12 :- Comment it using “#”
listen –on – v6 port 53{ :: 1:};
- Line no.17 :- allow – query{any;}

- Check and Notedown the last line of the file :-

```
Applications Places System Sat Aug 29, 4:52 PM root
root@localhost:/media/RHEL_6.0 Click to view your appointments and tasks
File Edit View Search Terminal Help
[root@localhost Packages]# vim /etc/named.conf
```

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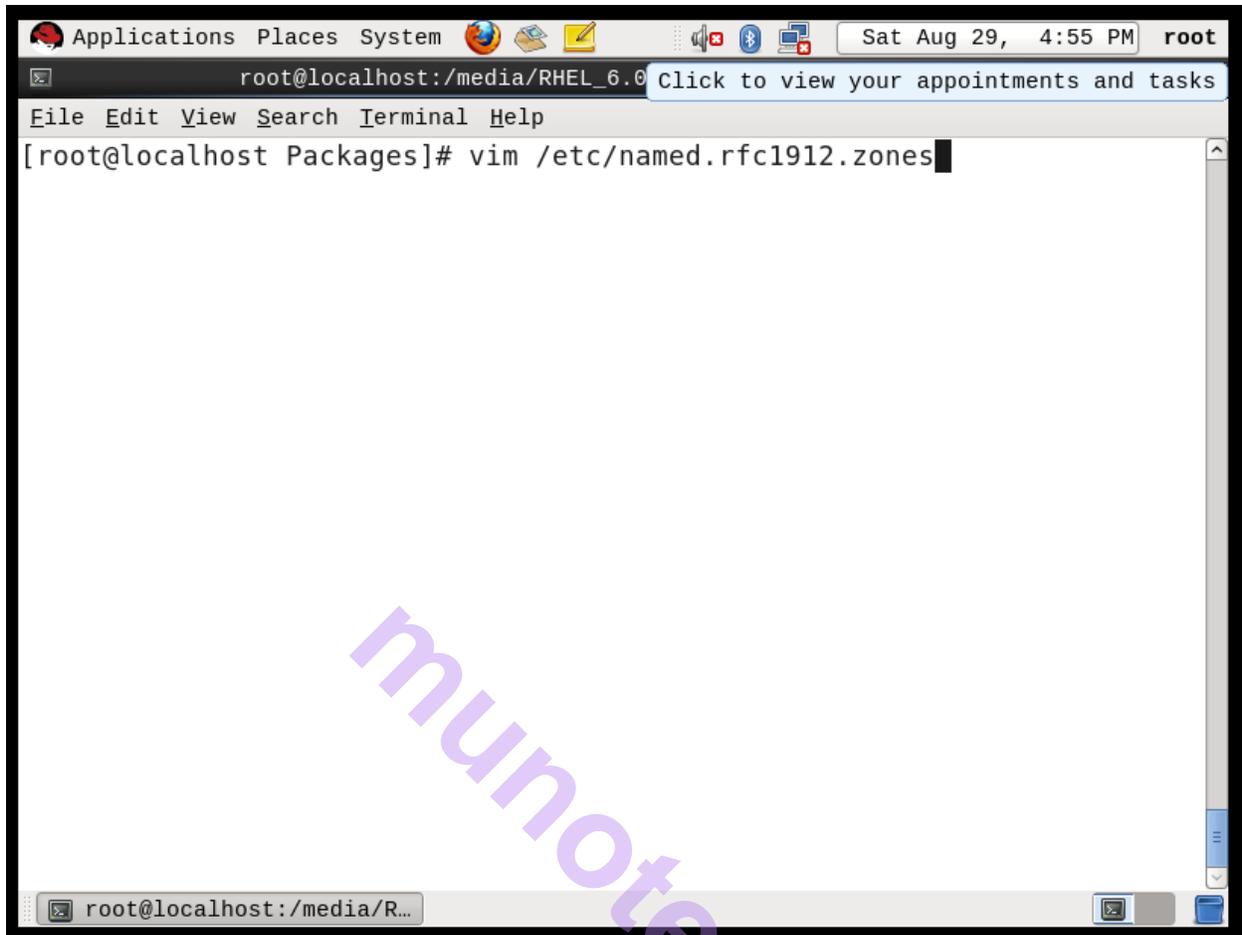


The screenshot shows a terminal window with a vim editor open. The terminal title bar indicates the user is root on a local host, and the current directory is /media/RHEL_6.0. The vim editor is displaying the configuration for the named service, specifically the options section. The configuration includes listening on port 53 on 192.168.1.3 and all interfaces, setting the directory to /var/named, and configuring various files and options like statistics-file, memstatistics-file, allow-query, recursion, dnssec-enable, dnssec-validation, and dnssec-lookaside. A comment indicates the path to the ISC DLV key file. The editor is in INSERT mode, and the status bar shows line 10, column 10, and 45% of the file is visible.

```
10 options {
11     listen-on port 53 { 192.168.1.3; };
12 #     listen-on-v6 port 53 { ::1; };
13     directory      "/var/named";
14     dump-file      "/var/named/data/cache_dump.db";
15     statistics-file "/var/named/data/named_stats.txt";
16     memstatistics-file "/var/named/data/named_mem_stats.txt";
17     allow-query    { any; };
18     recursion yes;
19
20     dnssec-enable yes;
21     dnssec-validation yes;
22     dnssec-lookaside auto;
23
24     /* Path to ISC DLV key */
25     bindkeys-file  "/etc/named.iscdlv.key";
26 };
27
28 logging {
29     channel default_debug {
30         file "data/named.run";
-- INSERT --                               10,10          45%
```

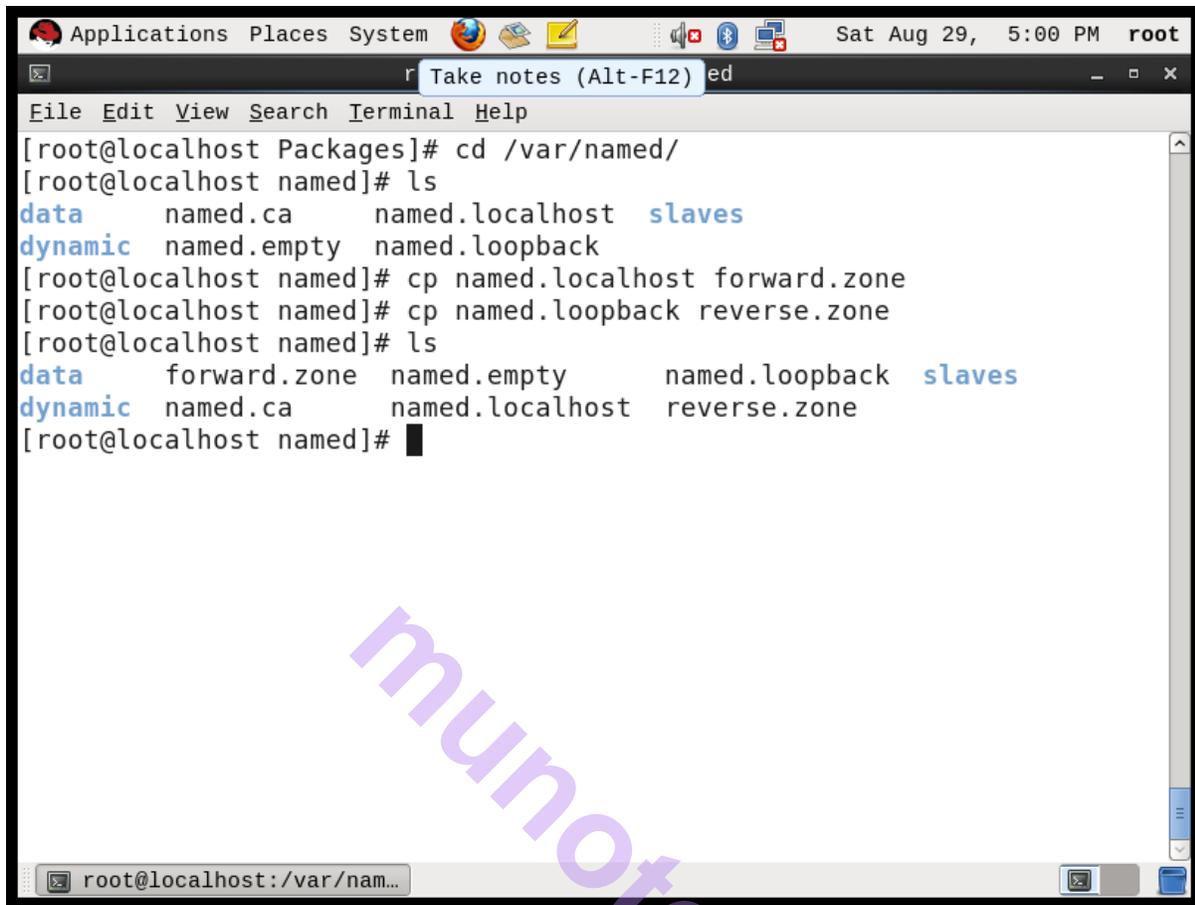
8) root@server ~] #vim /etc/named.rfc1912.zones

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The screenshot shows a Linux desktop environment. The top panel includes a menu bar with 'Applications', 'Places', and 'System', along with system status icons and the date 'Sat Aug 29, 4:55 PM' and the user 'root'. A notification bubble is present in the top right corner. The terminal window is open, displaying the prompt '[root@localhost Packages]# vim /etc/named.rfc1912.zones'. The terminal window has a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The terminal content is empty except for the command line. A watermark 'munotes.in' is visible diagonally across the terminal area.

```
root@localhost:~/media/RHEL_6.0
File Edit View Search Terminal Help
[root@localhost Packages]# vim /etc/named.rfc1912.zones
```

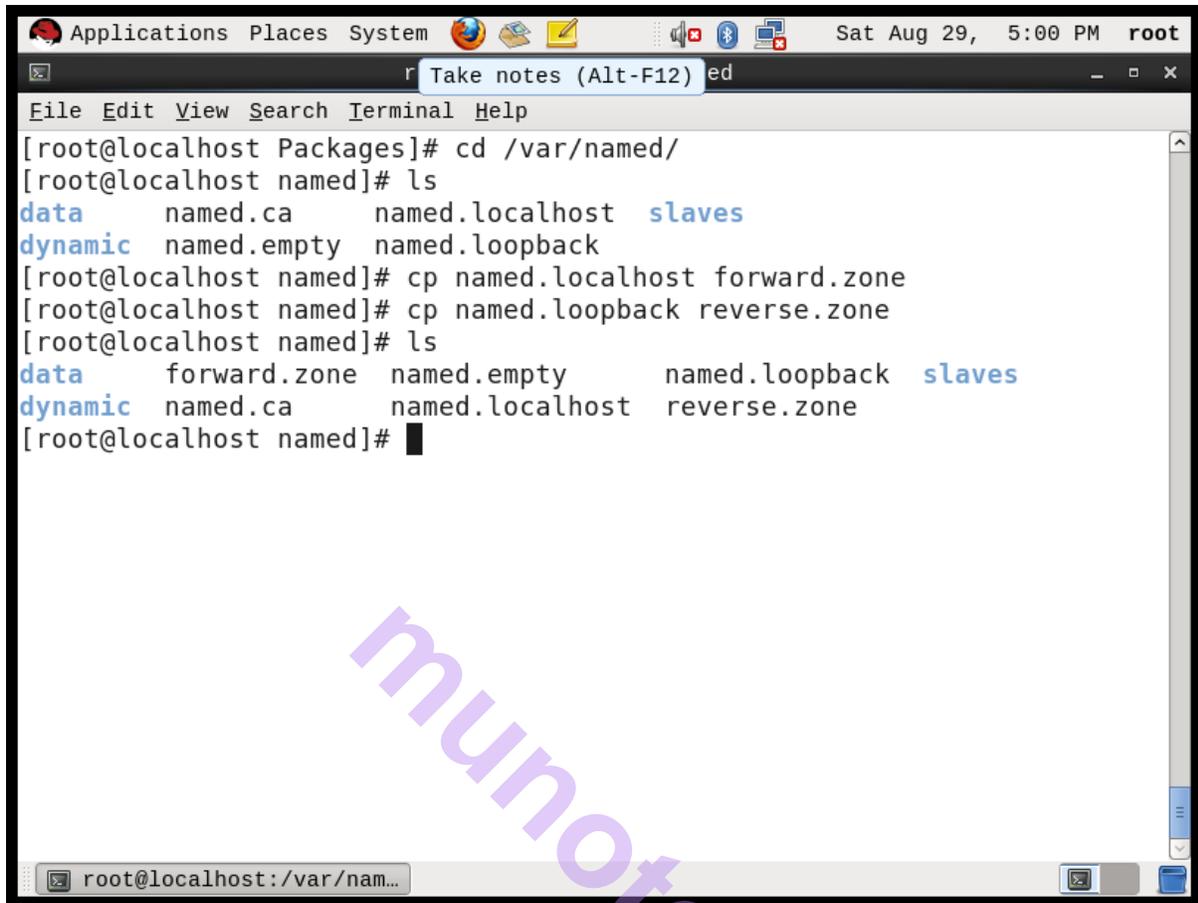



The screenshot shows a terminal window with the following content:

```
Applications Places System Sat Aug 29, 5:00 PM root
Take notes (Alt-F12) ed
File Edit View Search Terminal Help
[root@localhost Packages]# cd /var/named/
[root@localhost named]# ls
data      named.ca      named.localhost  slaves
dynamic   named.empty   named.loopback
[root@localhost named]# cp named.localhost forward.zone
[root@localhost named]# cp named.loopback reverse.zone
[root@localhost named]# ls
data      forward.zone  named.empty      named.loopback  slaves
dynamic   named.ca      named.localhost  reverse.zone
[root@localhost named]#
```

- 10) **root@server named]#cp named.localhost forward.zone**
- 11) **root@server named]#cp named.loopback reverse.zone**

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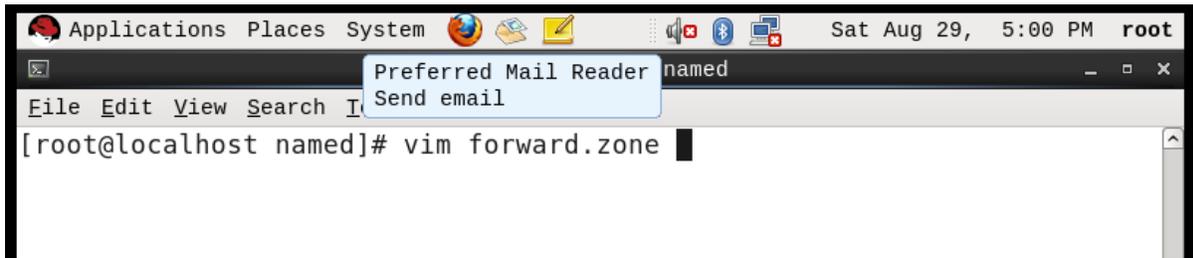


The screenshot shows a terminal window titled "Take notes (Alt-F12) ed" with a menu bar containing "File Edit View Search Terminal Help". The terminal output is as follows:

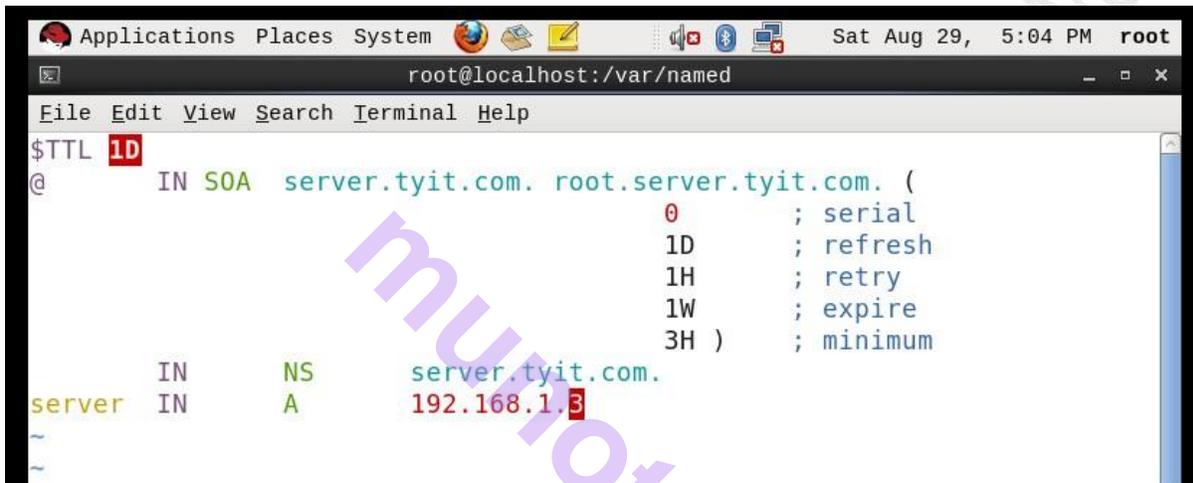
```
[root@localhost Packages]# cd /var/named/  
[root@localhost named]# ls  
data      named.ca      named.localhost  slaves  
dynamic   named.empty   named.loopback  
[root@localhost named]# cp named.localhost forward.zone  
[root@localhost named]# cp named.loopback reverse.zone  
[root@localhost named]# ls  
data      forward.zone  named.empty      named.loopback  slaves  
dynamic   named.ca      named.localhost  reverse.zone
```

The terminal prompt is currently at [root@localhost named]#.

root@server named]#vim forward.zone



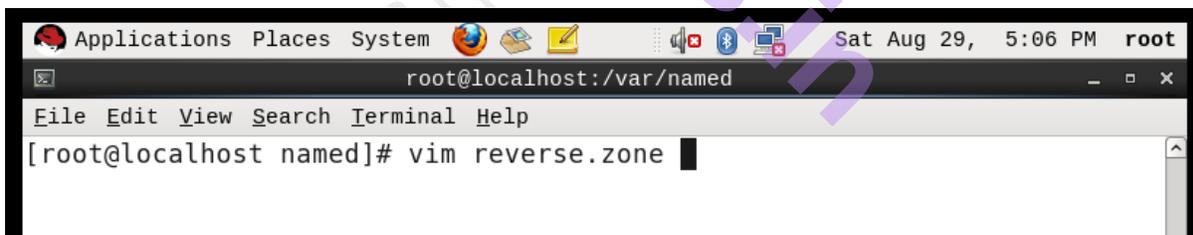
A terminal window titled 'named' is shown. The prompt is '[root@localhost named]#'. The user has entered the command 'vim forward.zone'. The terminal title bar shows 'Applications Places System' and the date 'Sat Aug 29, 5:00 PM'. A 'Preferred Mail Reader' window is open over the terminal.



A terminal window titled 'root@localhost:/var/named' is shown. The prompt is '\$TTL 1D'. The user has entered the command '@ IN SOA server.tyit.com. root.server.tyit.com. ('. The terminal displays the following content:

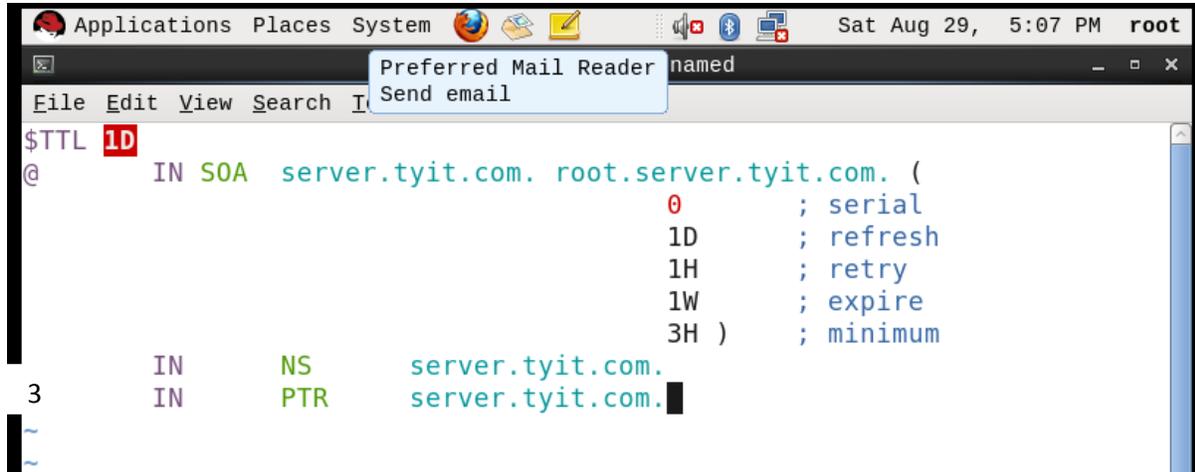
```
$TTL 1D
@ IN SOA server.tyit.com. root.server.tyit.com. (
                                0      ; serial
                                1D     ; refresh
                                1H     ; retry
                                1W     ; expire
                                3H )  ; minimum
server IN NS server.tyit.com.
server IN A 192.168.1.3
```

12) root@server named]#vim reverse.zone



A terminal window titled 'root@localhost:/var/named' is shown. The prompt is '[root@localhost named]#'. The user has entered the command 'vim reverse.zone'. The terminal title bar shows 'Applications Places System' and the date 'Sat Aug 29, 5:06 PM'.

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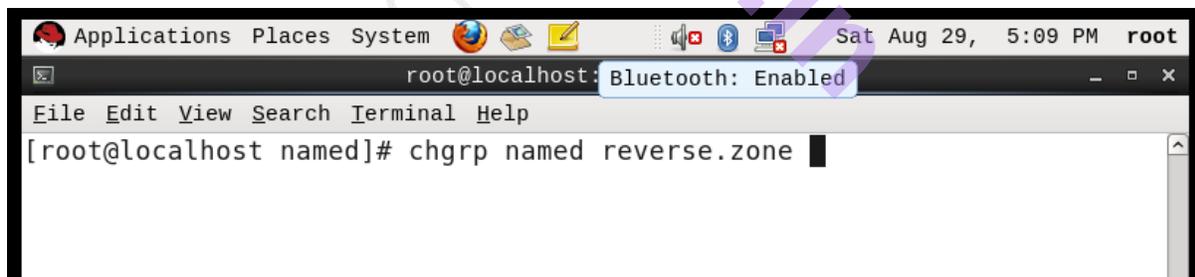
```
Applications Places System Sat Aug 29, 5:07 PM root
Preferred Mail Reader named
File Edit View Search I Send email
$TTL 1D
@ IN SOA server.tyit.com. root.server.tyit.com. (
                                0 ; serial
                                1D ; refresh
                                1H ; retry
                                1W ; expire
                                3H ) ; minimum
3 IN NS server.tyit.com.
  IN PTR server.tyit.com.
```

13) **root@server named]#chgrp named forward.zone**



```
Applications Places System Sat Aug 29, 5:09 PM root
Firefox Web Browser /var/named
File Edit View Search Browse the Web
[root@localhost named]# chgrp named forward.zone
```

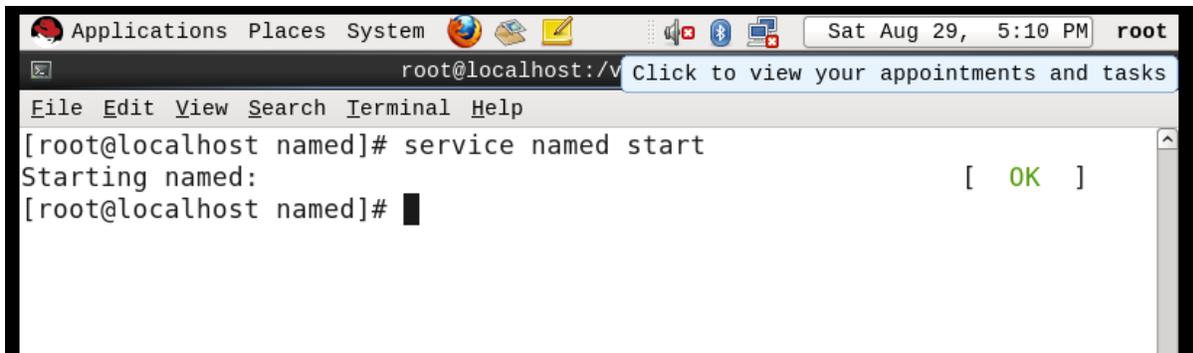
14) **root@server named]#chgrp named reverse.zone**



```
Applications Places System Sat Aug 29, 5:09 PM root
root@localhost: Bluetooth: Enabled
File Edit View Search Terminal Help
[root@localhost named]# chgrp named reverse.zone
```

15) **root@server named]#server named start**

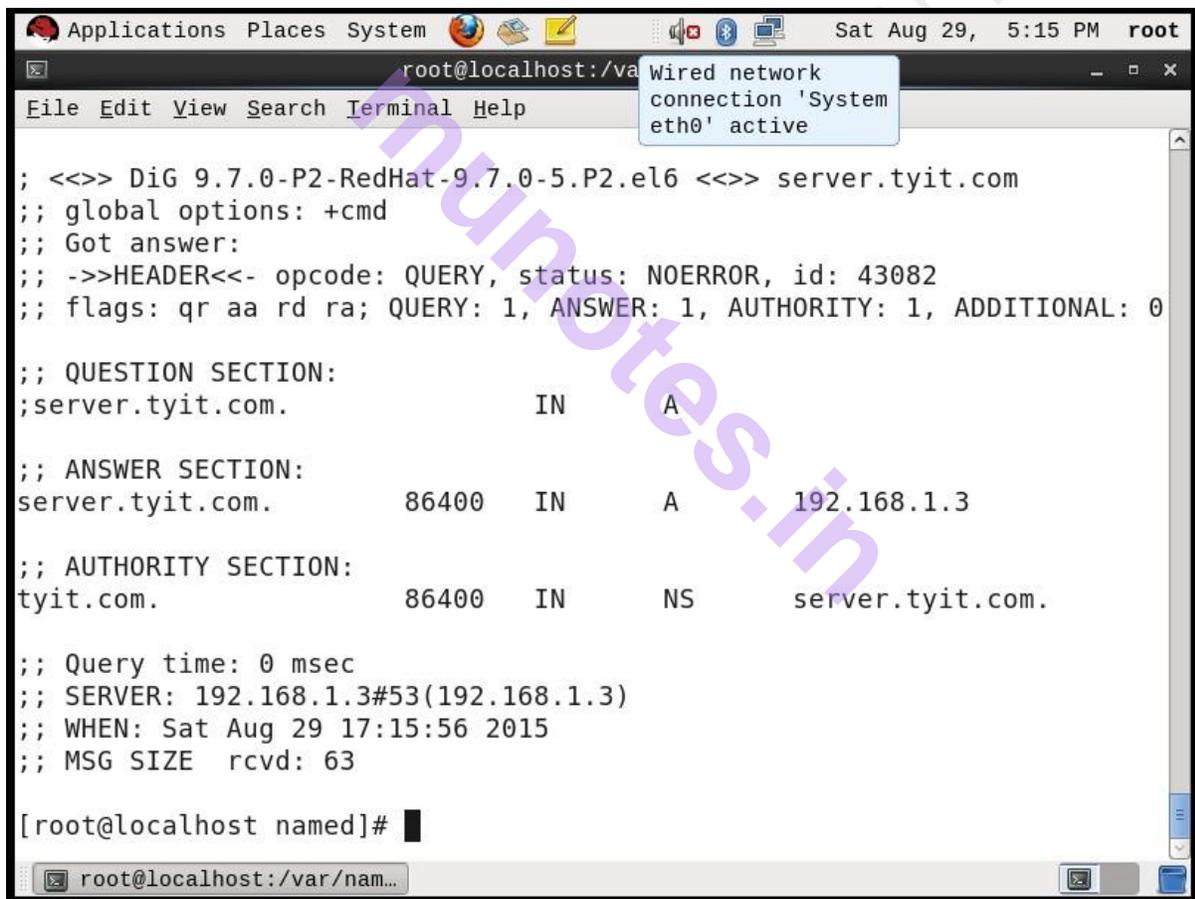
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```
Applications Places System Sat Aug 29, 5:10 PM root
root@localhost:~/va Click to view your appointments and tasks
File Edit View Search Terminal Help
[root@localhost named]# service named start
Starting named: [ OK ]
[root@localhost named]#
```

16) To check whether DNS is working type the following

- 1) **dig server.tyit.com**
- 2) **dig -x 192.168.1.3**



```
Applications Places System Sat Aug 29, 5:15 PM root
root@localhost:~/va Wired network connection 'System eth0' active
File Edit View Search Terminal Help
; <<>> DiG 9.7.0-P2-RedHat-9.7.0-5.P2.el6 <<>> server.tyit.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 43082
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;server.tyit.com.                IN      A
;; ANSWER SECTION:
server.tyit.com.                86400  IN      A      192.168.1.3
;; AUTHORITY SECTION:
tyit.com.                       86400  IN      NS     server.tyit.com.

;; Query time: 0 msec
;; SERVER: 192.168.1.3#53(192.168.1.3)
;; WHEN: Sat Aug 29 17:15:56 2015
;; MSG SIZE rcvd: 63

[root@localhost named]#
```

17) To check in the network,type the following

- (i)**ns lookup**
- >server.tyit.com**
- >192.168.1.3**
- >exit.**

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```
Applications Places System Sat Aug 29, 5:16 PM root
root@localhost:/var/nam...
File Edit View Search Terminal Help
Wired network connection 'System eth0' active
[root@localhost named]# dig 192.168.1.3

; <<>> DiG 9.7.0-P2-RedHat-9.7.0-5.P2.el6 <<>> 192.168.1.3
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: SERVFAIL, id: 15042
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;192.168.1.3.                IN      A

;; Query time: 3 msec
;; SERVER: 192.168.1.3#53(192.168.1.3)
;; WHEN: Sat Aug 29 17:16:28 2015
;; MSG SIZE rcvd: 29

[root@localhost named]#
```

Practical no 8 : Configure a Linux Server and transfer files to windows client.(Setting up NFS File Server)

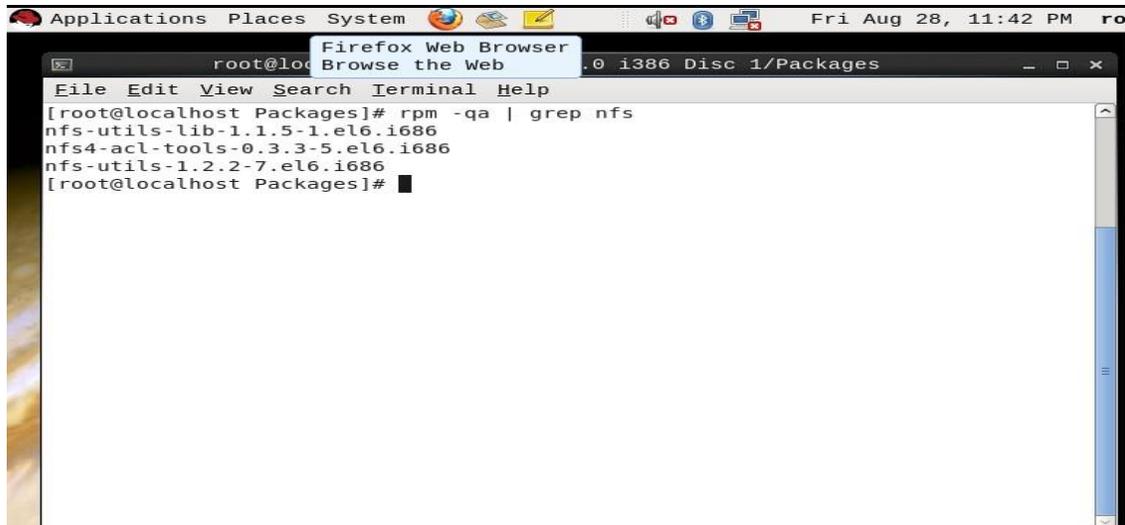
- The Network File System (NFS) is a way of mounting Linux directories over a network. An NFS server can export one or more directories that can then be mounted on a remote Linux machine.
- The main use of NFS in the home context is to share out data on a central server to all the PC's in the house.
- This way you can have a single copy of data accessible from a central location.
- The Network File System is the mostly used method for providing file sharing services on Linux networks.
- It enables local access to remote disks and file system in a distributed manner.
- NFS uses a standard Client-Server architecture.
- The NFS contains all those file systems that user wants to share along with daemon making those shares visible.
- This way of sharing file by NFS is called as **NFS exports**.
- The NFS server daemons provide remote access to the expected file system, enabling file locking over the network and allows to enable disk quotas on the NFS exports.
- On the Client side, NFS Client simply mounts the expected file system locally.

The mounted file system is known as **NFS mount**.

Setting Up NFS Server:

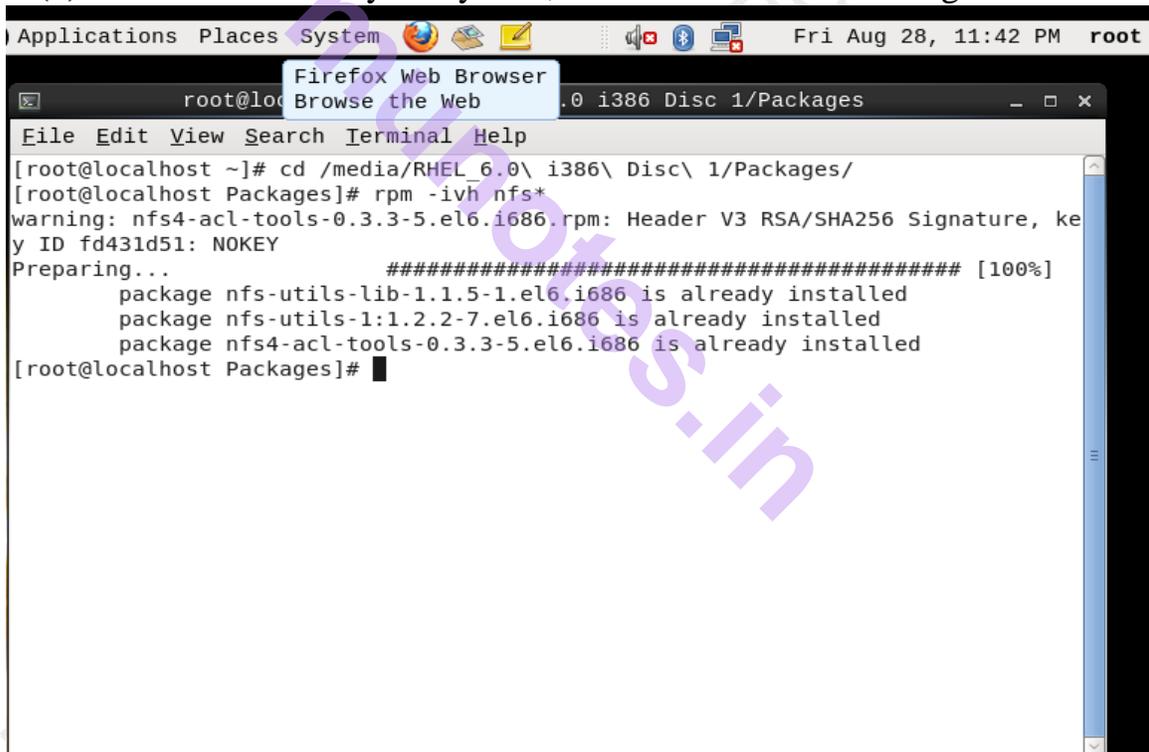
- (1) Verify the package of NFS whether installed as shown below:

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```
Applications Places System Fri Aug 28, 11:42 PM ro
root@localhost Packages
File Edit View Search Terminal Help
[root@localhost Packages]# rpm -qa | grep nfs
nfs-utils-lib-1.1.5-1.el6.i686
nfs4-acl-tools-0.3.3-5.el6.i686
nfs-utils-1.2.2-7.el6.i686
[root@localhost Packages]#
```

(2) If not installed on your system, then execute the following command:



```
Applications Places System Fri Aug 28, 11:42 PM root
root@localhost Packages
File Edit View Search Terminal Help
[root@localhost ~]# cd /media/RHEL_6.0\ i386\ Disc\ 1/Packages/
[root@localhost Packages]# rpm -ivh nfs*
warning: nfs4-acl-tools-0.3.3-5.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing... ##### [100%]
package nfs-utils-lib-1.1.5-1.el6.i686 is already installed
package nfs-utils-1:1.2.2-7.el6.i686 is already installed
package nfs4-acl-tools-0.3.3-5.el6.i686 is already installed
[root@localhost Packages]#
```

(3) Verify IP address of the linux machine to be setup as NFS Server:

Linux Administration Practical Manual

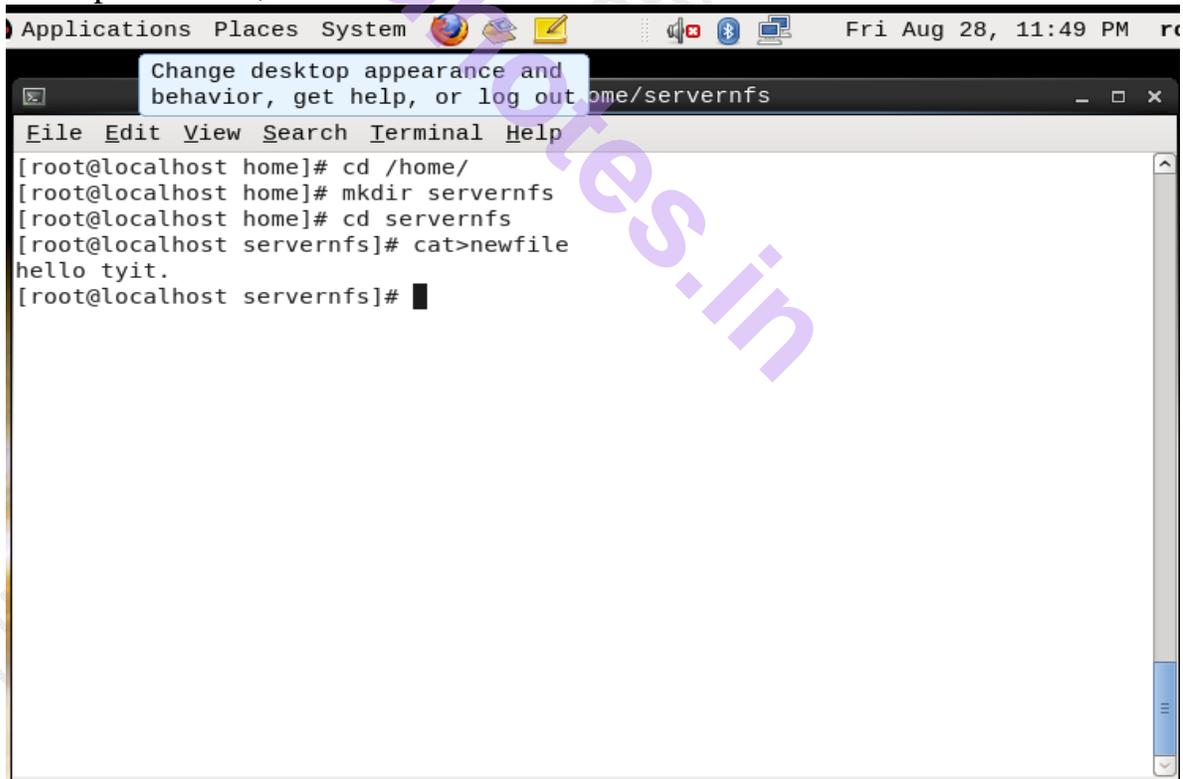


A terminal window titled 'root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages' showing the output of the 'ifconfig eth0' command. The output displays network configuration details for the eth0 interface, including IP address, netmask, broadcast address, and various statistics.

```
root@localhost:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@localhost Packages]# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:0C:29:A6:40:2D
          inet addr:192.168.1.3  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fea6:402d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:9 errors:0 dropped:0 overruns:0 frame:0
          TX packets:21 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:828 (828.0 b)  TX bytes:3578 (3.4 KiB)
          Interrupt:19 Base address:0x2000

[root@localhost Packages]#
```

(4) Make a directory to be exported, create few files into it and give it full permission, as follows:



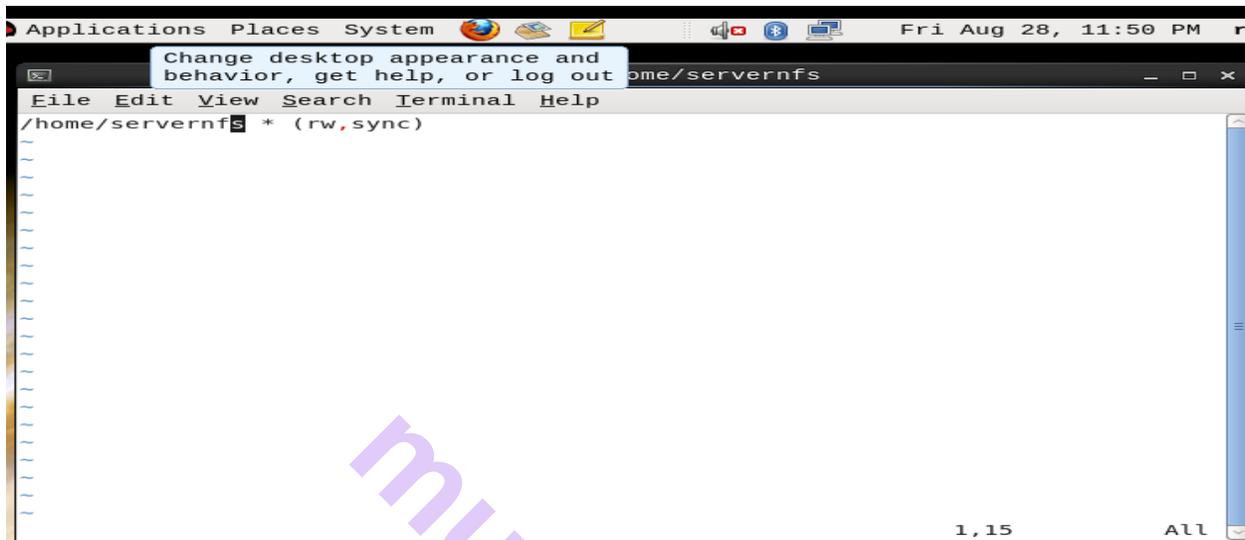
A terminal window titled 'root@localhost/home/servernfs' showing the steps to create a directory and a file. The user navigates to /home, creates a directory named 'servernfs', and then creates a file named 'newfile' containing the text 'hello tyit.'.

```
root@localhost/home/servernfs
Change desktop appearance and behavior, get help, or log out
File Edit View Search Terminal Help
[root@localhost home]# cd /home/
[root@localhost home]# mkdir servernfs
[root@localhost home]# cd servernfs
[root@localhost servernfs]# cat>newfile
hello tyit.
[root@localhost servernfs]#
```

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- (5) Open the configuration file of NFS, i.e, /etc/exports and write the following lines under it:

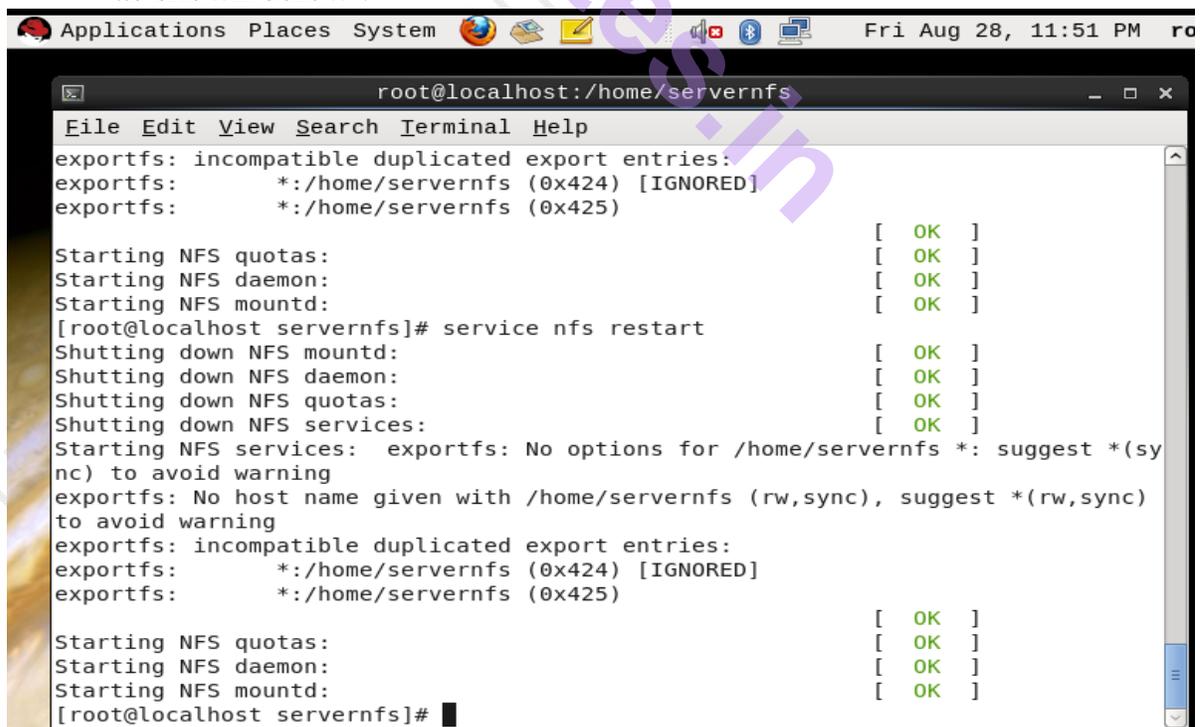
[root@diamond ~] # vi /etc/exports.



```
Applications Places System Fri Aug 28, 11:50 PM
Change desktop appearance and behavior, get help, or log out
/home/servernfs
File Edit View Search Terminal Help
/home/servernfs *(rw, sync)
1,15 All
```

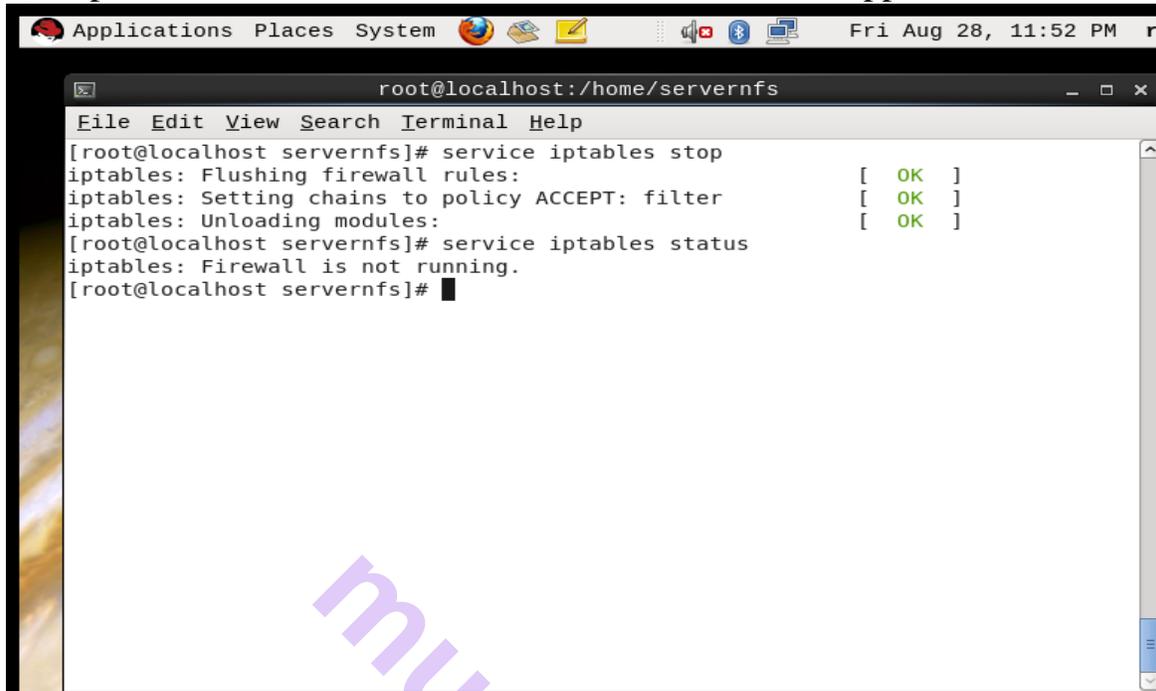
The above entry says that server export directory has been exported to the network 192.168.1.3

- (6) Save and quit the file. Restart the service of nfs and enable it from boot as shown below :



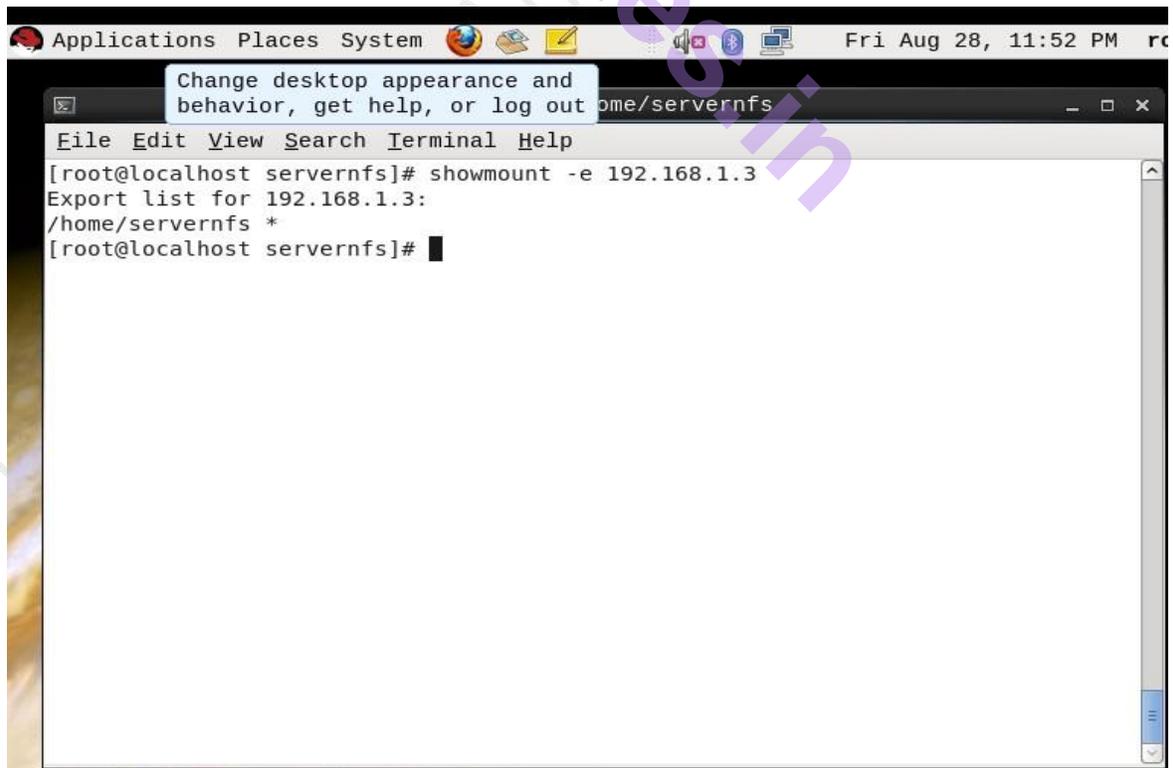
```
Applications Places System Fri Aug 28, 11:51 PM
root@localhost:/home/servernfs
File Edit View Search Terminal Help
exportfs: incompatible duplicated export entries:
exportfs:      */home/servernfs (0x424) [IGNORED]
exportfs:      */home/servernfs (0x425)
[ OK ]
Starting NFS quotas: [ OK ]
Starting NFS daemon: [ OK ]
Starting NFS mountd: [ OK ]
[root@localhost servernfs]# service nfs restart
Shutting down NFS mountd: [ OK ]
Shutting down NFS daemon: [ OK ]
Shutting down NFS quotas: [ OK ]
Shutting down NFS services: [ OK ]
Starting NFS services: exportfs: No options for /home/servernfs *: suggest *(sync) to avoid warning
exportfs: No host name given with /home/servernfs (rw, sync), suggest *(rw, sync) to avoid warning
exportfs: incompatible duplicated export entries:
exportfs:      */home/servernfs (0x424) [IGNORED]
exportfs:      */home/servernfs (0x425)
[ OK ]
Starting NFS quotas: [ OK ]
Starting NFS daemon: [ OK ]
Starting NFS mountd: [ OK ]
[root@localhost servernfs]#
```

(7) Stop the Firewalls and check the status whether it is stopped.



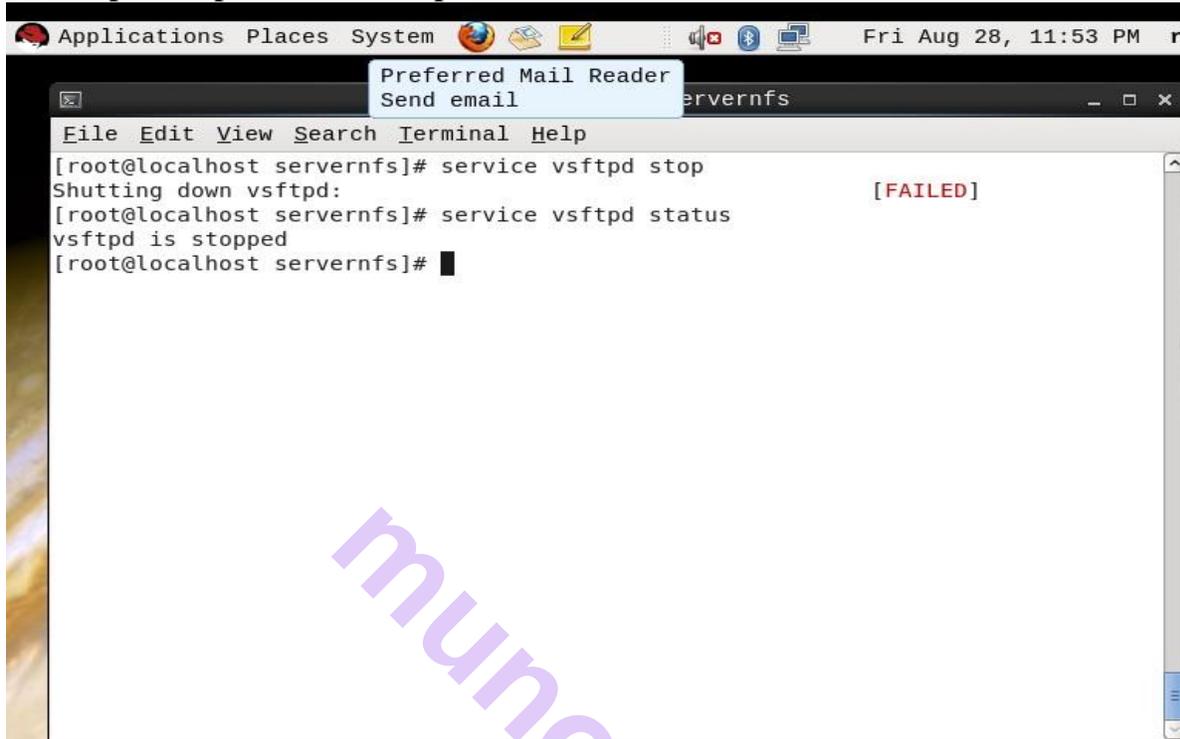
```
root@localhost:/home/servernfs
File Edit View Search Terminal Help
[root@localhost servernfs]# service iptables stop
iptables: Flushing firewall rules:           [ OK ]
iptables: Setting chains to policy ACCEPT: filter [ OK ]
iptables: Unloading modules:                 [ OK ]
[root@localhost servernfs]# service iptables status
iptables: Firewall is not running.
[root@localhost servernfs]#
```

(8) Showmount command shows you all shared directories in given IP address.(Server)



```
root@localhost:/home/servernfs
File Edit View Search Terminal Help
[root@localhost servernfs]# showmount -e 192.168.1.3
Export list for 192.168.1.3:
/home/servernfs *
[root@localhost servernfs]#
```

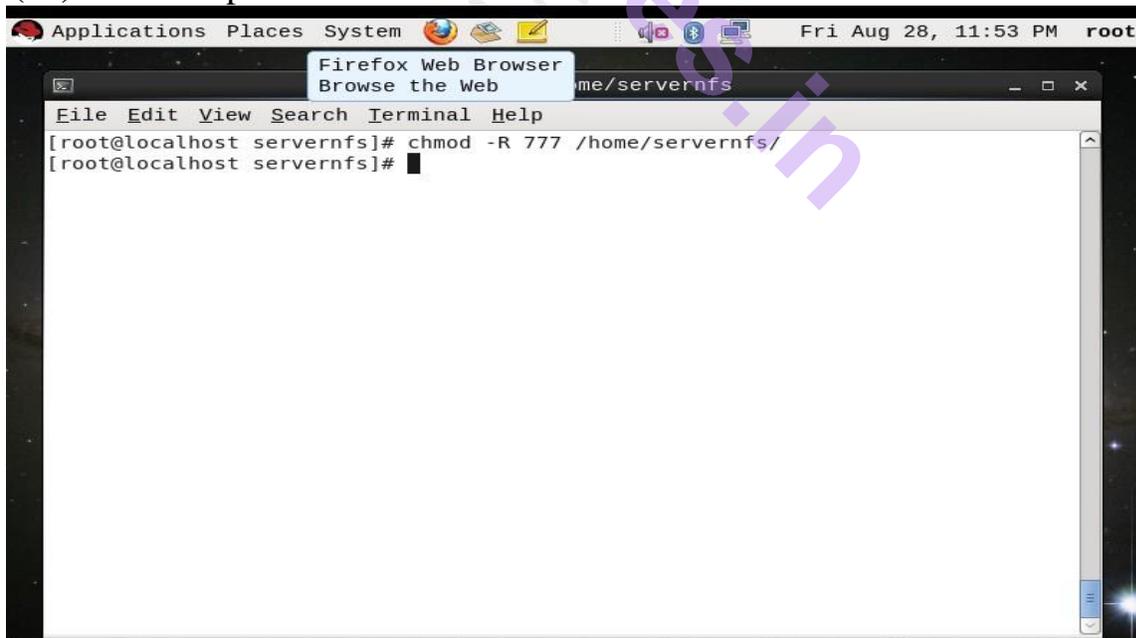
(9) Stop the ftp service - vsftpd services and NFS services clash with each other.



A terminal window titled 'servernfs' is shown. The user is root at localhost. The terminal output is as follows:

```
[root@localhost servernfs]# service vsftpd stop
Shutting down vsftpd: [FAILED]
[root@localhost servernfs]# service vsftpd status
vsftpd is stopped
[root@localhost servernfs]#
```

(10) Give full permissions to the shared folder.

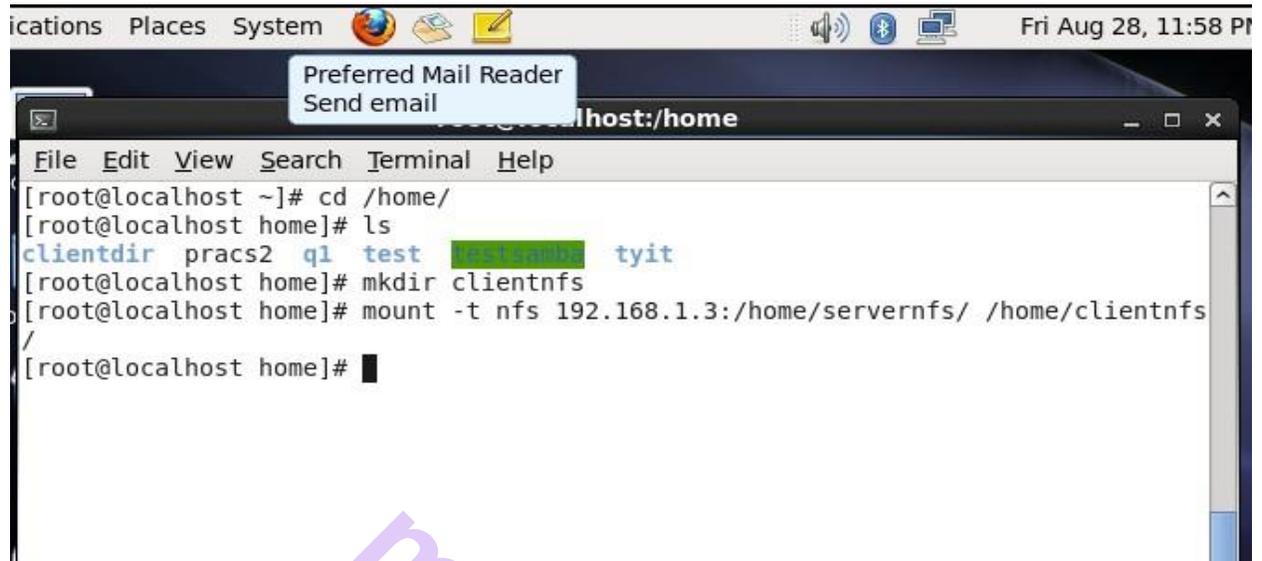


A terminal window titled 'servernfs' is shown. The user is root at localhost. The terminal output is as follows:

```
[root@localhost servernfs]# chmod -R 777 /home/servernfs/
[root@localhost servernfs]#
```

NFS Client:

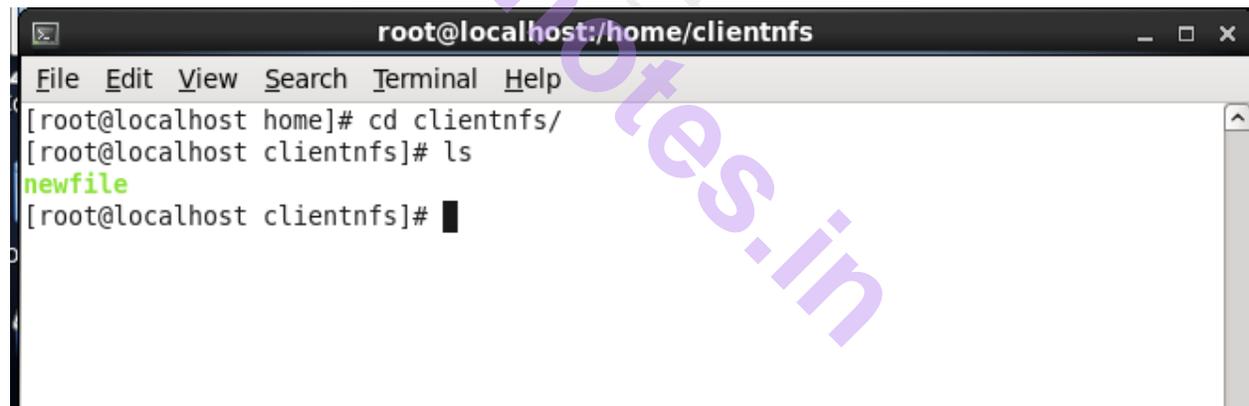
As NFS Client make a directory /nfsclient and mount the server exported directory on it, as shown:



A terminal window titled "localhost:/home" with a menu bar (File, Edit, View, Search, Terminal, Help) and a system tray at the top showing "Fri Aug 28, 11:58 PM". A tooltip for "Preferred Mail Reader" is visible. The terminal output is as follows:

```
[root@localhost ~]# cd /home/
[root@localhost home]# ls
clientdir pracs2 ql test testdir tyit
[root@localhost home]# mkdir clientnfs
[root@localhost home]# mount -t nfs 192.168.1.3:/home/servernfs/ /home/clientnfs
/
[root@localhost home]#
```

On listing, it show up the content of server export directory.



A terminal window titled "root@localhost:/home/clientnfs" with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal output is as follows:

```
[root@localhost home]# cd clientnfs/
[root@localhost clientnfs]# ls
newfile
[root@localhost clientnfs]#
```

Practical no 9: Configure to the Internet

Proxy servers operate as an intermediary between a local network and Internet. Requests from local clients for web services can be handled by the proxy server. Squid is a high-performance HTTP and FTP caching proxy server. It is also known as a Web proxy cache. As it stores data from frequently used Web pages and files, it can often give your users the data they need without their systems having to look to the Internet.

From squid web proxy server you can control what should be access on your network from internet. It could be act as a filter that could filter everything from porn site to advertise , videos.

In our example we will configure squid web proxy server and filter sites and deny permission to specific host from accessing internet.

First we set Network Adapter cards in VM-ware. We required two NIC cards.

- 1) First NIC Directly connected to ISP for internet connection
- 2) Second NIC is used to connect client and give internet connection to Client and also used to control internet access to client.

We require one NIC card to communicate with windows which receives internet connection from Windows (ISP). So set it as NAT, and second NIC we set as Host-Only .

Configure squid web proxy server

Step 1 :- rpm query is used to check whether squid is install or not.

#rpm -qa squid

```
[root@server ~]# rpm -qa | grep squid  
squid-3.1.4-1.el6.i686
```

If the package is not installed the install with following command.

move to Package Directory.

```
#cd /media/THEL_6.0\ i386\ Disc\ 1/Package
```

Now use rpm command to install SQUID Package.

```
#rpm -ivh squid*
```

Step 2 :- check the hostname and ip address of server it will be use in editing of squid.conf

```
#hostname
```

```
#ifconfig
```

```
[root@server ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:48:13:2A
          inet addr:192.168.1.1  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe48:132a/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:201 errors:0 dropped:0 overruns:0 frame:0
          TX packets:21 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:12847 (12.5 KiB)  TX bytes:2441 (2.3 KiB)
          Interrupt:19 Base address:0x2000
```

Main Squid configuration file is squid.conf in the /etc/squid/ directory. But only a few are active by default. Most of this file is filled with comments that describe most directives and associated options.

To make editing easier use show line numbers options and locate desire tag from line number.(set the line numbers by :set nu)**open /etc/squid/squid.conf for editing.**

```
#Vi /etc/squid/squid.conf
```

```
1 #
2 # Recommended minimum configuration:
3 #
4 acl manager proto cache_object
5 acl localhost src 127.0.0.1/32
6 acl localhost src ::1/128
7 acl to_localhost dst 127.0.0.0/8 0.0.0.0/32
8 acl to_localhost dst ::1/128
9
10 # Example rule allowing access from your local networks.
11 # Adapt to list your (internal) IP networks from where browsing
12 # should be allowed
13 acl localnet src 10.0.0.0/8 # RFC1918 possible internal network
14 acl localnet src 172.16.0.0/12 # RFC1918 possible internal network
15 acl localnet src 192.168.0.0/16 # RFC1918 possible internal network
16 acl localnet src fc00::/7 # RFC 4193 local private network range
17 acl localnet src fe80::/10 # RFC 4291 link-local (directly plugged) machines
18
19 acl SSL_ports port 443
20 acl Safe_ports port 80 # http
21 acl Safe_ports port 21 # ftp
22 acl Safe_ports port 443 # https
23 acl Safe_ports port 70 # gopher
24 acl Safe_ports port 210 # wais
25 acl Safe_ports port 1025-65535 # unregistered ports
26 acl Safe_ports port 280 # http-mgmt
27 acl Safe_ports port 488 # gss-http
28 acl Safe_ports port 591 # filemaker
29 acl Safe_ports port 777 # multiling http
30 acl CONNECT method CONNECT
31 #
32 # Recommended minimum Access Permission configuration:
:se nu
```

Squid.conf file

Insert to Line no 34 write `acl deny_host src 192.168.1.14`

The above line deny access to IP Address 192.168.1.14 network.

Insert Line no 35 write `acl allow_network src 192.168.1.0/24`

The above line allow to 192.168.1.all network IP to access internet via 192.168.1.1 server.

Insert Line no 36 write `acl web_deny dstdomain "/etc/squid/web_deny"`

The above line block access to web site enter in web deny file. At present the web_deny file is not there we have to create that file.

```
32 # Recommended minimum Access Permission configuration:
33 #
34 acl deny_host src 192.168.1.14
35 acl allow_network src 192.168.1.0/24
36 acl web_deny dstdomain "/etc/squid/web_deny"
```

Now we apply above acl rules. Go to line no .55 and insert following line after line No. 55

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```
53 #
54 # INSERT YOUR OWN RULE(S) HERE TO ALLOW ACCESS FROM YOUR CLIENTS
55 #
56 http_access deny deny_host
57 http_access deny web_deny
58 http_access allow allow_network
59
```

Squid proxy server uses port no 3128 for communication.

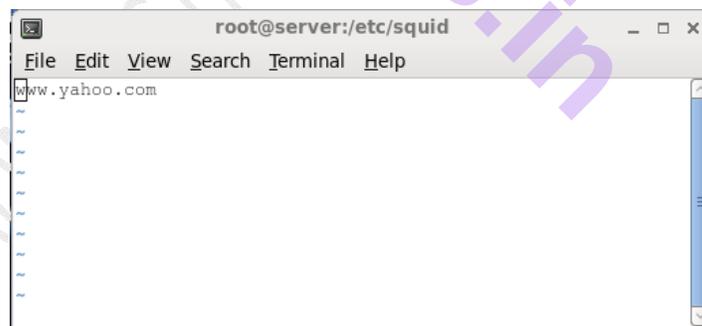
```
--
69 # Squid normally listens to port 3128
70 http_port 3128
```

:wq

Save the file.

Now we create web_deny file which we declare at line no. 36. At /etc/squid directory. Open the file with command # vi /etc/squid/web_deny and add web site name www.yahoo.com

```
[root@server ~]# cd /etc/squid/
[root@server squid]# ls
cachemgr.conf          errorpage.css.default  msntauth.conf          squid.conf.default
cachemgr.conf.default mime.conf               msntauth.conf.default web_deny
errorpage.css         mime.conf.default     squid.conf
[root@server squid]# vi web_deny
```



Now save and close file with :wq

Now restart the service so the changes get applied.

#service squid start

Now set the squid service to start at boot time.

#chkconfig squid on

```
[root@server ~]# _chkconfig squid on
```

Now restart the squid service

#service squid restart

```
[root@server ~]# service squid restart
Stopping squid: ..... [ OK ]
Starting squid: . [ OK ]
[root@server ~]# █
```

We are done with the squid server configuration.

SQUID CLIENT Configuration

Go to client side/clone side

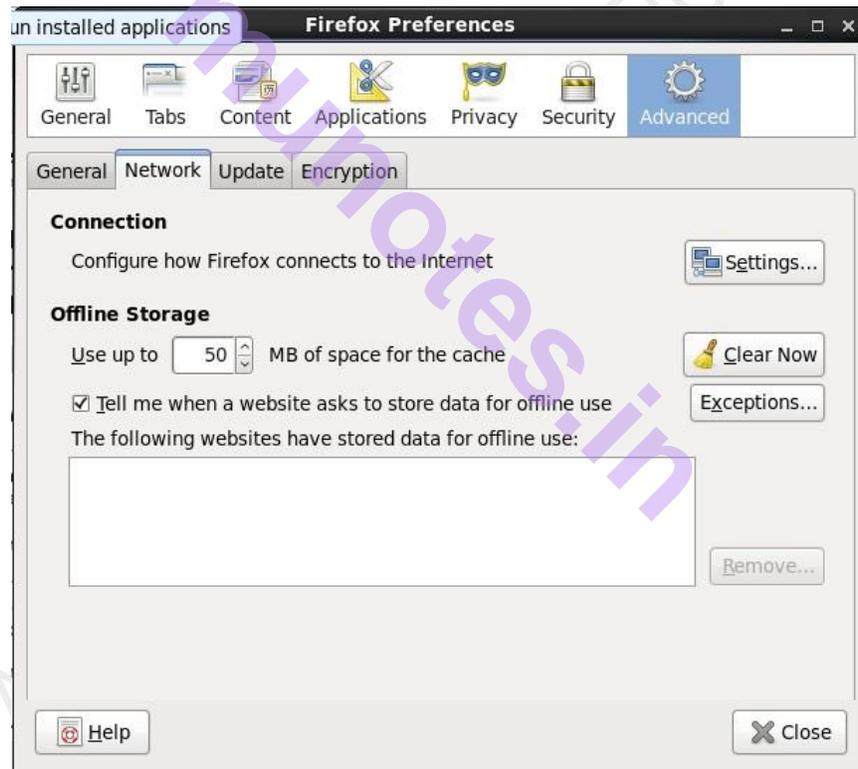
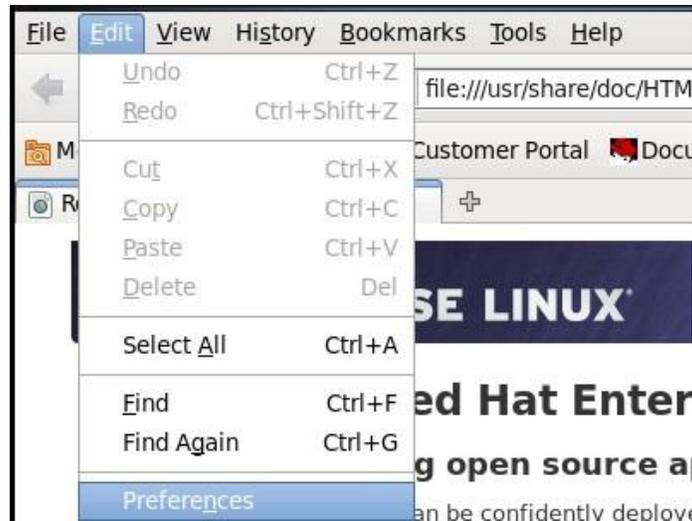
Go to firefox browser-open firefox

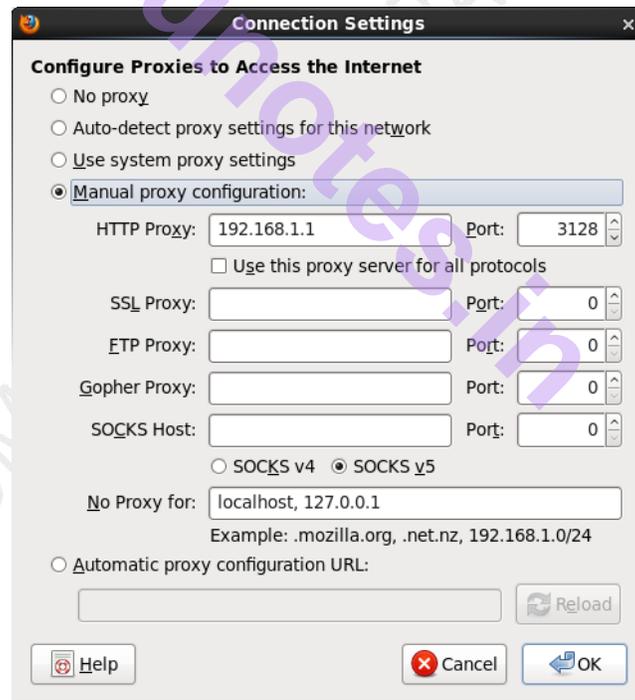
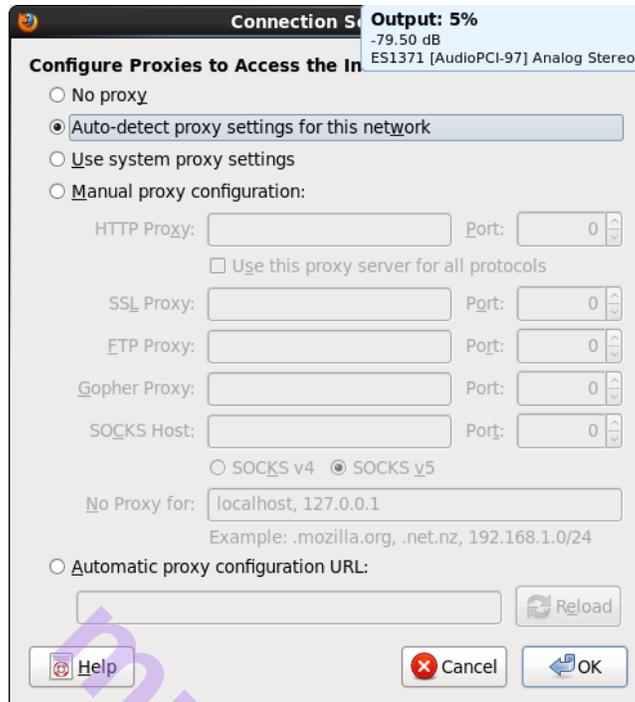
Go to Edit→Preference→advanced→ network tools→ click settings-→ select manual proxy configuration→ HTTP Proxy and enter Squid proxy server IP Address 192.168.1.1 and Port no as 8080

Click on OK and Apply.

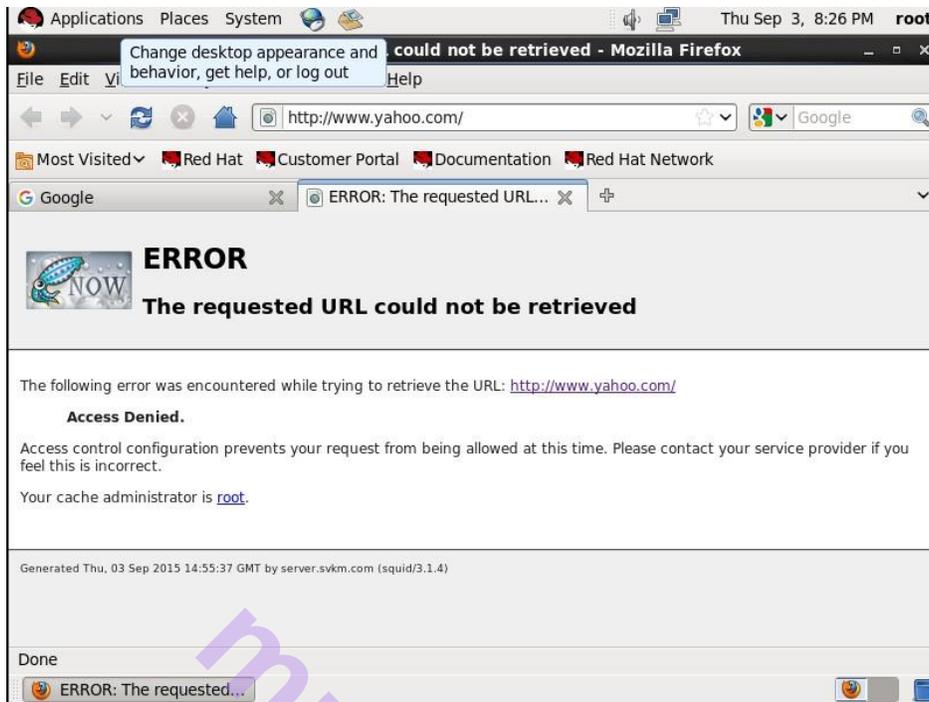


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Practical no 10: Configuring Mail Server

A number of Mail Transport Agents are available for RedHat Enterprise Linux .

MTA is a program which plays a vital role in transferring the mail. It is responsible for sending messages across the network.

The most widely used MTA is sendmail.

Sendmail is not a client program, which you use to read your email.

Sendmail is one of the behind-the-scenes programs which move email over the internet.

- Normally it runs as a background daemon.
- Can even be run out of the super daemon (xinetd)

Configuring Sendmail (Server Side)

Before configuring sendmail, verify whether it is installed or not as follows:

```
#rpmquery -qa | grep sendmail
```

It gives the output that whether sendmail is installed and also shows the version of the installed package if installed

If not found , then install the package as follows:

```
#rpm -ivh sendmail*
```

```
[root@server ~]# cd /media/RHEL_6.0_i386_Disc1/Packages/
[root@server Packages]# rpm -ivh sendmail*
warning: sendmail-8.14.4-8.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing...##### [100%]
 1: sendmail##### [ 50%]
 2: sendmail-cf##### [100%]
[root@server Packages]# █
```

```
[root@server Packages]# rpm -qa | grep sendmail
sendmail-cf-8.14.4-8.el6.noarch
sendmail-8.14.4-8.el6.i686
[root@server Packages]# █
```

By default, Sendmail Server allows to connect to localhost only

So we should edit the `/etc/mail/sendmail.mc` file to allow connect to other hosts.

To open the configuration file of sendmail, the command is as follows:

vim /etc/mail/sendmail.mc

```
[root@server Packages]# vim /etc/mail/sendmail.mc
```

```
vert (-1) dnl
dnl #
dnl # This is the sendmail macro config file for n4. If you make changes to
dnl # /etc/mail/sendmail.mc, you will need to regenerate the
dnl # /etc/mail/sendmail.cf file by confirming that the sendmail-cf package is
dnl # installed and then performing a
dnl #
dnl #    /etc/mail/make
dnl #
include(`/usr/share/sendmail-cf/n4/cf.n4') dnl
VERSION(`set up for linux') dnl
OSTYPE(`linux') dnl
dnl #
dnl # Do not advertize sendmail version.
dnl #
dnl define(`conf SMTP_LOG_FILENAME', `sj_Sendmail; $b') dnl
dnl #
dnl # default logging level is 9, you might want to set it higher to
dnl # debug the configuration
dnl #
dnl define(`conf LOG_LEVEL', `9') dnl
dnl #
dnl # Uncomment and edit the following line if your outgoing mail needs to
dnl # be sent out through an external mail server:
dnl #
dnl define(`SMART_HOST', `smtp.your.provider') dnl
dnl #
define(`conf DEF_USER_ID', ``8:12'') dnl
"/etc/mail/sendmail.mc" 176L, 7202C
```

1, 1 Top

Show hidden line with `:set nu` option on vi editor command mode.

Go to line number 116

DAEMON_OPTIONS ('Port = smtp , Addr =192.168.1.1, Name='MTA')

You can allow other computers to use your sendmail server by commenting.

In the `sendmail.mc` file, lines that begin with `dnl` , which stands to delete new line are constant.

Some lines end with `dnl`, but lines ending with `dnl` are not comments.

Comment this line with dn1 keyword followed by # sign

```
dn1 # DAEMON_OPTIONS ('Port = smtp , Addr =192.168.1.1 ,  
Name='MTA')
```

```
116 dn1 # DAEMON_OPTIONS('Port =smtp, Addr =127.0.0.1, Name=MTA') dn1
```

Save this file with :wq and Exit

Now generate new sendmail.cf file by using m4 command as shown below.

```
m4 /etc/mail/sendmail.mc > /etc/mail/sendmail.cf
```

m4 is a macro processor i.e. a tool that follows principle of shorthand writing.

Macro is a symbolic link for a long string of characters.

```
[root@server Packages]# vi m / etc / mail / sendmail . mc  
[root@server Packages]# m4 / etc / mail / sendmail . mc > / etc / mail / sendmail . cf  
[root@server Packages]# █
```

Now check DNS Configuration:

- A linux server with IP address 192.168.1.3 and hostname server.tyit.com
- A Configured DNS server on Linux server
- Updated /etc/hosts file
- Running portmap and xinetd services (service xinetd stop , service portmap stop)
- Firewall should be off on server (service iptables stop) We have configured all these steps in our pervious article.

Check DNS server

Before start configuration of **sendmail server** we have to check whether our DNS is properly configured or not .

Eg: use dig command (dig server.svkm.com & dig -x 192.168.1.1).

```
[root@server Packages]# dig server.svkm.com

; <<>> Di G 9. 7. 0- P2- RedHat - 9. 7. 0- 5. P2. el 6 <<>> server.svkm.com
;; global options: +cnm
;; Got answer:
;; ->>HEADER<<< opcode: QUERY, status: NOERROR, id: 29411
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;server.svkm.com                IN      A

;; ANSWER SECTION:
server.svkm.com                86400  IN      A      192.168.1.1

;; AUTHORITY SECTION:
svkm.com                       86400  IN      NS     server.svkm.com

;; Query time: 65 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Sun Aug 30 21:08:07 2015
;; MSG SIZE rcvd: 63

[root@server Packages]# █
```

Now open forward.zone file from named directory

vi /var/named/forward.zone

Add MX Entry in forward.zone as follows:

IN MX 192.168.1.3

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```
$TTL 1D
@ IN SOA server.svkm.com root.server.svkm.com (
0 ; serial
1D ; refresh
1H ; retry
1W ; expire
3H ) ; minimum

server IN NS server.svkm.com
IN A 192.168.1.1
IN MX 192.168.1.1
```

Now restart sendmail service

service sendmail restart

```
[root@server Packages]# vi /var/named/forward.zone
[root@server Packages]# service sendmail restart
Shutting down sendmail: [ OK ]
Starting sendmail: [ OK ]
Starting smclient: [ OK ]
[root@server Packages]#
```

If sendmail service restart without any error means you have configured sendmail successfully.

Configuring sendmail Client Side

Here we are going to test sendmail server by sending and receiving mails.

Now create one user

useradd test

Set the password for that user

passwd test

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```
[root@server ~]# useradd test
[root@server ~]# passwd test
Changing password for user test.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@server ~]# █
```

mail test@server.nm.com

It will ask for the Subject and Body of the mail

Example: Subject: **testmail**

Body: **Hi Everyone.**

This is my First sendmail program.

Save the file by pressing keys <ctrl+d> which indicates End of file.

```
[root@server ~]# mail test@server.upgcm.com
Subject: testmail
Hi Everyone.
this is my sendmail program
EOT
[root@server ~]# █
```

Type **su – test**

The above command switch to the user name test. To check whether mail has received or not, type mail command

mail

The above command open the mailbox for the current login user. It will give you the details of mail received by the subject name.

```
test@server ~]$ su - test
password:
test@server ~]$ mail
teirloom Mail version 12.4 7/29/08. Type ? for help.
'/var/spool/mail/test': 1 message 1 new
>N 1 test@server.svkm.com Sun Aug 30 21:27 20/733 "hi"
& █
```

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New emails are shown with letter **N** at starting and unread mail shown with letter **U** at starting. Once you read the mail **U** and **N** notification get cleared.

To read that mail type the number which will be given in previous output

1

You can now read the contents of mail.

To exit type **<Ctrl+d>**

```
[test@server ~]$ mail test@server.svkm.com
Subject: hi
test
EOT
[test@server ~]$
[test@server ~]$ mail
No mail for test
[test@server ~]$ su - test
Password:
[test@server ~]$ mail
Heirloom Mail version 12.4 7/29/08. Type ? for help.
"/var/spool/mail/test": 1 message 1 new
>N 1 test@server.svkm.com Sun Aug 30 21:27 20/733 "hi"
& 1
Message 1:
From test@server.svkm.com Sun Aug 30 21:27:56 2015
Return-Path: <test@server.svkm.com>
From test@server.svkm.com
Date: Sun, 30 Aug 2015 21:27:35 +0530
To: test@server.svkm.com
Subject: hi
User-Agent: Heirloom mail x 12.4 7/29/08
Content-Type: text/plain; charset=us-ascii
Status: R

test

& █
```

Practical no 11: Configure FTP Server on Linux server

- FTP server is used to transfer files between server and clients.
- All major operating system supports FTP.
- FTP is the most used protocol over internet to transfer files. Like most Internet operations, FTP works on a client/ server model.
- FTP client programs can enable users to transfer files to and from a remote system running an FTP server program.
- Any Linux system can operate as an FTP server.
- It has to run only the server software—an FTP daemon with the appropriate configuration. Transfers are made between user accounts on client and server systems.
- A user on the remote system has to log in to an account on a server and can then transfer files to and from that account's directories only.
- A special kind of user account, named FTP, allows any user to log in to it with the username “anonymous.”
- This account has its own set of directories and files that are considered public, available to anyone on the network who wants to download them.
- The numerous FTP sites on the Internet are FTP servers supporting FTP user accounts with anonymous login.
- Any Linux system can be configured to support anonymous FTP access, turning them into network FTP sites. Such sites can work on an intranet or on the Internet.

Configuring the FTP Server

- The vsftpd RPM package is required to configure a Red Hat Enterprise Linux system as an ftp server.
- If it is not already installed, install it with rpm commands.
- After it is installed, start the service as root with the command `service vsftpd start` .
- The system is now an ftp server and can accept connections.
- To configure the server to automatically start the service at boot time, execute the command `chkconfig vsftpd on` as root.
- To stop the server, execute the command `service vsftpd stop`.

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- To verify that the server is running, use the command `service vsftpd status`.

1) Verify the package `vsftpd` for FTP. If installed create few files in `pub`. it is shown below.

#rpm -qa | grep vsftpd

This command returns the version of `vsftpd`. If package `vsftpd` is not installed then install using following command.

#rpm -ivh vsftpd*

#rpm -ivh ftp*

```
[root@localhost Packages]# rpm -qa | grep vsftpd
[root@localhost Packages]# rpm -ivh vsftpd*
warning: vsftpd-2.2.2-6.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID
fd431d51: NOKEY
Preparing... (100%)
##### [100%]
 1:vsftpd ( 1%)
##### [100%]
[root@localhost Packages]# █
```

```
[root@localhost Packages]# rpm -ivh ftp*
warning: ftp-0.17-51.1.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID f
d431d51: NOKEY
Preparing... (100%)
##### [100%]
 1:ftp ( 70%)
##### [100%]
```

Check whether the package is install or not with `#rpm -qa | grep ftp` command

```
[root@localhost Packages]# rpm -qa | grep ftp
report-plugin-ftp-0.18-7.el6.i686
vsftpd-2.2.2-6.el6.i686
report-config-ftp-0.18-7.el6.i686
ftp-0.17-51.1.el6.i686
[root@localhost Packages]# █
```

Now use following command to start vsftpd services at boot time using chkconfig command.

chkconfig vsftpd on

```
[root@localhost Packages]# chkconfig vsftpd on
[root@localhost Packages]# chkconfig --list | grep ftp
vsftpd          0:off  1:off  2:on   3:on   4:on   5:on   6:off
[root@localhost Packages]#
```

cd /var/ftp/pub/

#cat > ftpfile

```
[root@localhost Packages]# cd /var/ftp/pub/
[root@localhost pub]# cat > ftpfile
hi....
This is my FTP file for testing.
[root@localhost pub]#
```

This is my ftp file for testing.

Use ctrl+d to save and exit.

2) Verify IP address of linux machine to be configured as FTP.

#ifconfig

Set IP Address to 192.168.1.1

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```
[root@localhost pub]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:48:13:2A
          inet addr:192.168.252.130  Bcast:192.168.252.255  Mask:255.255.255.
0
          inet6 addr: fe80::20c:29ff:fe48:132a/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:507 errors:0 dropped:0 overruns:0 frame:0
          TX packets:55 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:42782 (41.7 KiB)  TX bytes:7769 (7.5 KiB)
          Interrupt:19 Base address:0x2000

eth1-eth0 Link encap:Ethernet  HWaddr 00:0C:29:48:13:34
          inet addr:192.168.1.1  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe48:1334/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:49 errors:0 dropped:0 overruns:0 frame:0
          TX packets:29 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:4760 (4.6 KiB)  TX bytes:4144 (4.0 KiB)
          Interrupt:16 Base address:0x2080

lo        Link encap:Local Loopback
```

3) Open the configuration file and make the following changes :

- I. Uncomment anonymous_enable = YES
- II. Uncomment local_enable = YES
- III. Uncomment anonymous_upload_enable = YES
- IV. Uncomment listen = YES

All the required steps are as follows:

#vi /etc/vsftpd/vsftpd.conf

```
[root@localhost pub]# vi /etc/vsftpd/vsftpd.conf
```

```
1 # Example config file /etc/vsftpd/vsftpd.conf
2 #
3 # The default compiled in settings are fairly paranoid. This sample f
  ile
4 # loosens things up a bit, to make the ftp daemon more usable.
5 # Please see vsftpd.conf.5 for all compiled in defaults.
6 #
7 # READ THIS: This example file is NOT an exhaustive list of vsftpd op
  tions.
8 # Please read the vsftpd.conf.5 manual page to get a full idea of vsf
  tpd's
9 # capabilities.
10 #
11 # Allow anonymous FTP? (Beware - allowed by default if you comment th
   is out).
12 anonymous_enable=YES
13 #
14 # Uncomment this to allow local users to log in.
15 local_enable=YES
16 #
17 # Uncomment this to enable any form of FTP write command.
18 write_enable=YES
19 #
:se nu
```

Once the file is open do the above changes to configuration file And restart the vsftpd service.

#service vsftpd restart

```
[root@localhost pub]# vi /etc/vsftpd/vsftpd.conf
[root@localhost pub]# service vsftpd start
Starting vsftpd for vsftpd: [ OK ]
[root@localhost pub]# service vsftpd status
vsftpd (pid 3114) is running...
[root@localhost pub]# service vsftpd restart
Shutting down vsftpd: [ OK ]
Starting vsftpd for vsftpd: [ OK ]
[root@localhost pub]# █
```

4) Login with anonymous user.

Now you can login with [ftp 192.168.1.1](ftp://192.168.1.1)

We can use Username: anonymous and password for same is blank.

Here you can use `ls -a` command to view the content of ftp home directory.

ftp> ls -a

```
[root@localhost pub]# cd
[root@localhost ~]# ftp 192.168.1.1
Connected to 192.168.1.1 (192.168.1.1).
220 (vsFTPD 2.2.2)
Name (192.168.1.1:root): anonymous
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> ls -a
227 Entering Passive Mode (192,168,1,1,33,125).
150 Here comes the directory listing.
drwxr-xr-x   3 0       0           4096 May 26  2010 .
drwxr-xr-x   3 0       0           4096 May 26  2010 ..
drwxr-xr-x   2 0       0           4096 Sep 02 13:04 pub
226 Directory send OK.
ftp> bye
```

To Log off from ftp we use bye command

5) Now allow ftp anonymous write enable as follows:

```
#getsebool -a | grep ftp
```

```
#setsebool -P allow_ftp_anon_write on or = 1
```

```
#getsebool -a | grep ftp
```

```
[root@localhost ~]# getsebool -a | grep ftp
allow_ftpd_anon_write --> off
allow_ftpd_full_access --> off
allow_ftpd_use_cifs --> off
allow_ftpd_use_nfs --> off
ftp_home_dir --> off
ftpd_connect_db --> off
httpd_enable_ftp_server --> off
sftpd_anon_write --> off
sftpd_enable_homedirs --> off
sftpd_full_access --> off
sftpd_write_ssh_home --> off
tftp_anon_write --> off
[root@localhost ~]# █
```

Allow System user to get access to ftp server.

```
#getsebool -a | grep ftp
```

```
#setsebool -P ftp_home_dir on
```

```
#getsebool -a | grep ftp
```

```
[root@localhost ~]# setsebool -P allow_ftp_d_anon_write=1
[root@localhost ~]# setsebool -P ftp_home_dir on
[root@localhost ~]# getsebool -a | grep ftp
allow_ftp_d_anon_write --> on
allow_ftp_d_full_access --> off
allow_ftp_d_use_cifs --> off
allow_ftp_d_use_nfs --> off
ftp_home_dir --> on
ftp_d_connect_db --> off
httpd_enable_ftp_server --> off
sftp_d_anon_write --> off
sftp_d_enable_homedirs --> off
sftp_d_full_access --> off
sftp_d_write_ssh_home --> off
tftp_anon_write --> off
[root@localhost ~]# █
```

6) By default /var/ftp is ftp user Home directory. Check the context of file /var/ftp/pub and change to ftp

```
#ls -ldz /var/ftp/pub
```

```
#chgrp ftp /var/ftp/pub
```

```
#chown ftp /var/ftp/pub
```

```
#ls -ldz /var/ftp/pub
```

```
[root@localhost ~]# ls -ldZ /var/ftp/pub/
drwxr-xr-x. root root system_u:object_r:public_content_t:s0 /var/ftp/pub/
[root@localhost ~]# chown ftp /var/ftp/pub/
[root@localhost ~]# chgrp ftp /var/ftp/pub/
[root@localhost ~]# ls -ldZ /var/ftp/pub/
drwxr-xr-x. ftp ftp system_u:object_r:public_content_t:s0 /var/ftp/pub/
[root@localhost ~]# █
```

7) now go to pub directory and create one file.

```
#cd /var/ftp/pub
```

```
#touch T1 T2 T3
```

```
#cat > ftptest
```

Welcome to ftp server

To save the document use ctrl+d

```
[root@localhost ~]# cd /var/ftp/pub/
[root@localhost pub]# pwd
/var/ftp/pub
[root@localhost pub]# touch T1 T2 T3
[root@localhost pub]# cat > ftpfile.txt
Hi...
This file is for FTP server testing.
[root@localhost pub]# ls
ftpfile.txt  T1  T2  T3
[root@localhost pub]#
```

8) Restart the service of vsftpd and enable it from boot.

Also give full permission to the directory /var/ftp/pub.

```
service vsftpd start
```

```
#service vsftpd restart
```

```
#chkconfig vsftpd on
```

```
#chkconfig --list | grep vsftpd
```

```
[root@localhost Packages]# chkconfig vsftpd on
[root@localhost Packages]# chkconfig --list | grep ftp
vsftpd          0:off  1:off  2:on   3:on   4:on   5:on   6:off
[root@localhost Packages]#
```

Now FTP is configure. Test as FTP client from other machine.

Use the following command.

```
#ftp 192.168.1.1
```

It will prompt for username and password. If your using ftp as username it will not prompt for password as ftp is anonymous user

9) Disabling anonymous FTP login :

Open configuration file.

```
#vi /etc/vsftpd/vsftpd.conf
```

- i) Go to directive `anonymous_enable = YES` and make it `anonymous_enable = NO`.
- ii) Go to directive `anonymous_upload_enable = YES` and make it `anonymous_upload_enable = NO`.

Now restart the vsftpd service.

```
#service vsftpd restart
```

And try to login with username anonymous. It will not allow to login with anonymous username and gives you login fail message

```
#ftp 192.168.1.1
```

```
[root@localhost pub]# vi /etc/vsftpd/vsftpd.conf
[root@localhost pub]# service vsftpd restart
Shutting down vsftpd: [ OK ]
Starting vsftpd for vsftpd: [ OK ]
[root@localhost pub]# ftp 192.168.1.1
Connected to 192.168.1.1 (192.168.1.1).
220 (vsFTPd 2.2.2)
Name (192.168.1.1:root): anonymous
331 Please specify the password.
Password:
530 Login incorrect.
Login failed.
ftp> █
```

10) Block System user (normal user) for ftp login :

Now add two users to your system. e.g. add new user manish and shreyash

We use following command to add user.

```
#useradd manish
```

```
#passwd manish //this command use to set password.
```

```
#useradd shreyash
```

```
#passwd shreyash
```

```
[root@localhost pub]# useradd manish
[root@localhost pub]# passwd manish
Changing password for user manish.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@localhost pub]# useradd shreyash
[root@localhost pub]# passwd shreyash
Changing password for user shreyash.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@localhost pub]# █
```

Now try to login with users one by one.

When you login with system user ftp home directory change to login user home directory

```
ftp>pwd
```

```
ftp>ls
```

```
ftp>bye
```

```
[root@localhost ~]# ftp 192.168.1.1
Connected to 192.168.1.1 (192.168.1.1).
220 (vsFTPd 2.2.2)
Name (192.168.1.1:root): manish
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> pwd
257 "/home/manish"
ftp> ls
227 Entering Passive Mode (192,168,1,1,167,59).
150 Here comes the directory listing.
226 Directory send OK.
ftp> █
```

we can use ftp_users and users_list files to user control the access to ftp server.

Suppose I want to block user manish to get access to ftp server. Then open the user_list file and add user name manish at the end of directory. Save and exit from file.

#vi /etc/vsftpd/user_list

```
[root@localhost ~]# cd /etc/vsftpd/
[root@localhost vsftpd]# ls
ftpusers  user_list  vsftpd.conf  vsftpd_conf_migrate.sh  vsftpd.conf.rpmsave
[root@localhost vsftpd]# vi user_list
```

```
# vsftpd userlist
# If userlist_deny=NO, only allow users in this file
# If userlist_deny=YES (default), never allow users in this file, and
# do not even prompt for a password.
# Note that the default vsftpd pam config also checks /etc/vsftpd/ftpusers
# for users that are denied.
root
bin
daemon
adm
lp
sync
shutdown
halt
mail
news
uucp
operator
games
nobody
manish
```

Restart the vsftpd services

#service vsftpd restart.

And try to login with user name manish.

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It will block the user name and gives you error message.

```
[root@localhost vsftpd]# service vsftpd restart
Shutting down vsftpd: [ OK ]
Starting vsftpd for vsftpd: [ OK ]
[root@localhost vsftpd]# ftp 192.168.1.1
Connected to 192.168.1.1 (192.168.1.1).
220 (vsFTPd 2.2.2)
Name (192.168.1.1:root): manish
530 Permission denied.
Login failed.
ftp> █
```

8) get and put command to upload and download the file.

Now create one txt file at shreyash /home directory

```
#cd /home
```

```
#pwd
```

```
#cd shreyash
```

```
#pwd
```

```
#cat > test.txt
```

hi... this file is created by shreyash.

To save and exit press ctrl+d

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```
[root@localhost ~]# cd /home/shreyash/
[root@localhost shreyash]# ls
[root@localhost shreyash]# cat > ftpfile.txt
Hello..
welcome to FTP server.
[root@localhost shreyash]# ls
ftpfile.txt
[root@localhost shreyash]# cd
[root@localhost ~]# cat > FTP_Test.txt
This file transfer from current dir. to ftp server.
[root@localhost ~]# █
```

```
[root@localhost ~]# pwd
/root
[root@localhost ~]# ls
anaconda-ks.cfg  Downloads  GreetingServer.class  install.log.syslog  Templates
backup          FTP_Test.txt  GreetingServer.java   Music               Videos
demo.txt        GreetingClient.class  hello.class           Pictures
Desktop         GreetingClient.java  hello.java            Public
Documents       GreetingClient.java~  install.log           software.txt
[root@localhost ~]# █
```

Login with user name shreyash

#ftp 192.168.1.1

now get command to download file from ftp server and it is downloaded to your present working directory.

```
ftp> get test.txt
```

```
[root@localhost ~]# ftp 192.168.1.1
Connected to 192.168.1.1 (192.168.1.1).
220 (vsFTPd 2.2.2)
Name (192.168.1.1:root): shreyash
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> ls
227 Entering Passive Mode (192,168,1,1,211,99).
150 Here comes the directory listing.
-rw-r--r--  1 0      0      32 Sep 02 15:35 ftpfile.txt
226 Directory send OK.
ftp> get ftpfile.txt
local: ftpfile.txt remote: ftpfile.txt
227 Entering Passive Mode (192,168,1,1,229,230).
150 Opening BINARY mode data connection for ftpfile.txt (32 bytes).
226 Transfer complete.
32 bytes received in 2.5e-05 secs (1280.00 Kbytes/sec)
ftp> put FTP_Test.txt
local: FTP_Test.txt remote: FTP_Test.txt
227 Entering Passive Mode (192,168,1,1,89,237).
150 Ok to send data.
226 Transfer complete.
52 bytes sent in 1.2e-05 secs (4333.33 Kbytes/sec)
ftp> ls
227 Entering Passive Mode (192,168,1,1,69,138).
150 Here comes the directory listing.
-rw-r--r--  1 506    506    52 Sep 02 15:41 FTP_Test.txt
-rw-r--r--  1 0      0      32 Sep 02 15:35 ftpfile.txt
226 Directory send OK.
ftp> bye
```

Same way create one text file in your current directory and try to upload the same with put command.

ftp> put test_new.txt

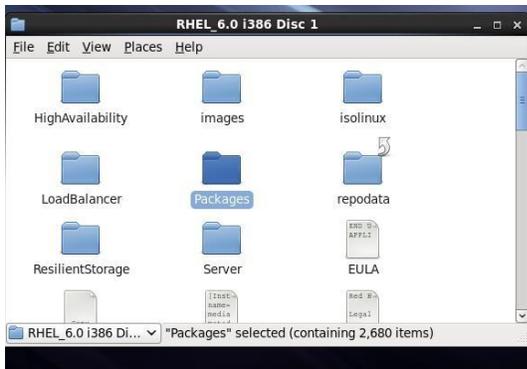
To exit from ftp use bye command.

Practical no 12: Using gcc compiler(Programming using c)

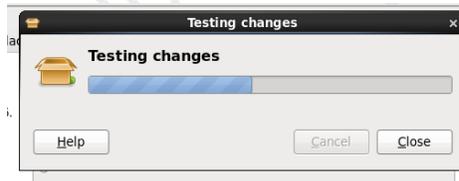
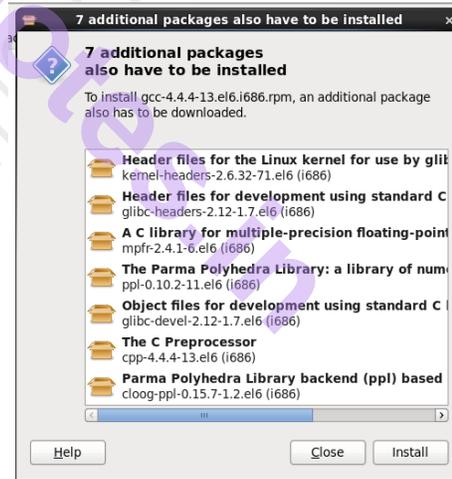
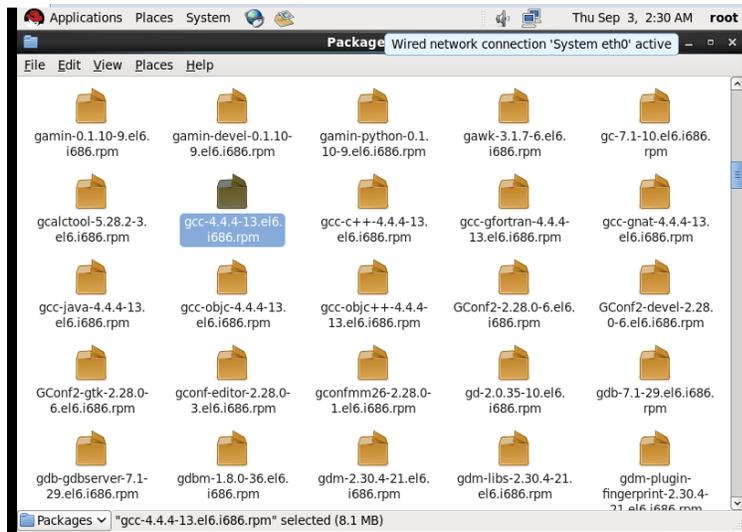
Executing shell scripts with C using gcc compiler

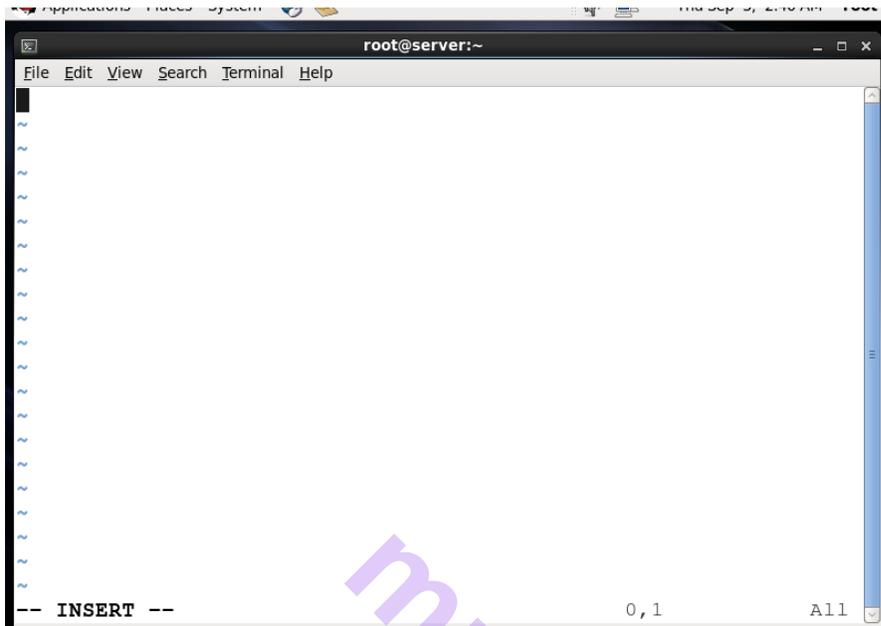
Installation of gcc package:

```
#rpm -ivh gcc
```



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A screenshot of a terminal window titled "root@server:~". The window contains a text editor with a blank white area. The menu bar at the top includes "File", "Edit", "View", "Search", "Terminal", and "Help". The status bar at the bottom shows "-- INSERT --", "0,1", and "All".

Type the following code:



```
#include<stdio.h>
#include<conio.h>
void main()
{
    printf("Hello !!! Welcome to gcc Compiler");
}
```

A screenshot of a terminal window titled "root@server:~" showing the same text editor as above, but now containing C code. The code is: `#include<stdio.h>`, `#include<conio.h>`, `void main()`, `{`, `printf("Hello !!! Welcome to gcc Compiler");`, and `}`. The status bar at the bottom shows "-- INSERT --", "5,47", and "All".


```
root@server:~  
File Edit View Search Terminal Help  
[root@server ~]# vim hello.c  
[root@server ~]# gcc hello.c -o hello.out  
[root@server ~]# ./hello.out  
Hello !!! Welcome to gcc Compiler[root@server ~]#
```

2. Write a Program to check whether a number is palindrome:

Open vi Editor to type C program or follows:

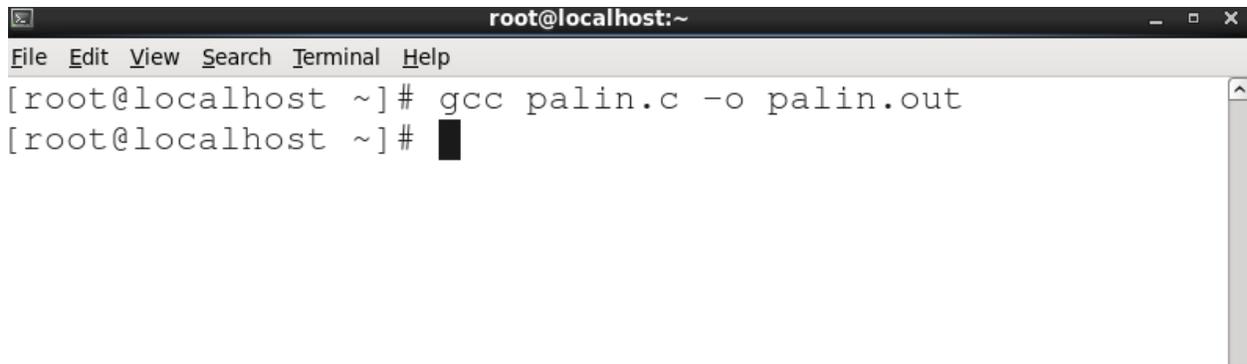
#vim palin.c

Type the following code:

```
File Edit View Search Terminal Help  
int main()  
{  
int n,reverse=0,temp;  
printf("Enter Number:");  
scanf("%d",&n);  
temp=n;  
while(temp!=0)  
{  
reverse = reverse*10;  
reverse = reverse + temp%10;  
temp = temp/10;  
}  
if(n==reverse)  
{  
printf("%d This is a palindrome.\n",n);  
}  
else  
{  
printf("%d This is not a palindrome.\n",n);  
}  
return 0;  
22, 1 50%  
root@localhost:~
```

#gcc palin.c -o palin.out

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```
root@localhost:~  
File Edit View Search Terminal Help  
[root@localhost ~]# gcc palin.c -o palin.out  
[root@localhost ~]#
```

Finally run the program and obtain the output

To Run,execute the following command:

#./palin.out

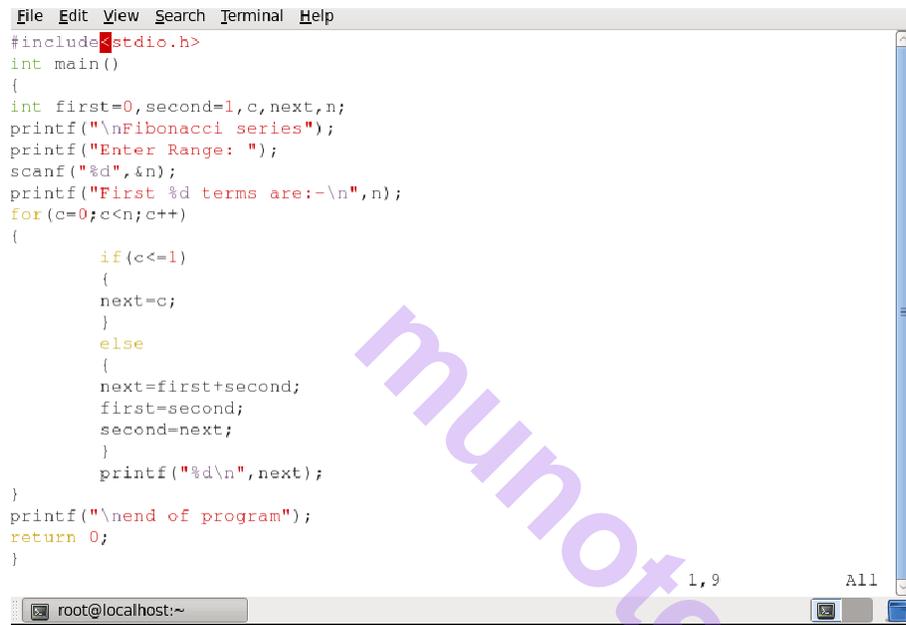
```
File Edit View Search Terminal Help
[root@localhost ~]# gcc palin.c -o palin.out
[root@localhost ~]# ./palin.out
Enter Number:123
123 This is not a palindrome.
[root@localhost ~]# █
```

3. Write a program to find Fibonacci series:

Open vi Editor to type C program or follows:

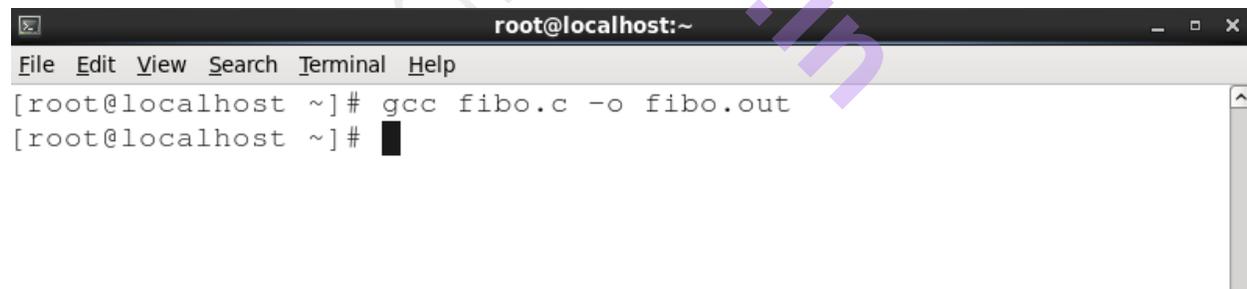
#vim fibo.c

Type the following code:



```
File Edit View Search Terminal Help
#include <stdio.h>
int main()
{
int first=0, second=1, c, next, n;
printf("\nFibonacci series");
printf("Enter Range: ");
scanf("%d", &n);
printf("First %d terms are:-\n", n);
for(c=0; c<n; c++)
{
    if(c<=1)
    {
        next=c;
    }
    else
    {
        next=first+second;
        first=second;
        second=next;
    }
    printf("%d\n", next);
}
printf("\nend of program");
return 0;
}
```

#gcc fibo.c -o fibo.out



```
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# gcc fibo.c -o fibo.out
[root@localhost ~]#
```

Finally run the program and obtain the output

To Run, execute the following command:

#!/fibo.out

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```
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# gcc fibo.c -o fibo.out
[root@localhost ~]# ./fibo.out

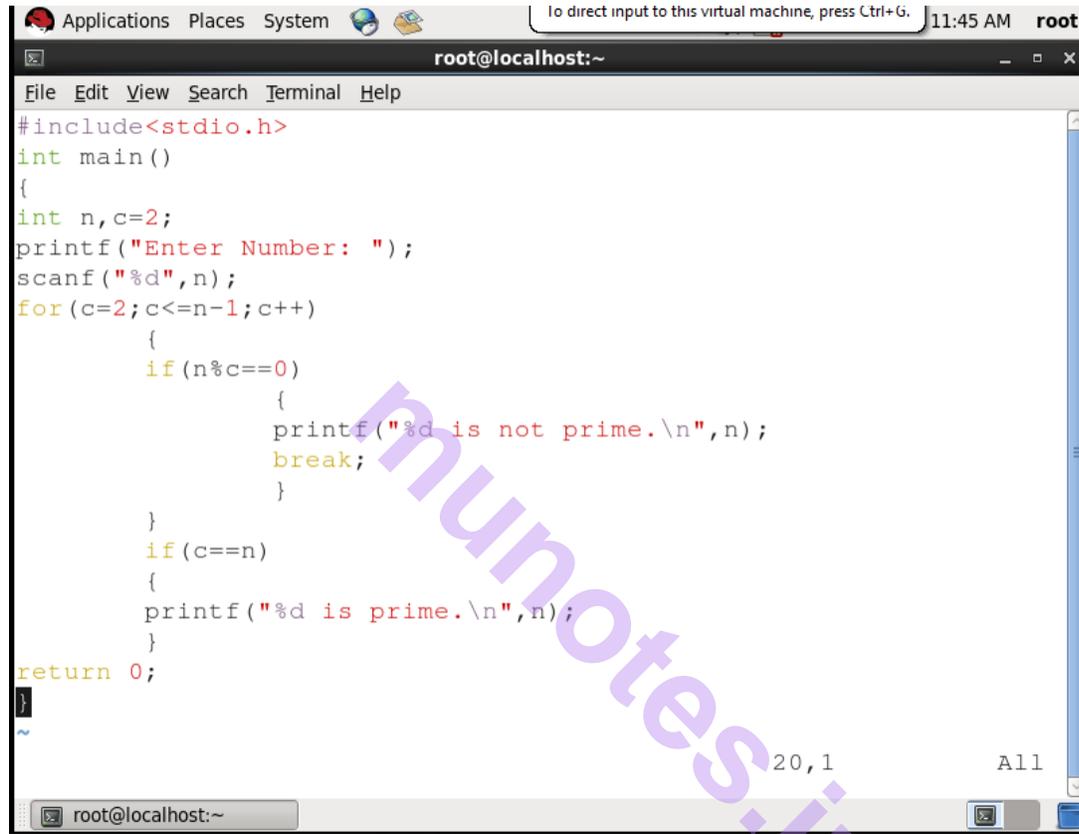
Fibonacci seriesEnter Range: 6
First 6 terms are:-
0
1
1
2
3
5

end of program[root@localhost ~]# █
```

4. Write a program to find prime number:

#vim prime.c

Type the following code:



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. 11:45 AM root
root@localhost:~
File Edit View Search Terminal Help
#include<stdio.h>
int main()
{
int n,c=2;
printf("Enter Number: ");
scanf("%d",n);
for(c=2;c<=n-1;c++)
{
if(n%c==0)
{
printf("%d is not prime.\n",n);
break;
}
}
if(c==n)
{
printf("%d is prime.\n",n);
}
return 0;
}
~
20,1 All
root@localhost:~
```

#gcc prime.c -o prime.out

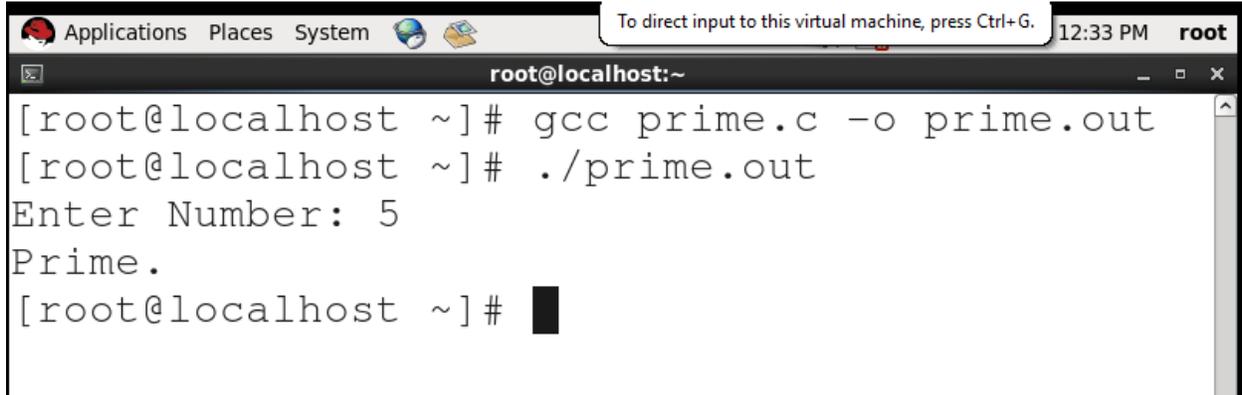


```
Applications Places System To direct input to this virtual machine, press Ctrl+G. 11:46 AM root
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# gcc prime.c -o prime.out
```

Finally run the program and obtain the output

To Run,execute the following command:

#./prime.out



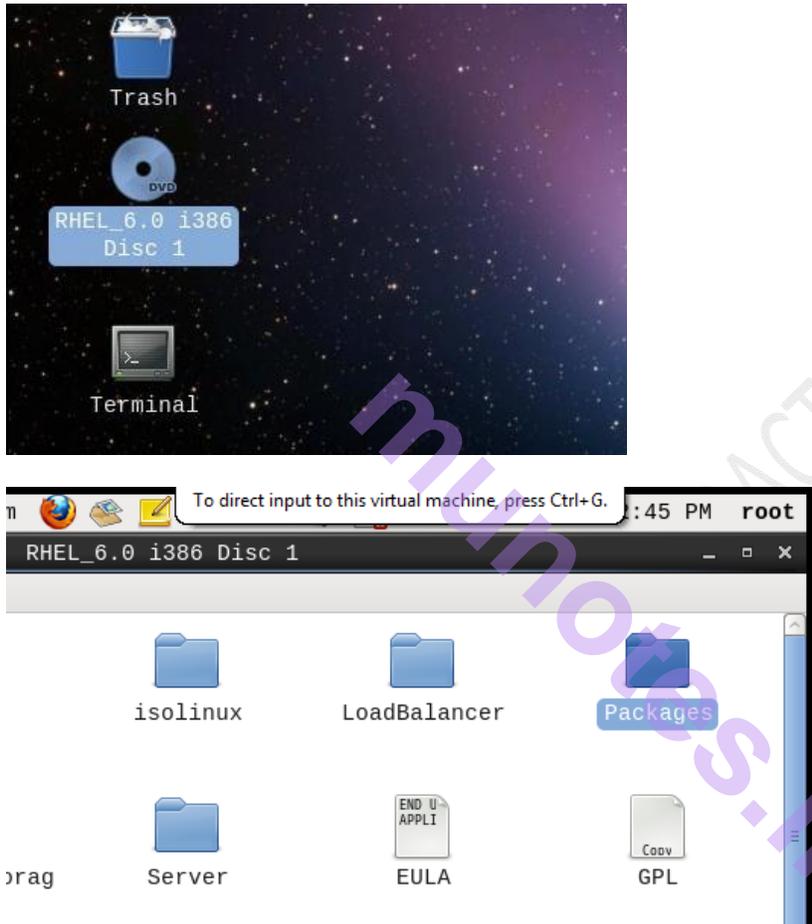
The screenshot shows a terminal window titled "root@localhost:~" with a system menu bar at the top containing "Applications", "Places", and "System". A notification bar above the terminal says "To direct input to this virtual machine, press Ctrl+G." The time is 12:33 PM and the user is root. The terminal output is as follows:

```
[root@localhost ~]# gcc prime.c -o prime.out
[root@localhost ~]# ./prime.out
Enter Number: 5
Prime.
[root@localhost ~]#
```

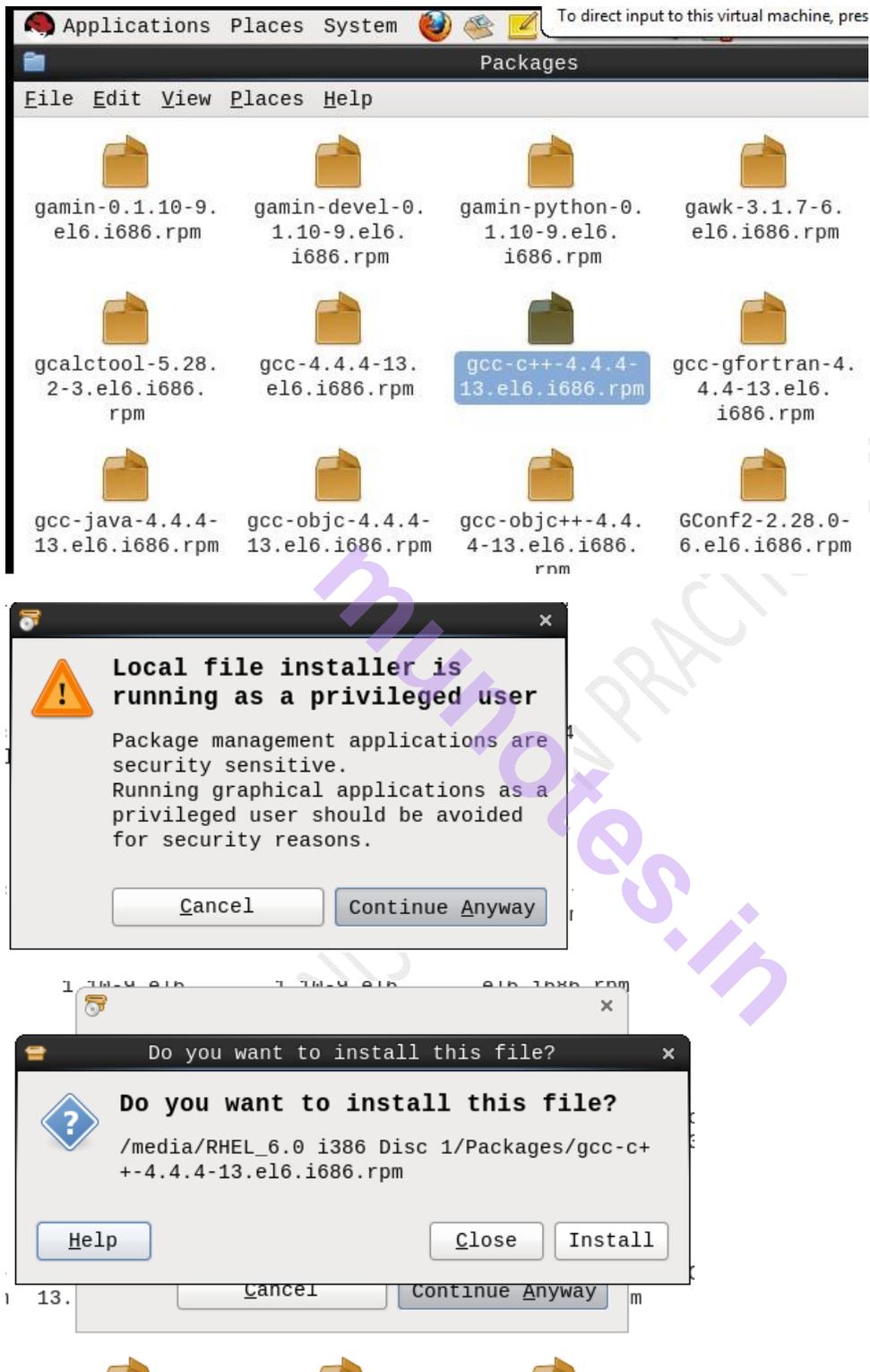
Practical no 13: Using gc++ compiler(Programming using c++)

Executing shell scripts with C++ using g++ Compiler

Installation of g++ package:



Linux Administration Practical Manual

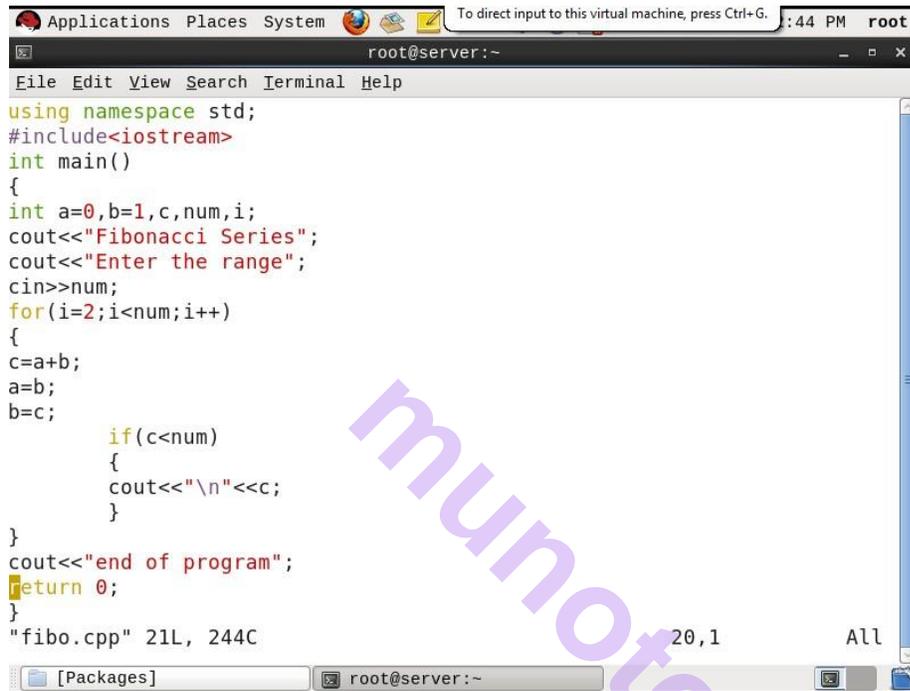


Open vi Editor to type C++ program as follows:

1. Write a program to display Fibonacci series:

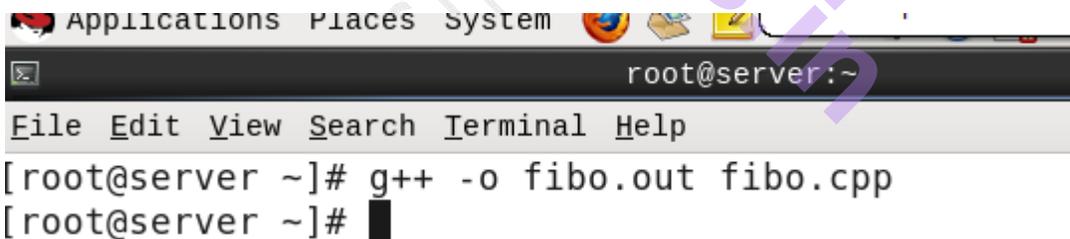
vim fibo.cpp

Type the following code:



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. :44 PM root
root@server:~
File Edit View Search Terminal Help
using namespace std;
#include<iostream>
int main()
{
int a=0,b=1,c,num,i;
cout<<"Fibonacci Series";
cout<<"Enter the range";
cin>>num;
for(i=2;i<num;i++)
{
c=a+b;
a=b;
b=c;
    if(c<num)
    {
        cout<<"\n"<<c;
    }
}
cout<<"end of program";
return 0;
}
"fibo.cpp" 21L, 244C 20,1 All
[Packages] root@server:~
```

g++ fibo.cpp -o fibo.out

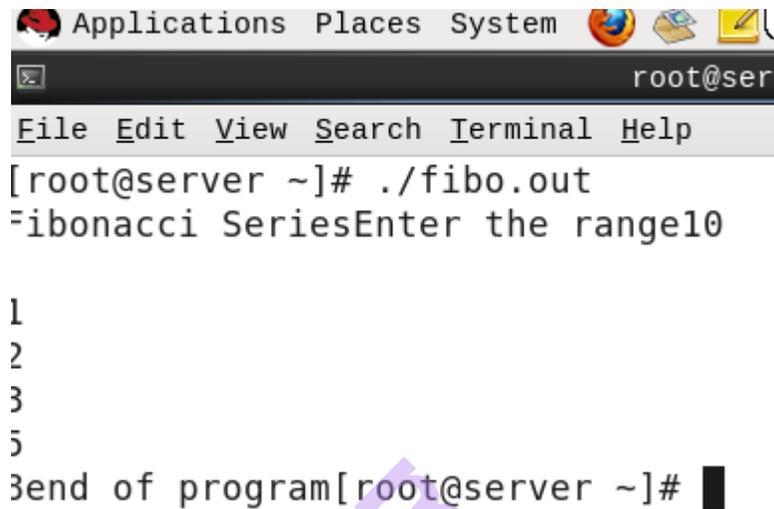


```
Applications Places System
root@server:~
File Edit View Search Terminal Help
[root@server ~]# g++ -o fibo.out fibo.cpp
[root@server ~]#
```

Finally run the program and obtain the output

To run, execute the following command:

#./fibonacci.out

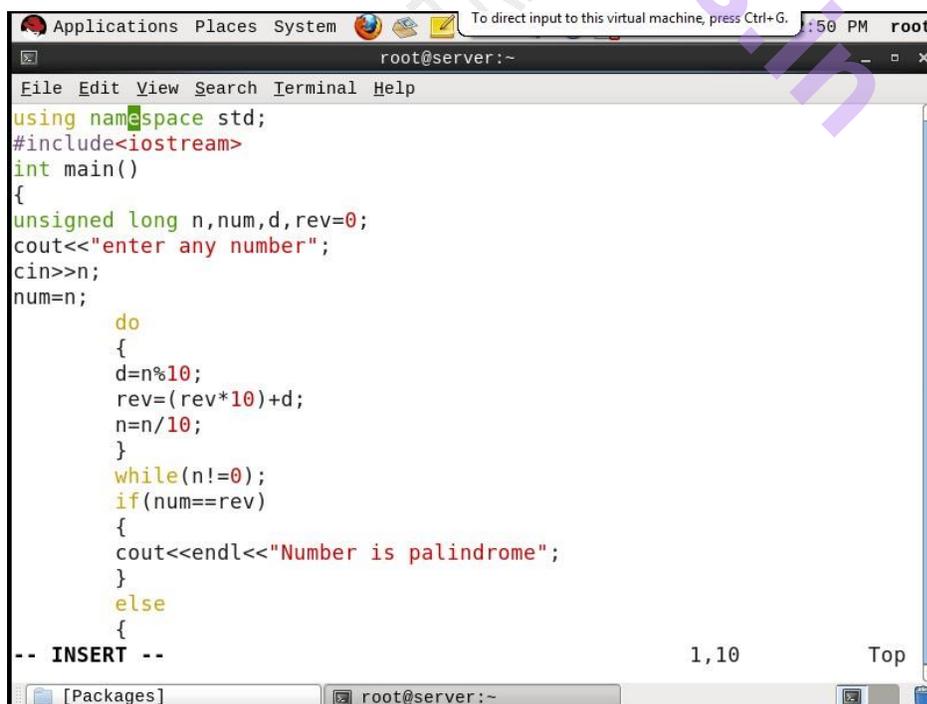


```
Applications Places System root@server
File Edit View Search Terminal Help
[root@server ~]# ./fibonacci.out
Fibonacci Series Enter the range 10
1
2
3
5
End of program [root@server ~]#
```

3. Write a program to find whether the number is palindrome:

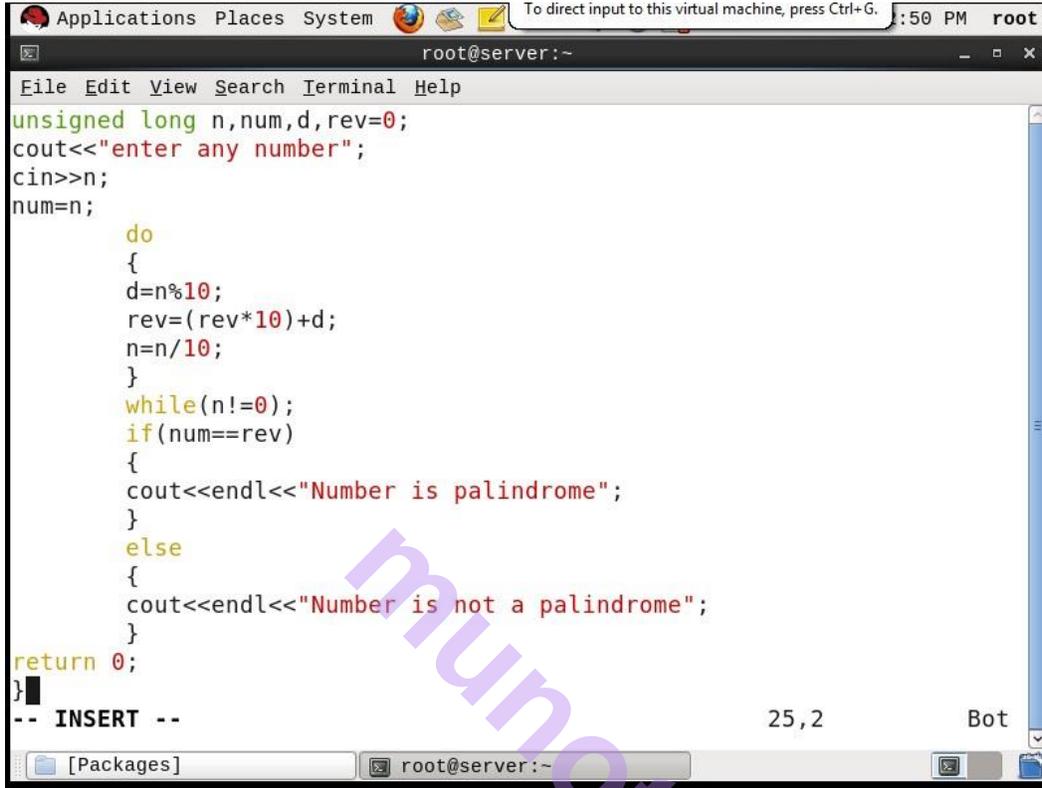
vim palin.cpp

Type the following code:

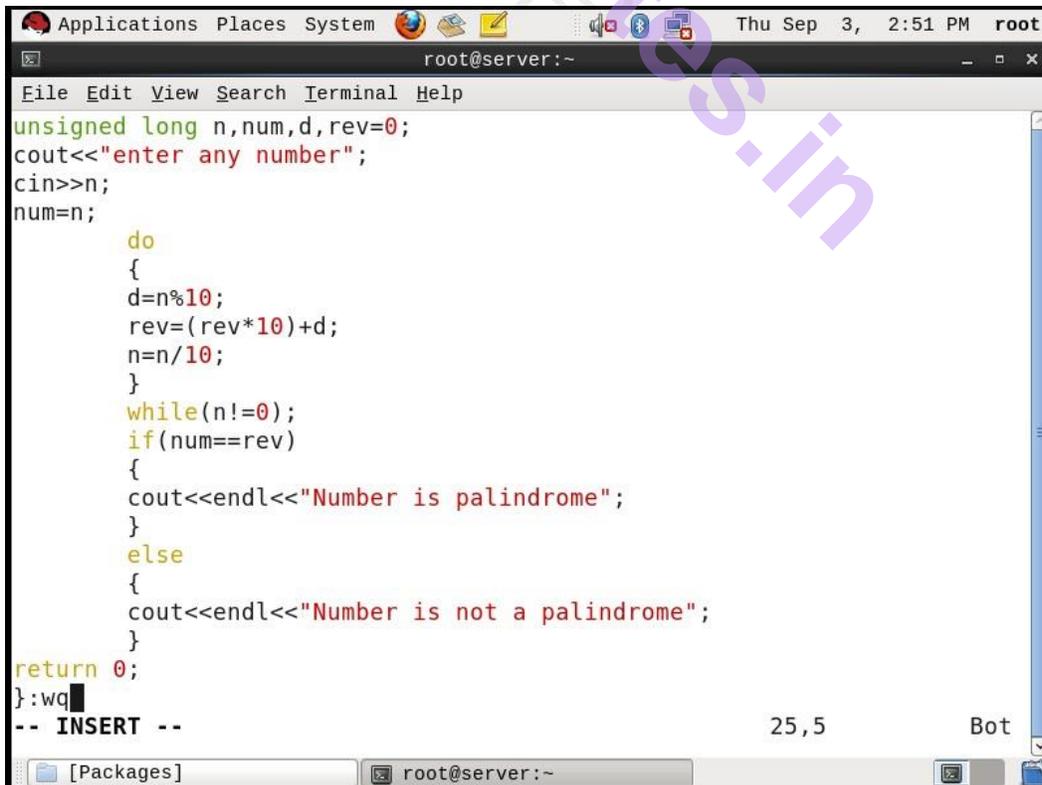


```
Applications Places System To direct input to this virtual machine, press Ctrl+G. 1:50 PM root
root@server:~
File Edit View Search Terminal Help
using namespace std;
#include<iostream>
int main()
{
    unsigned long n,num,d,rev=0;
    cout<<"enter any number";
    cin>>n;
    num=n;
    do
    {
        d=n%10;
        rev=(rev*10)+d;
        n=n/10;
    }
    while(n!=0);
    if(num==rev)
    {
        cout<<endl<<"Number is palindrome";
    }
    else
    {
        -- INSERT --
    }
}
1,10 Top
```

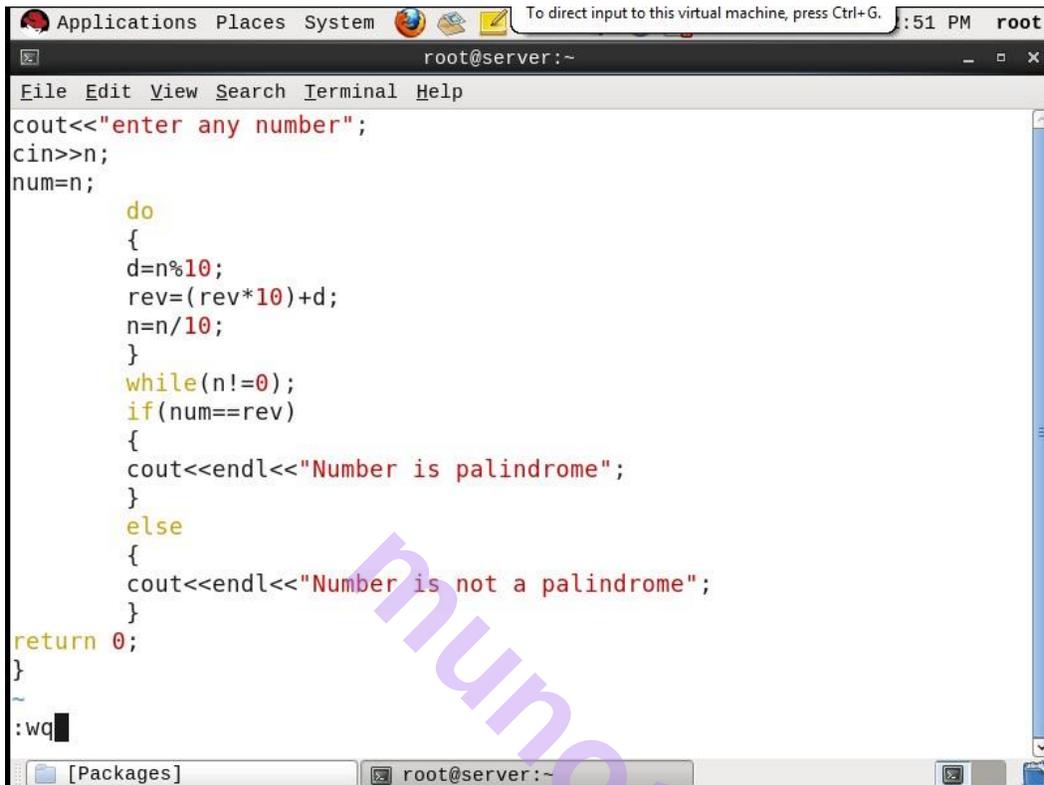
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```
Applications Places System To direct input to this virtual machine, press Ctrl+G. 1:50 PM root
root@server:~
File Edit View Search Terminal Help
unsigned long n,num,d,rev=0;
cout<<"enter any number";
cin>>n;
num=n;
    do
    {
        d=n%10;
        rev=(rev*10)+d;
        n=n/10;
    }
    while(n!=0);
    if(num==rev)
    {
        cout<<endl<<"Number is palindrome";
    }
    else
    {
        cout<<endl<<"Number is not a palindrome";
    }
return 0;
}
-- INSERT -- 25,2 Bot
```

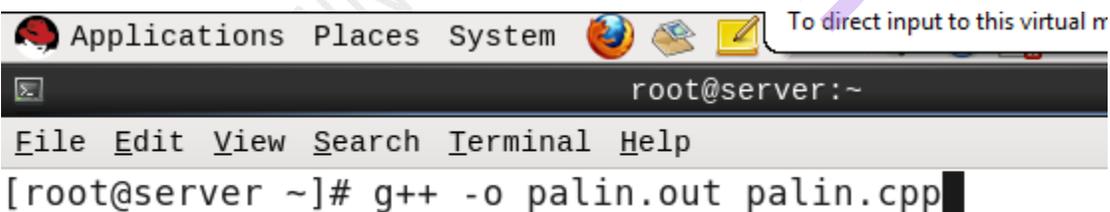


```
Applications Places System Thu Sep 3, 2:51 PM root
root@server:~
File Edit View Search Terminal Help
unsigned long n,num,d,rev=0;
cout<<"enter any number";
cin>>n;
num=n;
    do
    {
        d=n%10;
        rev=(rev*10)+d;
        n=n/10;
    }
    while(n!=0);
    if(num==rev)
    {
        cout<<endl<<"Number is palindrome";
    }
    else
    {
        cout<<endl<<"Number is not a palindrome";
    }
return 0;
}:wq
-- INSERT -- 25,5 Bot
```



```
Applications Places System To direct input to this virtual machine, press Ctrl+G. 3:51 PM root
root@server:~
File Edit View Search Terminal Help
cout<<"enter any number";
cin>>n;
num=n;
    do
    {
        d=n%10;
        rev=(rev*10)+d;
        n=n/10;
    }
    while(n!=0);
    if(num==rev)
    {
        cout<<endl<<"Number is palindrome";
    }
    else
    {
        cout<<endl<<"Number is not a palindrome";
    }
return 0;
}
~
:wq
```

g++ palin.cpp -o palin.out

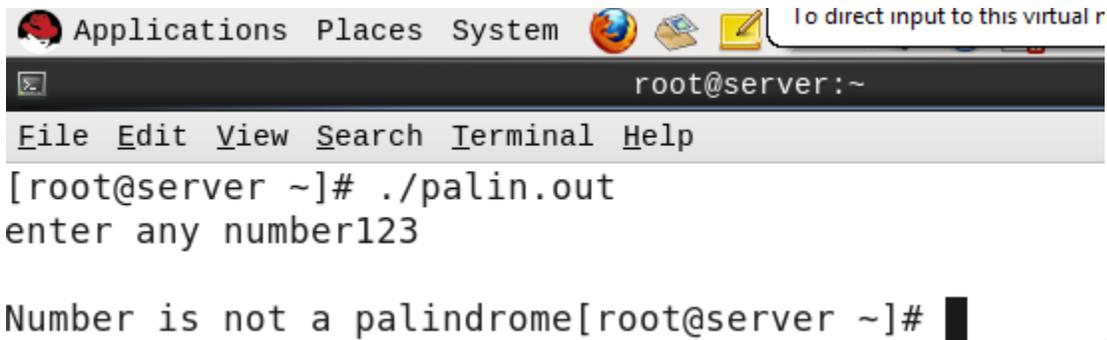


```
Applications Places System To direct input to this virtual m
root@server:~
File Edit View Search Terminal Help
[root@server ~]# g++ -o palin.out palin.cpp
```

Finally run the program and obtain the output

To run, execute the following command:

#./palin.out



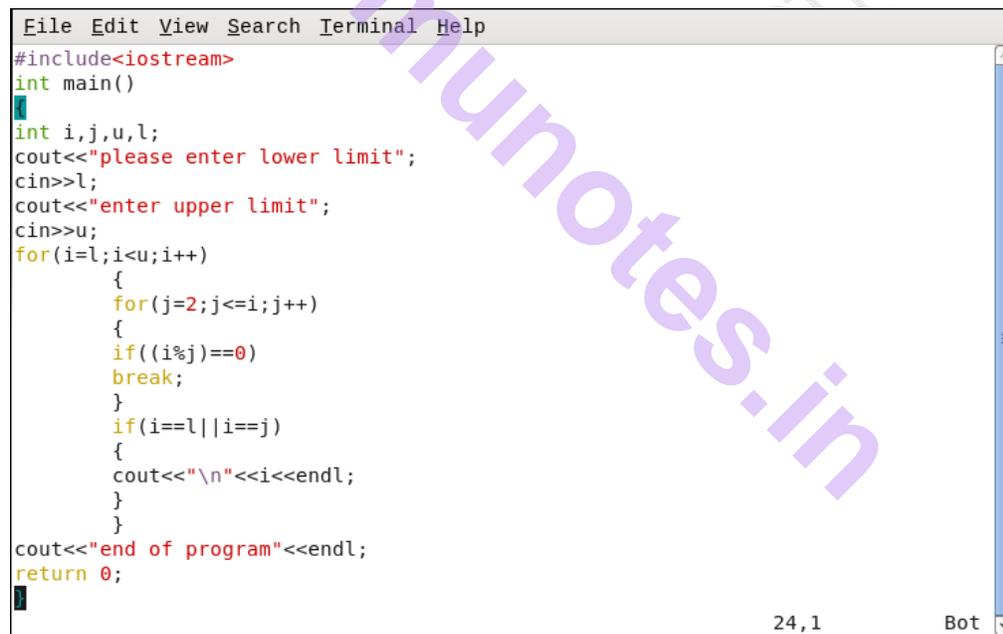
```
Applications Places System    To direct input to this virtual r
root@server:~
File Edit View Search Terminal Help
[root@server ~]# ./palin.out
enter any number123

Number is not a palindrome[root@server ~]#
```

4. Write a program to find prime number:

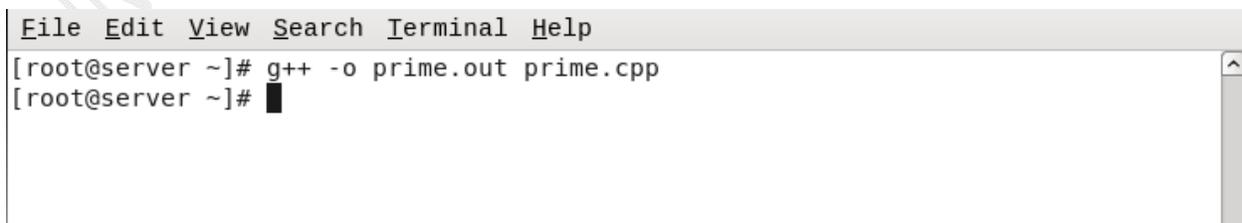
vim prime.cpp

Type the following code:



```
File Edit View Search Terminal Help
#include<iostream>
int main()
{
    int i,j,u,l;
    cout<<"please enter lower limit";
    cin>>l;
    cout<<"enter upper limit";
    cin>>u;
    for(i=l;i<u;i++)
    {
        for(j=2;j<=i;j++)
        {
            if((i%j)==0)
            break;
        }
        if(i==l||i==j)
        {
            cout<<"\n"<<i<<endl;
        }
    }
    cout<<"end of program"<<endl;
    return 0;
}
24,1 Bot
```

g++ prime.cpp -o prime.out

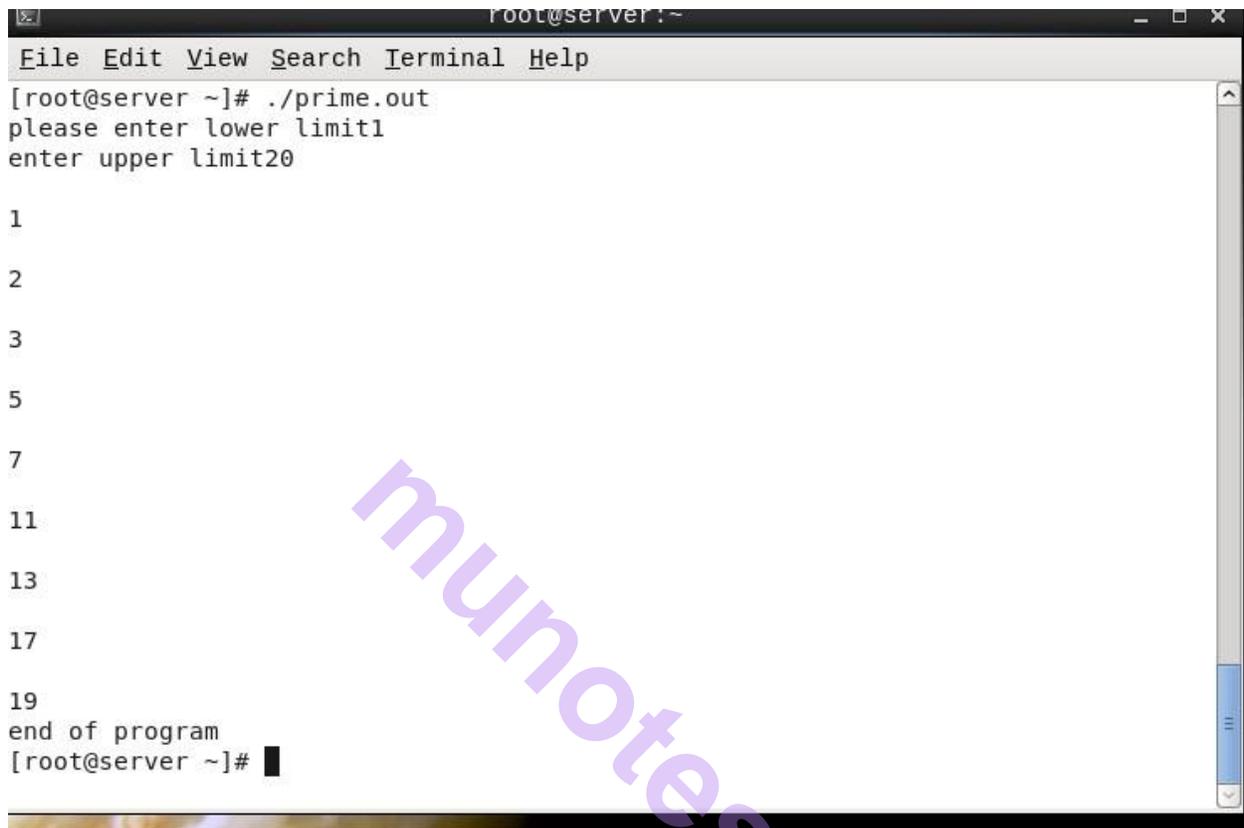


```
File Edit View Search Terminal Help
[root@server ~]# g++ -o prime.out prime.cpp
[root@server ~]#
```

Finally run the program and obtain the output

To run, execute the following command:

#!/prime.out



```
root@server ~# ./prime.out
please enter lower limit1
enter upper limit20

1
2
3
5
7
11
13
17
19
end of program
[root@server ~]#
```

Practical No : 14 Configuring Apache Web Server In Linux

- When you view a web page over the Internet, the code to create that page must be retrieved from a server somewhere on the Internet.
- The server that sends your web browser the code to display a web page is called a web server.
- There are countless web servers all over the Internet serving countless websites to people all over the world.
- Whether you need a web server to host a website on the Internet a Red Hat Enterprise Linux server can function as a web server using the Apache HTTP server.
- The Apache HTTP server is a popular, open source server application that runs on many UNIX-based systems as well as Microsoft Windows.
- Since we had created DNS named as server.nm.com but on Linux browser it is showing unable to connect because we need to configure apache web server , so that we can display out html page on web browser with the help of our own DNS server.nm.com

Configure web server

We will configure a web server. The necessary rpm for web server is httpd, httpd-level and check them for install.

```
[root@localhost ~]# cd /media/RHEL_6.0\ i386\ Disc\ 1/Packages/
```

```
#rpm -ivh httpd*
```

```
#rpm -qa | grep httpd
```

```
[root@localhost Packages]# rpm -ivh --nodeps httpd-2.2.15-5.el6.i686.rpm
warning: httpd-2.2.15-5.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing...      ##### [100%]
 1:httpd          ##### [100%]
[root@localhost Packages]# █
```

The above command give you the version no and name of package.

Now configure the IP address to 192.168.1.1 and check it

```
#ifconfig eth0 192.168.1.1
```

#ifconfig

start httpd daemons and verify its running status

#chkconfig httpd on

#service httpd start

#service httpd status

Configure virtual hosting

In this example we will host a website `www.nm.com` to apache web server. Create a documents root directory for this website and a index page

#mkdir -p /var/www/virtual/www.svkm.com/html

```
[root@server ~]# mkdir -p /var/www/virtual/www.svkm.com/html/
```

#vim /var/www/virtual/www.svkm.com/html/index.html

```
[root@localhost html]# vi index.html
```

for testing purpose we are writing basic html code in its index page.

<html>

<head>

<title> Linux Apache Website</title>

<body>

Today we complete Apache web server practical.

</body>

</head>

</html>

```
<html>
<head><title>
Linux Apache WebSite.
</title></head>
<body>
Today we completed Apache web server practical
</body>
</html>
```

Save file : **wq** and exit

Check IP Address:-

```
[root@localhost html]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:48:13:2A
          inet addr:192.168.1.1  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe48:132a/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:4381 errors:0 dropped:0 overruns:0 frame:0
          TX packets:47 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:293075 (286.2 KiB)  TX bytes:9882 (9.6 KiB)
          Interrupt:19 Base address:0x2000
```

Check for DNS by following command:

dig -x 192.168.1.1

```
[root@localhost html]# dig -x 192.168.1.1
; <<>> DiG 9.7.0-P2-RedHat-9.7.0-5.P2.el6 <<>> -x 192.168.1.1
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 63620
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;1.1.168.192.in-addr.arpa.      IN      PTR

;; AUTHORITY SECTION:
1.168.192.in-addr.arpa. 10800  IN      SOA     root.server.svkm.com. server.svkm.com. 0 86400 3600 604800 10800

;; Query time: 0 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Sep 3 18:22:07 2015
;; MSG SIZE rcvd: 98

[root@localhost html]#
```

Now open /etc/httpd/conf/httpd.conf main configuration file of apache server.

#vim /etc/httpd/conf/httpd.conf

```
[root@localhost html]# vi /etc/httpd/conf/httpd.conf
```

Locate virtual host tag

Now go in the end of file and copy last seven lines [virtual host tag] and paste them in the end of file. Change these seven lines as shown in following.

```
1003 #<VirtualHost *:80>
1004 #     ServerAdmin webmaster@dummy-host.example.com
1005 #     DocumentRoot /www/docs/dummy-host.example.com
1006 #     ServerName dummy-host.example.com
1007 #     ErrorLog logs/dummy-host.example.com-error_log
1008 #     CustomLog logs/dummy-host.example.com-access_log common
1009 #</VirtualHost>
1010
1011
1012 #<VirtualHost *:80>
1013 #     ServerAdmin webmaster@dummy-host.example.com
1014 #     DocumentRoot /www/docs/dummy-host.example.com
1015 #     ServerName dummy-host.example.com
1016 #     ErrorLog logs/dummy-host.example.com-error_log
1017 #     CustomLog logs/dummy-host.example.com-access_log common
1018 #</VirtualHost>
```

Remove the comments from all 7 lines

<Virtual Host *:80> ServerAdmin

root@server.svkm.com

Document Root /var/www/virtual/server.svkm.com/html

ServerName www.svkm.com

ErrorLog logs/server.svkm.com-error_log

CustomLog logs/server.svkm.com-access_log

common

</Virtual Host>

now save this file **:wq** and exit from it

```
#
#<VirtualHost *:80>
#   ServerAdmin webmaster@dummy-host.example.com
#   DocumentRoot /www/docs/dummy-host.example.com
#   ServerName dummy-host.example.com
#   ErrorLog logs/dummy-host.example.com-error_log
#   CustomLog logs/dummy-host.example.com-access_log common
#</VirtualHost>

<VirtualHost 192.168.1.1:80>
  ServerAdmin root@www.server.svkm.com
  DocumentRoot /var/www/virtual/www.svkm.com/html
  ServerName server.svkm.com
  ErrorLog logs/www.svkm.com-error_log
  CustomLog logs/www.svkm.com-access_log common
</VirtualHost>
```

You have done necessary configuration now restart the httpd service and test this configuration run links command.

#service httpd restart

```
[root@server ~]# vim /etc/httpd/conf/httpd.conf
[root@server ~]# service httpd start
Starting httpd:
[root@server ~]# service httpd restart
Stopping httpd: [ OK ]
Starting httpd: [ OK ]
[root@server ~]# chkconfig httpd on
[root@server ~]# █
```

chmod -R 777 /var/www/virtual/www.svkm.com/html

```
[root@server ~]# chmod -R 777 /var/www/virtual/www.svkm.com/html/
[root@server ~]# █
```

Go to the Clone and open browser and type

server.svkm.com OR 192.168.1.1

You can view your web page.

#links 192.168.1.1

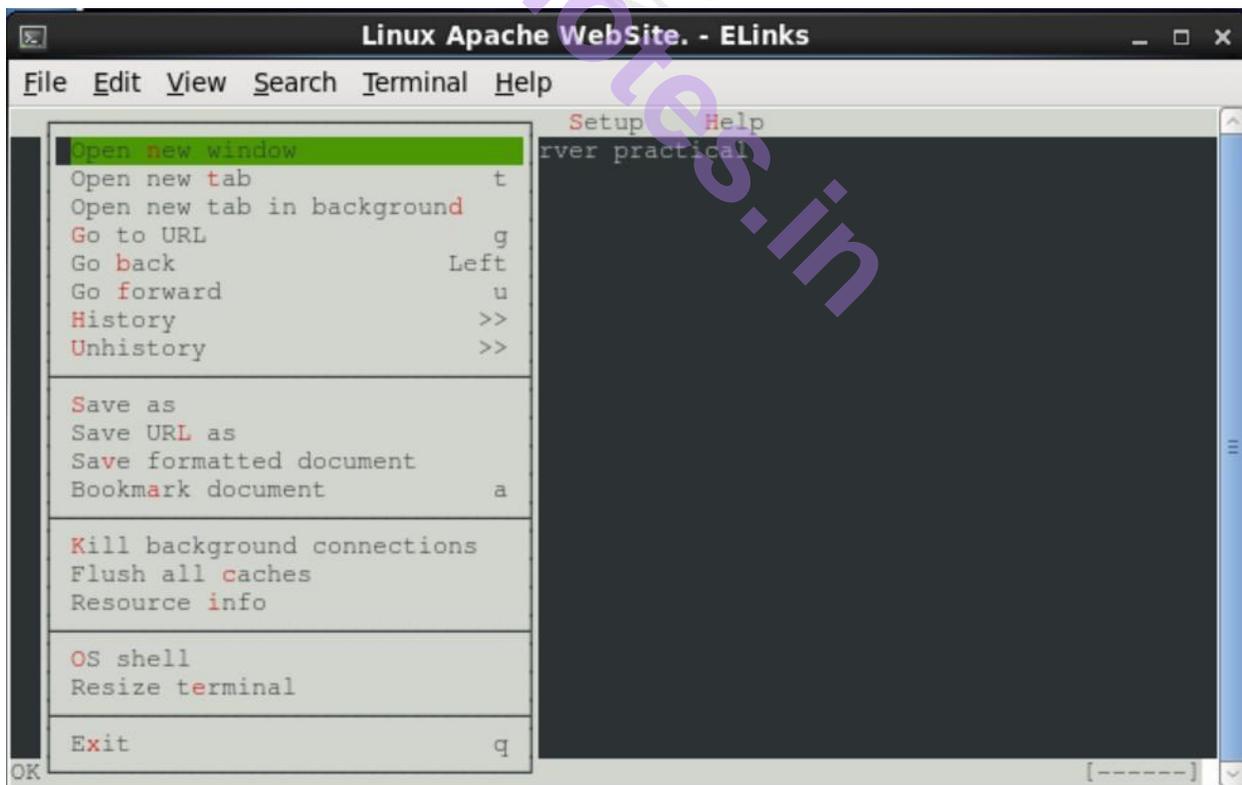
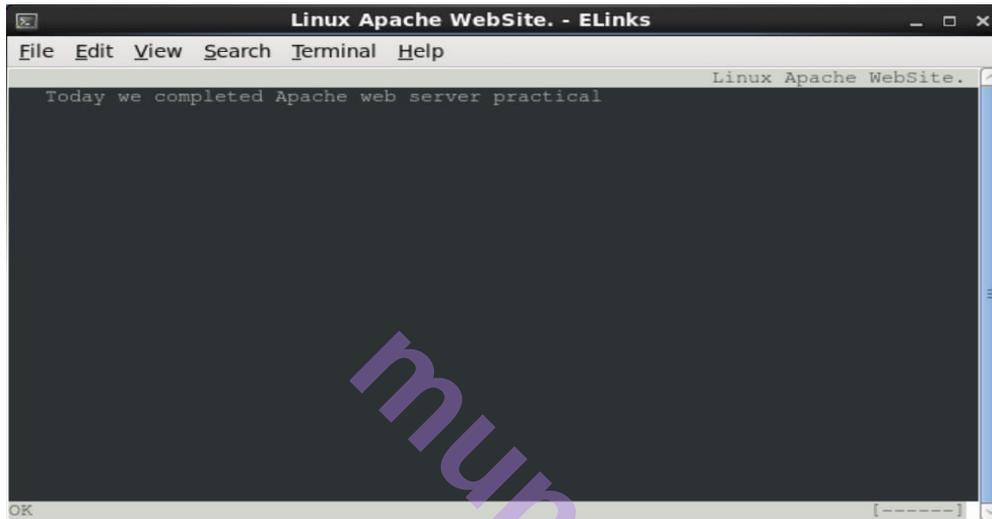
```
[root@server ~]# links 192.168.1.1 █
```

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If links command retrieve your home page means you have successfully configured the virtual host now test it with site name.

#links www.svkm.com

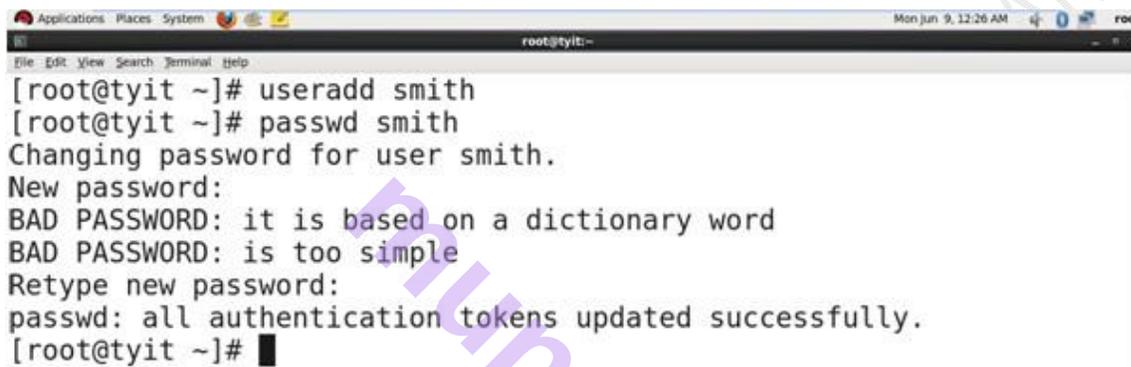
In output of links command you should see the index page of site



Practical no 15: Linux System Administration

(A) Becoming super user:

- (1) Create a user account to grant him the privilege of super user, as shown below:

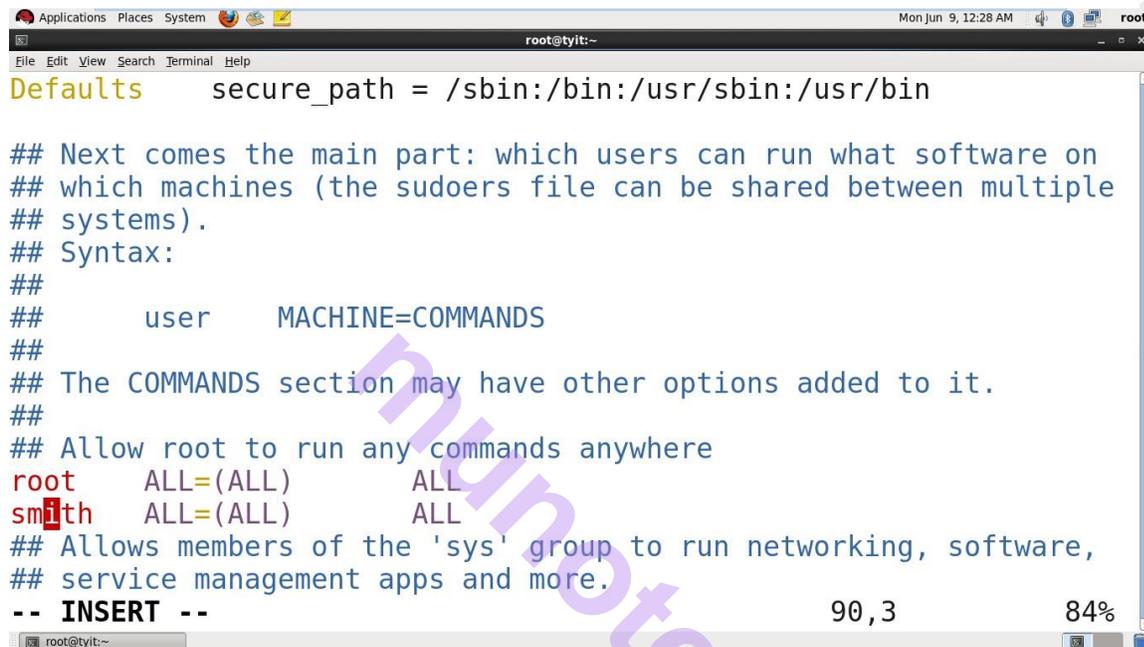


```
Applications Places System root@tyit:~
[root@tyit ~]# useradd smith
[root@tyit ~]# passwd smith
Changing password for user smith.
New password:
BAD PASSWORD: it is based on a dictionary word
BAD PASSWORD: is too simple
Retype new password:
passwd: all authentication tokens updated successfully.
[root@tyit ~]#
```

(2) Open the file `/etc/sudoers` and the following lines for smith:

```
SMITH    ALL = (ALL)    ALL
```

It is as shown below:

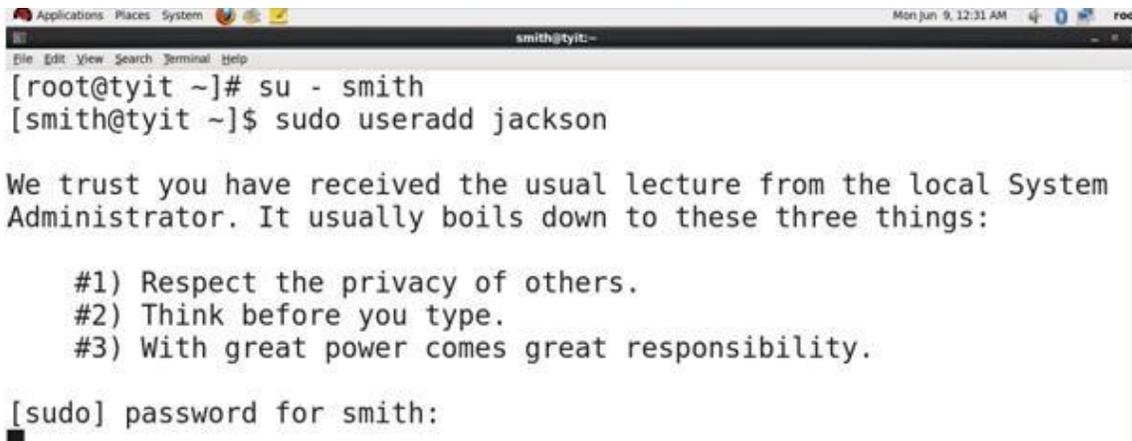
A screenshot of a terminal window titled 'root@tyit:~' showing the contents of the /etc/sudoers file. The terminal output includes the 'Defaults' section with 'secure_path = /sbin:/bin:/usr/sbin:/usr/bin', followed by comments explaining the file's purpose and syntax. The configuration for the 'smith' user is highlighted in red: 'smith ALL=(ALL) ALL'. The terminal also shows the 'root' user configuration and a line indicating an insertion point: '-- INSERT --' with '90,3' and '84%'.

(3) Run the command `visudo`:

```
#visudo
```

(4) Test the configuration by making smith to login and perform any administrative activity as shown below:

(i) Add user Jackson using `sudo`:



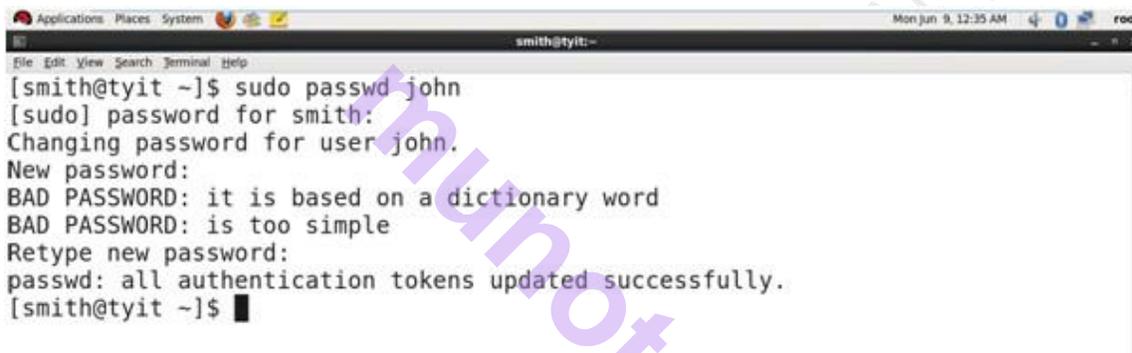
```
Applications Places System Mon Jun 9, 12:31 AM root
smith@tyit:~
File Edit View Search Terminal Help
[root@tyit ~]# su - smith
[smith@tyit ~]$ sudo useradd jackson

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

#1) Respect the privacy of others.
#2) Think before you type.
#3) With great power comes great responsibility.

[sudo] password for smith:
█
```

(ii) Changing password of john using sudo:



```
Applications Places System Mon Jun 9, 12:35 AM root
smith@tyit:~
File Edit View Search Terminal Help
[smith@tyit ~]$ sudo passwd john
[sudo] password for smith:
Changing password for user john.
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.
[smith@tyit ~]$ █
```

(B) Temporarily changing identity with the help of su command:

(1) When root changes identity temporarily, with the help of su command, the system never asks for password:



```
Applications Places System Mon Jun 9, 12:37 AM root
john@tyit:~
File Edit View Search Terminal Help
[root@tyit ~]# su - john
[john@tyit ~]$ █
```

(2) But when any local user tries to change the identity temporarily, redhat system asks for the password as shown below:

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```
Applications Places System Mon Jun 9, 12:41 AM root
smith@tyit:~
File Edit View Search Terminal Help
[john@tyit ~]$ su - smith
Password:
[smith@tyit ~]$
```

(C) Administrative Commands:

(1) **useradd** command with its options:

```
Applications Places System Mon Jun 9, 12:56 AM root
root@tyit:~
File Edit View Search Terminal Help
[root@tyit ~]# useradd -c "this is akshay's account" -u 612 -o -s /
sbin/bash akshay
[root@tyit ~]#
```

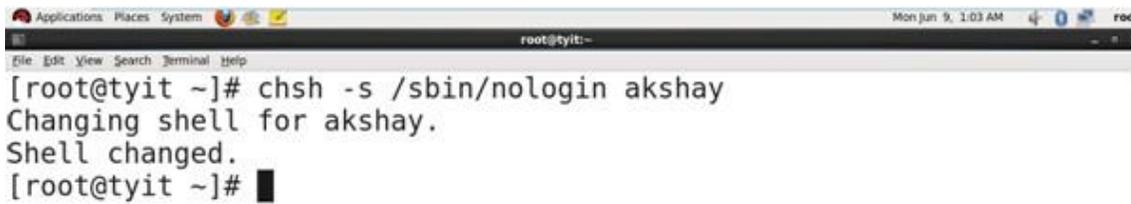
The file `/etc/passwd` also shows the entry of the user as follow:

```
Applications Places System Mon Jun 9, 12:56 AM root
root@tyit:~
File Edit View Search Terminal Help
e4:x:522:522:::/home/e4:/bin/bash
e5:x:523:523:::/home/e5:/bin/bash
e1:x:524:524:::/home/e1:/bin/bash
t1:x:525:525:::/home/t1:/bin/bash
t2:x:526:526:::/home/t2:/bin/bash
t3:x:527:527:::/home/t3:/bin/bash
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
smith:x:528:528:::/home/smith:/bin/bash
jackson:x:529:529:::/home/jackson:/bin/bash
akshay:x:612:612:this is akshay's account:/home/akshay:/sbin/bash

60,1 Bot
root@tyit:~
```

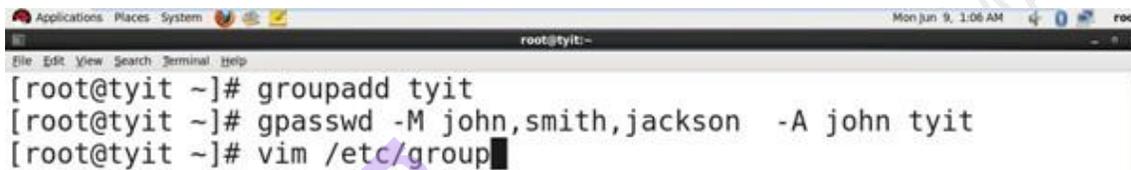
(2) **chage** command to change the age of user's password :

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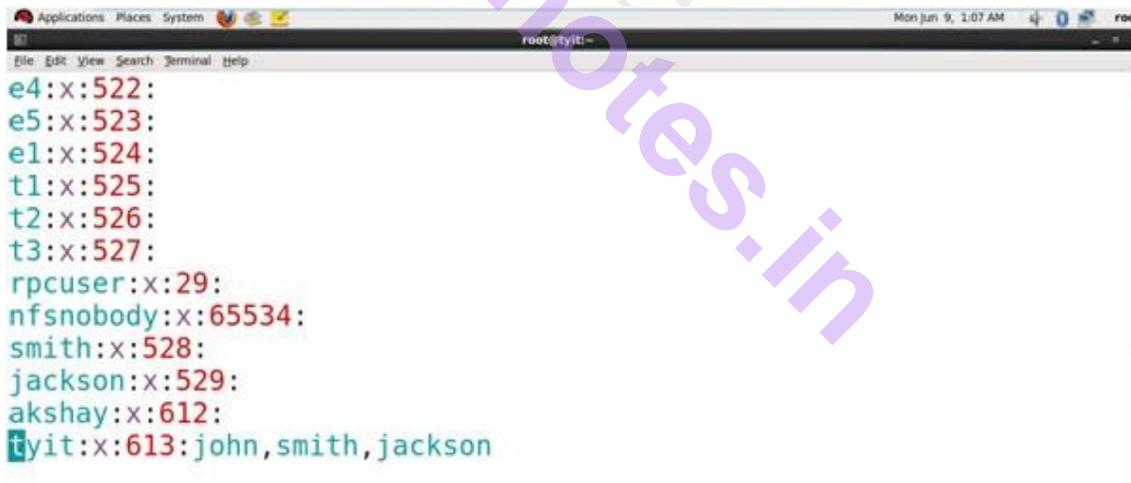
```
Applications Places System Mon Jun 9, 1:03 AM root
root@tyit:~
File Edit View Search Terminal Help
[root@tyit ~]# chsh -s /sbin/nologin akshay
Changing shell for akshay.
Shell changed.
[root@tyit ~]#
```

- (5) **Groupadd** command to create a new group and **gpasswd** command to add members and administrator in the group:



```
Applications Places System Mon Jun 9, 1:06 AM root
root@tyit:~
File Edit View Search Terminal Help
[root@tyit ~]# groupadd tyit
[root@tyit ~]# gpasswd -M john,smith,jackson -A john tyit
[root@tyit ~]# vim /etc/group
```

The above command also affect the file `/etc/group` as shown:



```
Applications Places System Mon Jun 9, 1:07 AM root
root@tyit:~
File Edit View Search Terminal Help
e4:x:522:
e5:x:523:
e1:x:524:
t1:x:525:
t2:x:526:
t3:x:527:
rpcuser:x:29:
nfsnobody:x:65534:
smith:x:528:
jackson:x:529:
akshay:x:612:
tyit:x:613:john,smith,jackson
```

(6) rpm:

- (i) The packages can be installed with the help of rpm command. For that purpose, we need to mount disk image of RedHat on linux machine. After installation, this disk image is already mounted. We can simply switch to it under media. It is as shown in the screenshot.,

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```
Applications Places System Mon Jun 9, 12:19 AM root
root@tyit:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@tyit ~]# cd /media/
[root@tyit media]# ls
RHEL_6.0 i386 Disc 1
[root@tyit media]# cd RHEL_6.0\ i386\ Disc\ 1/
[root@tyit RHEL_6.0 i386 Disc 1]# cd Packages/
[root@tyit Packages]#
```

(ii) The directory Packages has all the packages. For eg, to install vsftpd, use rpm command with 'i' option to install.

```
Applications Places System Mon Jun 9, 12:20 AM root
root@tyit:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@tyit Packages]# rpm -ivh vsftpd-2.2.2-6.el6.i686.rpm
warning: vsftpd-2.2.2-6.el6.i686.rpm: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY
Preparing...
##### [100%]
 1:vsftpd
##### [100%]
[root@tyit Packages]#
```

(iii) To query and verify use rpmquery or rpm -qa, as shown below:

```
Applications Places System Mon Jun 9, 12:22 AM root
root@tyit:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@tyit Packages]# rpmquery -qa | grep vsftpd
vsftpd-2.2.2-6.el6.i686
[root@tyit Packages]#
```

(iv) To delete any installed package, use rpm with -e option to erase:

```
Applications Places System Mon Jun 9, 12:22 AM root
root@tyit:/media/RHEL_6.0 i386 Disc 1/Packages
File Edit View Search Terminal Help
[root@tyit Packages]# rpm -ev vsftpd
[root@tyit Packages]# rpmquery -qa | grep vsftpd
[root@tyit Packages]#
```

(7) Shutdown command:

(i) To shutdown after 5 mins:

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```
Applications Places System Mon Jun 9, 1:22 AM root
root@tyit:~
[root@tyit ~]# shutdown -h +5

Broadcast message from root@tyit
(/dev/pts/1) at 1:22 ...

The system is going down for halt in 5 minutes!
```

(ii) To shutdown with a particular broadcast message:

```
Applications Places System Mon Jun 9, 1:23 AM root
root@tyit:~
[root@tyit ~]# shutdown -h +7 "Please save your work.. server is go
ing to shutdown ..."

Broadcast message from root@tyit
(/dev/pts/1) at 1:23 ...

The system is going down for halt in 7 minutes!
Please save your work.. server is going to shutdown ...
```

(iii) To reboot after 5 mins:

```
Applications Places System Mon Jun 9, 1:23 AM root
root@tyit:~
[root@tyit ~]# shutdown -r +5

Broadcast message from root@tyit
(/dev/pts/1) at 1:23 ...

The system is going down for reboot in 5 minutes!
```

(iv) To with specific broadcast message:

```
Applications Places System Mon Jun 9, 1:24 AM root
root@tyit:~
[root@tyit ~]# shutdown -r +5 "Save your work"

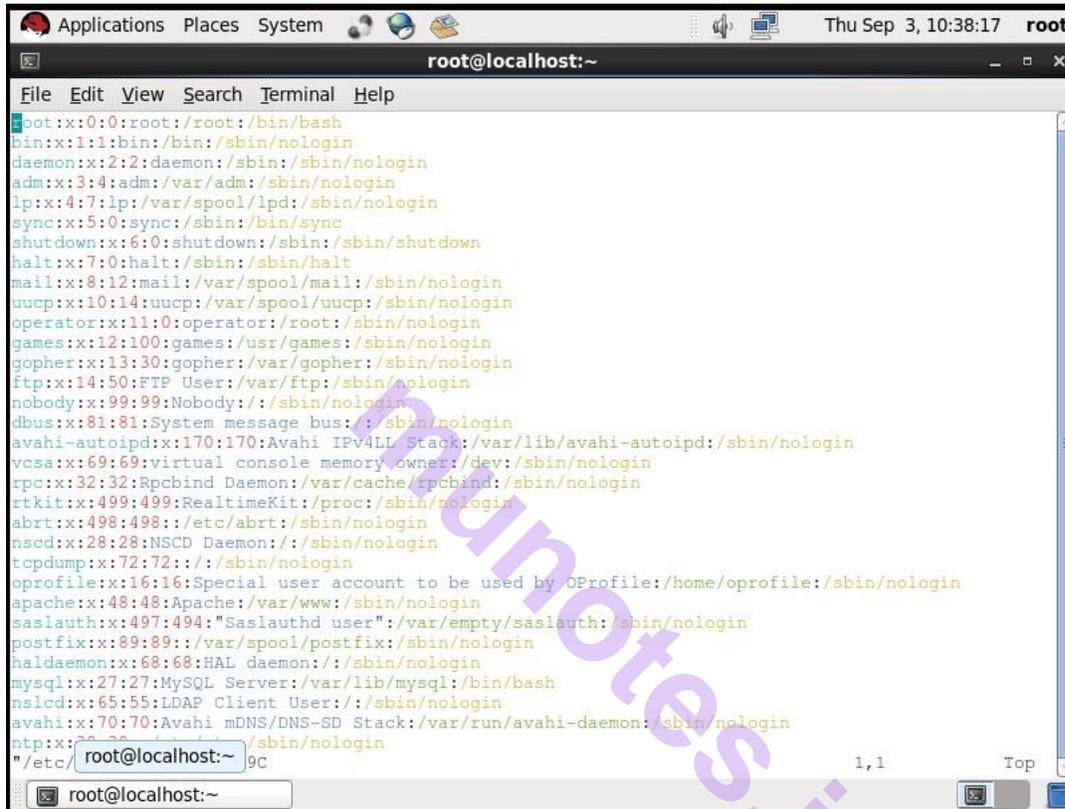
Broadcast message from root@tyit
(/dev/pts/1) at 1:24 ...

The system is going down for reboot in 5 minutes!
Save your work
```

(D) Administrative Files:

(1) /etc/aliases (will be done in sendmail)

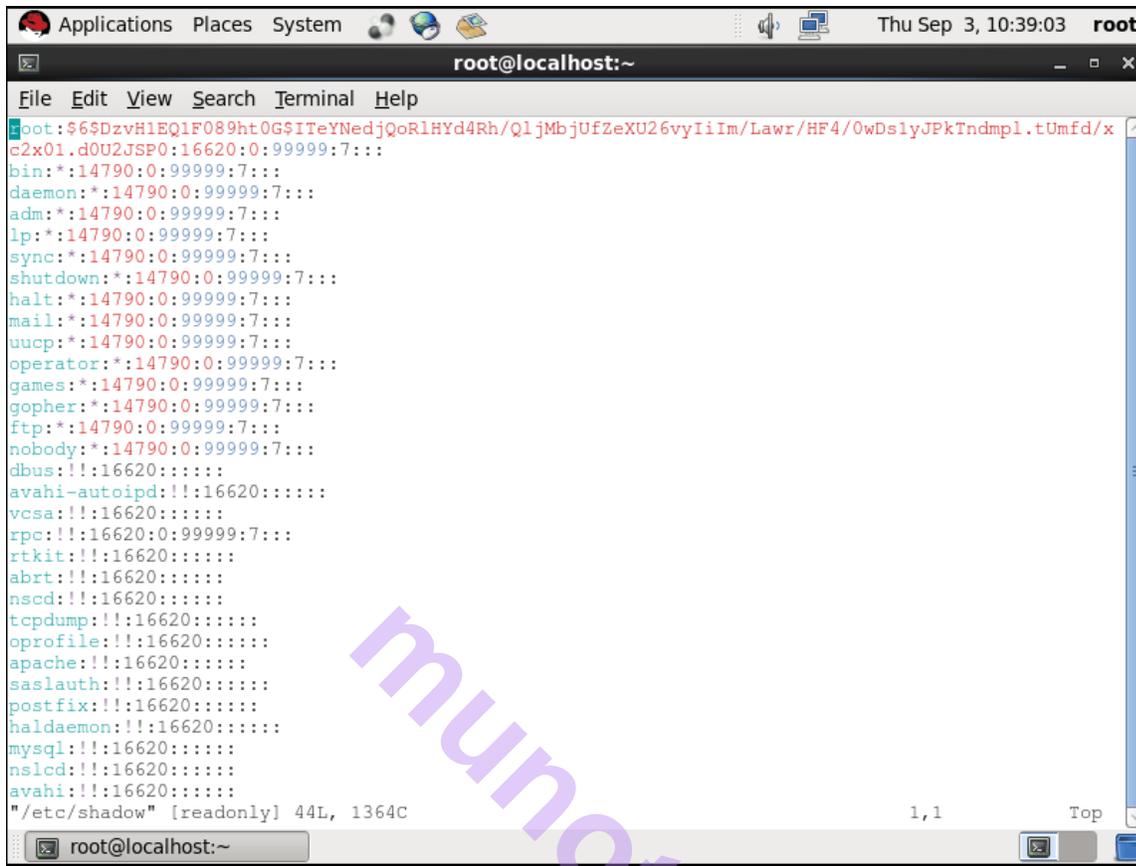
(2) /etc/passwd



```
root@localhost:~  
File Edit View Search Terminal Help  
root:x:0:0:root:/root:/bin/bash  
bin:x:1:1:bin:/bin:/sbin/nologin  
daemon:x:2:2:daemon:/sbin:/sbin/nologin  
adm:x:3:4:adm:/var/adm:/sbin/nologin  
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin  
sync:x:5:0:sync:/sbin:/bin/sync  
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown  
halt:x:7:0:halt:/sbin:/sbin/halt  
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin  
uucp:x:10:14:uucp:/var/spool/uucp:/sbin/nologin  
operator:x:11:0:operator:/root:/sbin/nologin  
games:x:12:100:games:/usr/games:/sbin/nologin  
gopher:x:13:30:gopher:/var/gopher:/sbin/nologin  
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin  
nobody:x:99:99:Nobody:./:/sbin/nologin  
dbus:x:81:81:System message bus:./:/sbin/nologin  
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin  
vcsa:x:69:69:virtual console memory owner:/dev:/sbin/nologin  
rpc:x:32:32:Rpcbind Daemon:/var/cache/rpcbind:/sbin/nologin  
rtkit:x:499:499:RealtimeKit:/proc:/sbin/nologin  
abrt:x:498:498:./etc/abrt:/sbin/nologin  
nscd:x:28:28:NSCD Daemon:./:/sbin/nologin  
tcpdump:x:72:72:./:/sbin/nologin  
oprofile:x:16:16:Special user account to be used by OProfile:/home/oprofile:/sbin/nologin  
apache:x:48:48:Apache:/var/www:/sbin/nologin  
saslauth:x:497:494:"Saslauthd user":/var/empty/saslauth:/sbin/nologin  
postfix:x:89:89:./var/spool/postfix:/sbin/nologin  
haldaemon:x:68:68:HAL daemon:./:/sbin/nologin  
mysql:x:27:27:MySQL Server:/var/lib/mysql:/bin/bash  
nslcd:x:65:55:LDAP Client User:./:/sbin/nologin  
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin  
ntp:x:20:20:ntp:/sbin/nologin  
"/etc/passwd  
root@localhost:~ 9C 1,1 Top
```

(3) /etc/shadow

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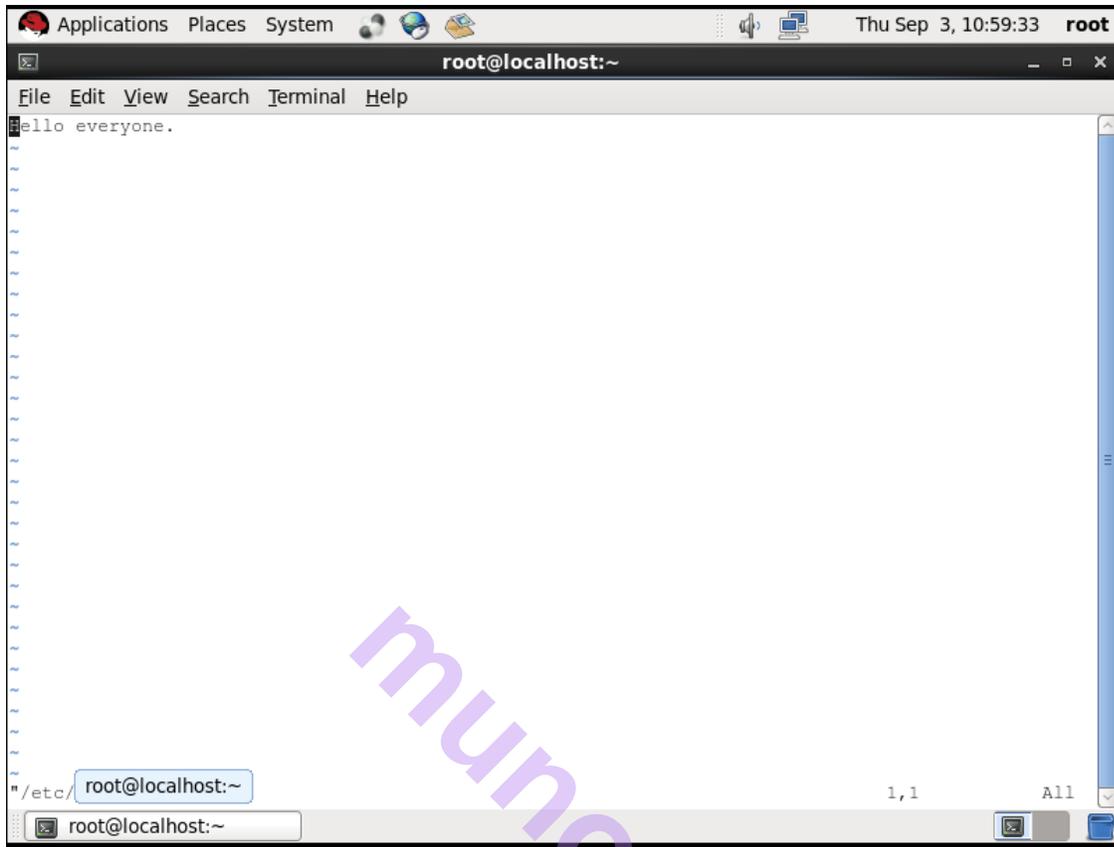
The screenshot shows a terminal window titled 'root@localhost:~' with a menu bar containing 'File Edit View Search Terminal Help'. The terminal displays the output of the 'cat /etc/passwd' command, listing system users and their associated UID, GID, and shell. The output is as follows:

```
root:$6$DzvH1EQ1F089ht0G$ITeYNedjQoR1HYd4Rh/Q1jMbJUFZeXU26vyIiIm/Lawr/HF4/0wDslyJPKTndmpl.tUmFd/x
c2x01.d0U2JSP0:16620:0:99999:7:::
bin:!:14790:0:99999:7:::
daemon:!:14790:0:99999:7:::
adm:!:14790:0:99999:7:::
lp:!:14790:0:99999:7:::
sync:!:14790:0:99999:7:::
shutdown:!:14790:0:99999:7:::
halt:!:14790:0:99999:7:::
mail:!:14790:0:99999:7:::
uucp:!:14790:0:99999:7:::
operator:!:14790:0:99999:7:::
games:!:14790:0:99999:7:::
gopher:!:14790:0:99999:7:::
ftp:!:14790:0:99999:7:::
nobody:!:14790:0:99999:7:::
dbus:!:16620:::::
avahi-autoipd:!:16620:::::
vcsa:!:16620:::::
rpc:!:16620:0:99999:7:::
rtkit:!:16620:::::
abrt:!:16620:::::
nscd:!:16620:::::
tcpdump:!:16620:::::
oprofile:!:16620:::::
apache:!:16620:::::
saslauth:!:16620:::::
postfix:!:16620:::::
haldaemon:!:16620:::::
mysql:!:16620:::::
nslcd:!:16620:::::
avahi:!:16620:::::
"/etc/shadow" [readonly] 44L, 1364C
```

The terminal status bar at the bottom shows 'root@localhost:~' and '1,1 Top'.

(4) /etc/motd

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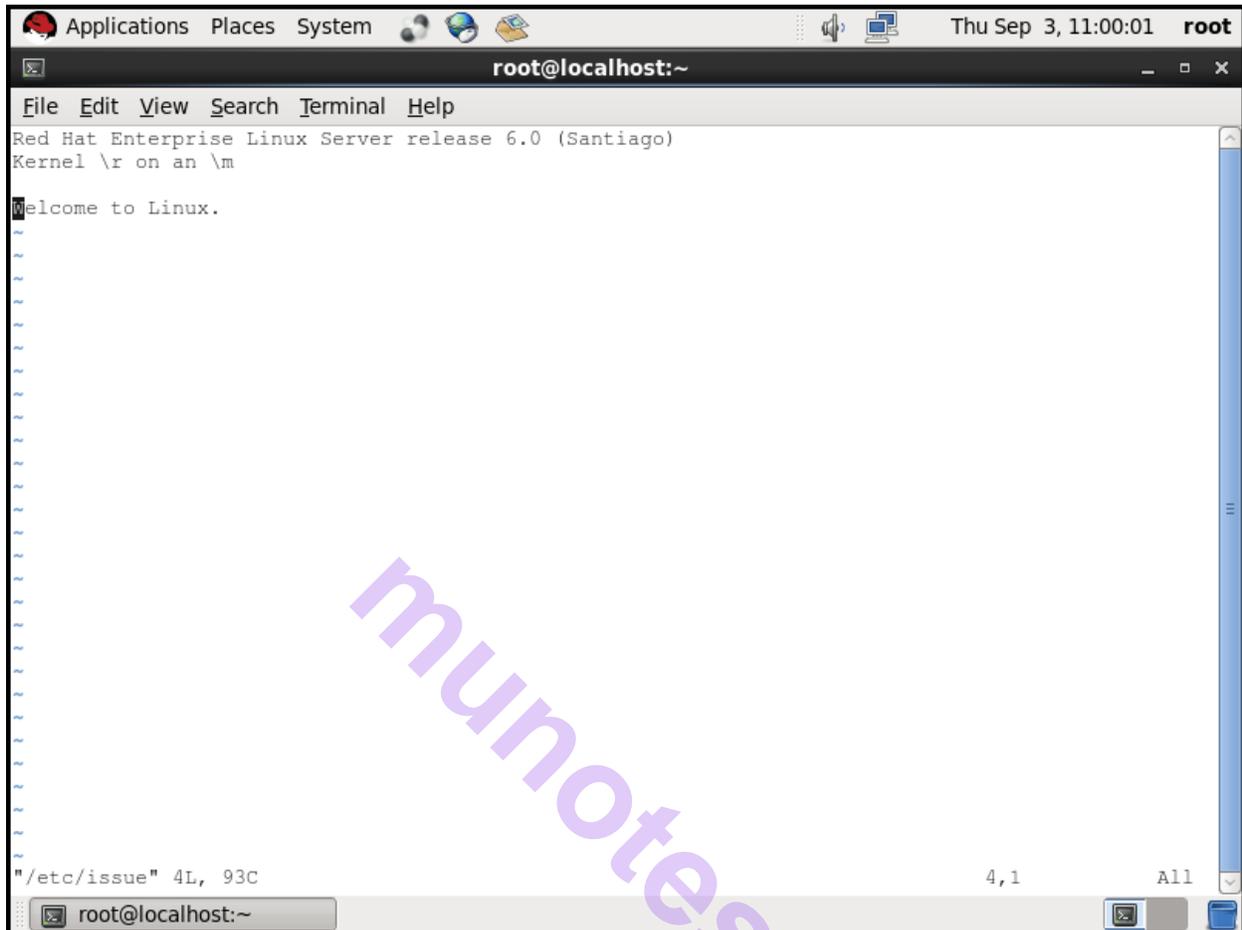


```
Red Hat Enterprise Linux Server release 6.0 (Santiago)
Kernel 2.6.32-71.el6.i686 on an i686

localhost login: root
Password:
Hello everyone.
[root@localhost ~]# _
```

(5) /etc/issue

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The screenshot shows a terminal window titled "root@localhost:~" with a menu bar containing "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal output includes the following text:

```
Red Hat Enterprise Linux Server release 6.0 (Santiago)
Kernel \r on an \m

Welcome to Linux.
```

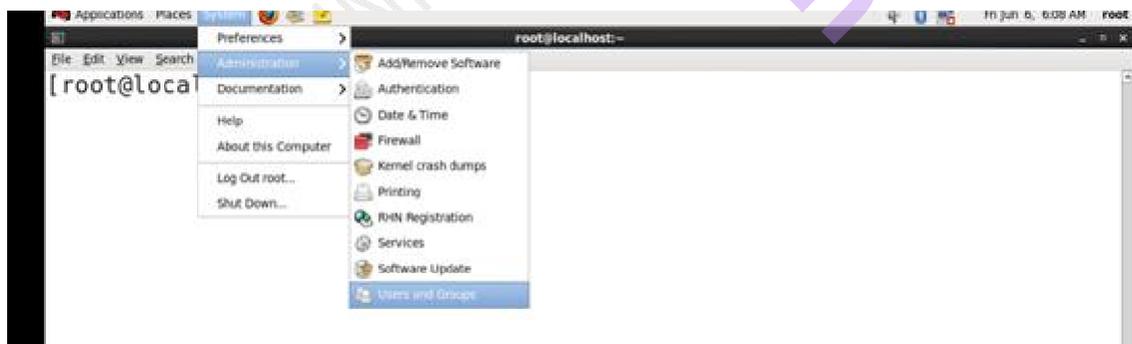
The terminal status bar at the bottom shows the current directory as "/etc/issue" with 4 lines and 93 characters, and a cursor at line 4, column 1. A large, diagonal watermark "munotes.in" is overlaid on the terminal content.

```
Red Hat Enterprise Linux Server release 6.0 (Santiago)
Kernel 2.6.32-71.el6.i686 on an i686
```

```
Welcome to Linux.
localhost login: _
```

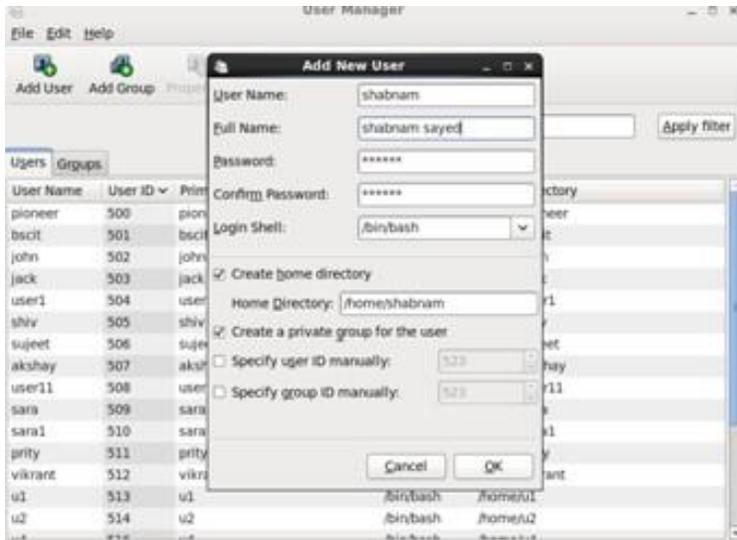
(E) Graphical Tools:

(1) To add user graphically:

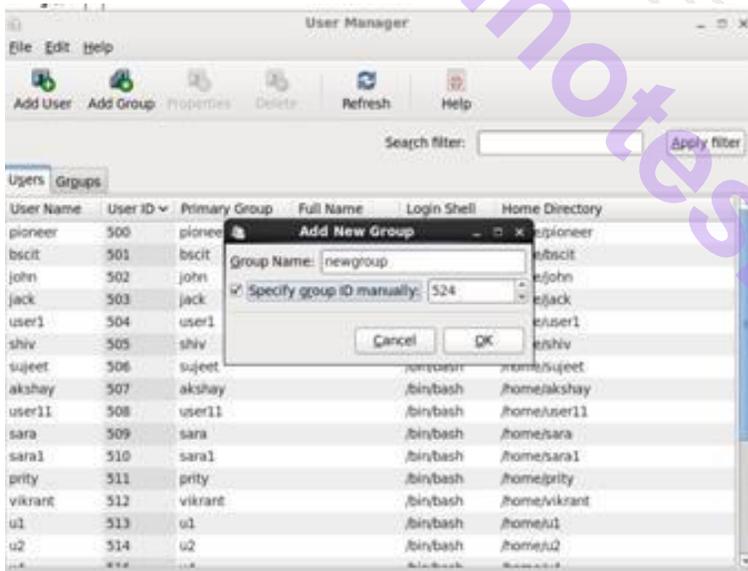


Useradd dialog box comes. Write username, full name, password, shell name, home dir and click OK.

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(2) To add a group graphically, system->Administration->user.
Click add group and provide the group name. Click OK.

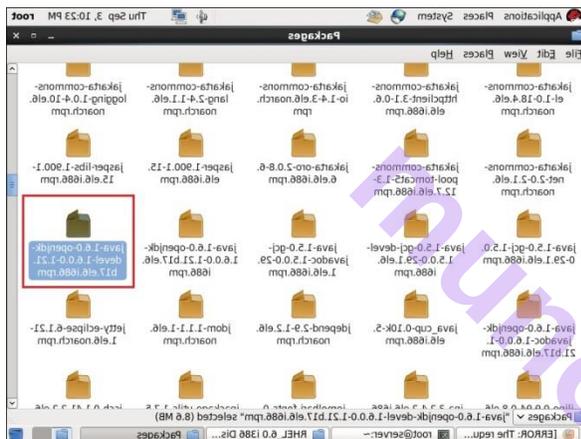


Practical no 16: Using javac compiler

(I) Sample JAVA program and demonstration of javac compiler:

1) Java package installation :=

We graphically install java-1.6 . go to CD/ Package directory.

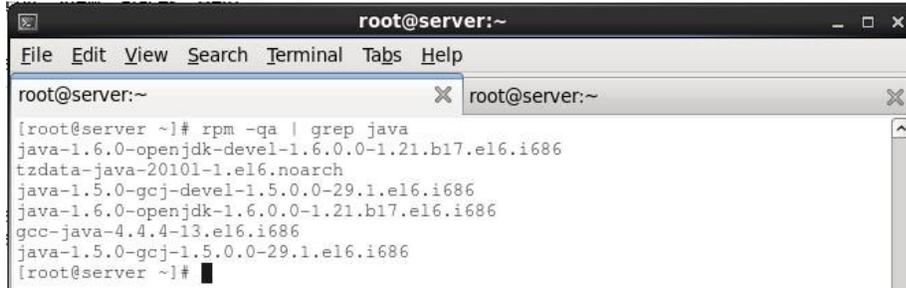


Find java 1.6.0-openjdk-devel. Double click the package.

Click on install.



2) Now query package and check whether it is properly install or not.



```
root@server:~  
File Edit View Search Terminal Tabs Help  
root@server:~  
[root@server ~]# rpm -qa | grep java  
java-1.6.0-openjdk-devel-1.6.0.0-1.21.b17.e16.i686  
tzdata-java-20101-1.e16.noarch  
java-1.5.0-gcj-devel-1.5.0.0-29.1.e16.i686  
java-1.6.0-openjdk-1.6.0.0-1.21.b17.e16.i686  
gcc-java-4.4.4-13.e16.i686  
java-1.5.0-gcj-1.5.0.0-29.1.e16.i686  
[root@server ~]#
```

3) Now create file HelloWorld.java with vi editor.

```
[root@server ~]# vim HelloWorld.java |
```

4) Add the following code to file and save and exit.

```
import java.io.*;  
public class HelloWorld{  
public static void main(String[] args) {  
System.out.println("Hello world");  
}  
}
```

5) Compile the file with javac command.

6) Use java command to view output.

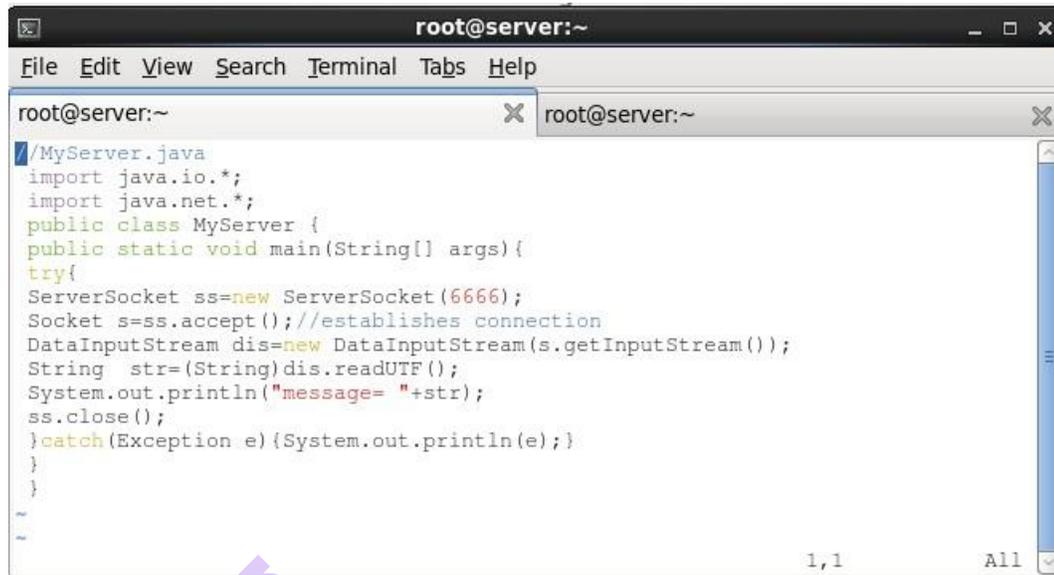
```
[root@server ~]# vim HelloWorld.java  
[root@server ~]# javac HelloWorld.java  
[root@server ~]# java HelloWorld  
Hello world  
[root@server ~]#
```

(II) Socket Programming using Java:

1) Now go to server machine and create file MyServer.java with vi editor.

```
[root@server ~]# vim MyServer.java
```

- 2) Add the following code to file and save and exit.



```
root@server:~  
File Edit View Search Terminal Tabs Help  
root@server:~ x root@server:~ x  
~/MyServer.java  
import java.io.*;  
import java.net.*;  
public class MyServer {  
public static void main(String[] args) {  
try {  
ServerSocket ss=new ServerSocket(6666);  
Socket s=ss.accept();//establishes connection  
DataInputStream dis=new DataInputStream(s.getInputStream());  
String str=(String)dis.readUTF();  
System.out.println("message= "+str);  
ss.close();  
}catch(Exception e){System.out.println(e);}  
}  
}
```

- 3) Now go to client machine create file MyClient.java with vi editor.

```
[root@server ~]# vim MyClient.java
```

- 4) Add the following code to file and save and exit



```
root@server:~  
File Edit View Search Terminal Tabs Help  
root@server:~ x root@server:~ x  
import java.net.*;  
public class MyClient {  
public static void main(String[] args) {  
try {  
Socket s=new Socket("localhost",6666);  
DataOutputStream dout=new DataOutputStream(s.getOutputStream());  
dout.writeUTF("Hello Server");  
dout.flush();  
dout.close();  
s.close();  
}catch(Exception e){System.out.println(e);}  
}  
}
```

- 5) Go to server machine and Compile the file with javac command. Use java MyServer command to see output.

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```
[root@server ~]# vim MyServer.java
[root@server ~]# javac MyServer.java
[root@server ~]# java MyServer
message= Hello Server
[root@server ~]# █
```

- 6) Go to client machine and Compile the file with javac command.

```
[root@server ~]# vim MyClient.java
[root@server ~]# javac MyClient.java
[root@server ~]# java MyClient
[root@server ~]# █
```