LAB 4: DHCP SERVER and CLIENTS

OBJECTIVES

This lab is design to demonstrate how to setup a DHCP server for an internal subnet. You will also create a virtual machine (VM) and install CentOs 7 workstation for DHCP Client. You will test DHCP server from CentOs 7 workstation.

OVERVIEW

Two different network interface cards will be used. The first network interface card (NIC) ens32 will be connected to external network with dynamic IP addressing method (DHCP). External DHCP server will assign the IP address for ens32. The network interface card ens33 will be connected to an internal subnet with a static IP address. The IP address 172.16.1.1 will be assigned to ens33 with 255.255.255.0 subnet mask. These static IP address 172.16.1.1 will be the gateway address of the subnet. The static IP address 172.16.1.1 will be the gateway address of the subnet.

The server will provide DHCP service to the internal network (ens33). Even though, the server is the DHCP client itself (ens32) from the external DHCP Server. All the servers will be used static IP addresses, but all other workstations will be the DHCP clients that configure network settings by this DHCP server.

All the workstations will get the IP configuration information automatically. It will reduce tremendous amount work when systems administrators have to configure network settings lot of workstations. It also makes easy to deploy a workstation image to multiple computers through network.

PROCEDURE I

[1] DHCP Server setup

[sysadmin@hadrian ~]# **sudo yum –y install dhcp**

[sysadmin@hadrian ~]# **sudo cp /usr/share/doc/dhcp-4.2.5/dhcpd.conf.example /etc/dhcp/dhcpd.conf**

[sysadmin@hadrian ~]# **sudo vi /etc/dhcpd.conf**
\#
\# DHCP Server Configuration file.
\#
ddns-update-style interim;
ignore client-updates;

subnet 172.16.1.0 netmask 255.255.255.0 {
        option routers 172.16.1.1;
        option subnet-mask 255.255.255.0;
        option domain-name "csusbcoyote.net";
        option domain-name-servers 139.182.2.1, 139.182.2.6;
        option time-offset -28800; # Pacific Standard Time

        range dynamic-bootp   172.16.1.101   172.16.1.254;
        default-lease-time 21600;
        max-lease-time 43200;
}

[root@hadrian /root]# **systemctl start dhcpd**
[root@hadrian /root]# **systemctl enable dhcpd**

Question: What does "ddns-update-style interim;" mean?
Question: What does "ignore client-updates;" mean?
Question: How to find out how many IP addresses are leased on DHCP server?
Question: How to add your own DNS on the DHCP so that your DHCP clients get new DNS settings?
Question: How to reserve an IP address to the particular machine so that the machine get same IP address every time the network started?
Question: Why subnetting is important?
Question: What following command do? ***systemctl restart dhcpd***
Question: What following command do? ***systemctl enable dhcpd***

Troubleshoot hint:
You have to restrict and specify which network interface should listen on the dhcp request.

(Check /etc/sysconfig/dhcpd file for hint)

PROCEDURE II

[1] Creating a virtual machine: lin

1. Click on "Sysadmin#" Resource Pool and Click on "Create a new virtual machine" on Basic Tasks
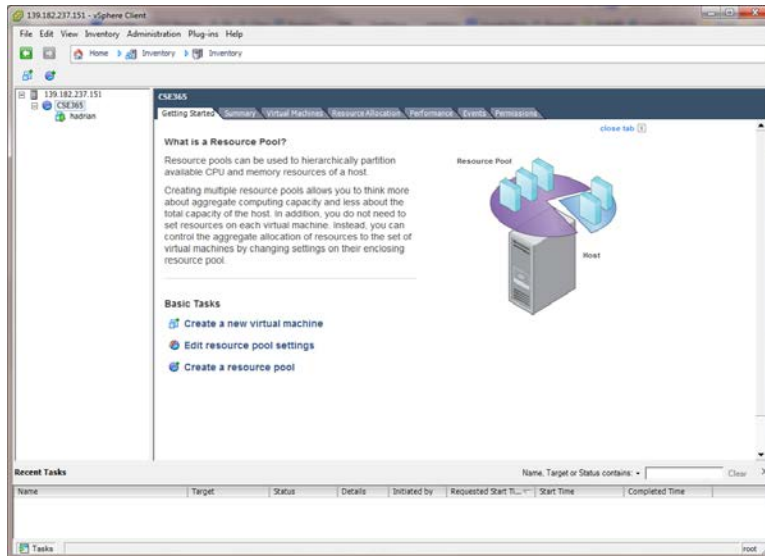
Please make sure that you create VM under your resource pool.

2. Select "Typical" and Click "Next"
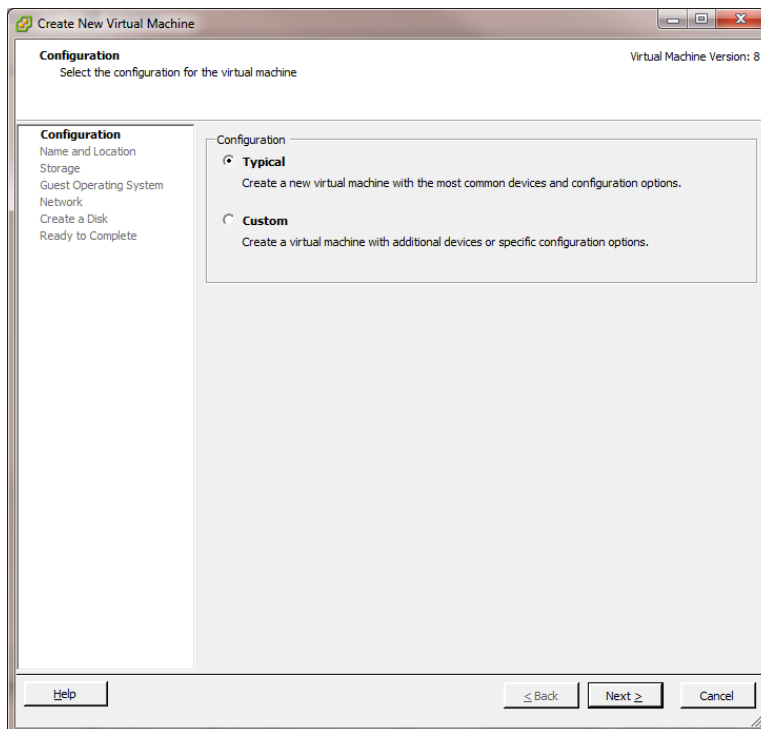
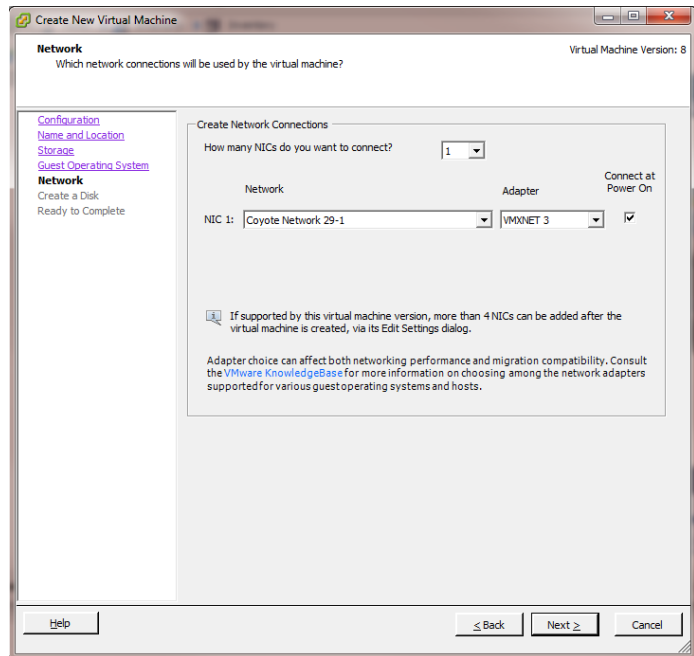**3. Type "lin-sysadminID" in "Name:" field**

4. Select "datastore1" and Click "Next"

5. **Select "Linux" on Guest Operating System: and select "CentOS (64bit) and click "Next"**
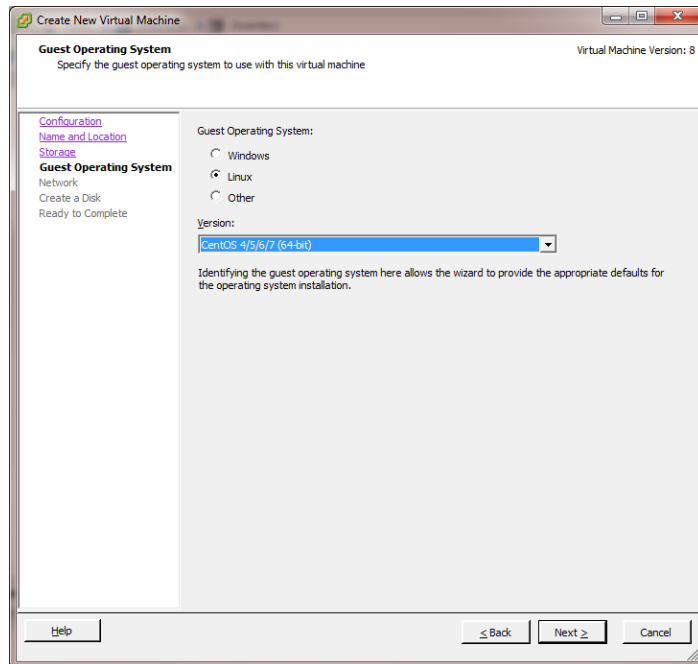
What is the limitation of 32bit OS?
What are the differences between 32 bit OS and 64 bit OS?

6. **Select "Coyote Network #" for NIC1 and Click "Next"** *Select the NIC as VMXNET3*

Why we need only one NIC instead of two not like hadrian?
What are the differences between E100, VMXNET 2 (Enhanced), and VMXNET3?

7. **Set virtual disk size as 16GB and select "Thin Provion" and Click "Next"**
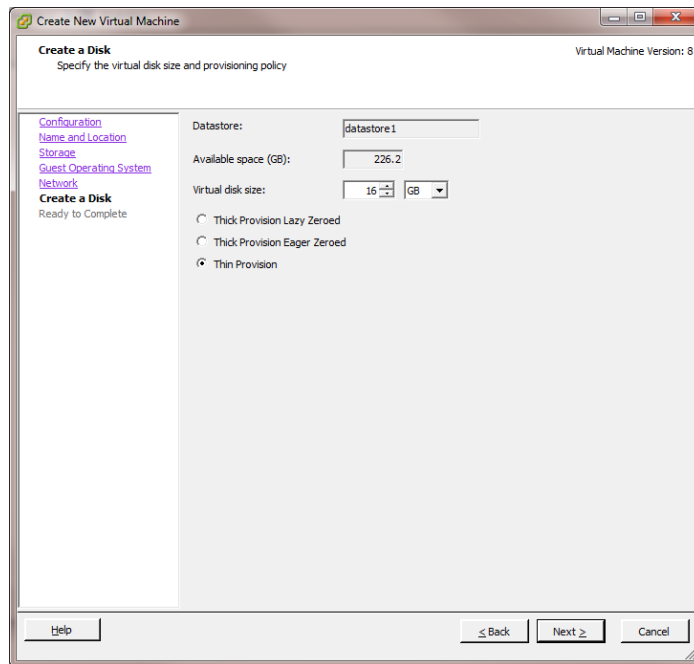
What are the differences between Thick Provisioning Lazy Zeroed and Thick Provisioning Eager Zeroed?
What is Thin Provision and why we use Thin Provision?

8. **Check "Edit the virtual machine settings before completion" and Click on "Continue"**
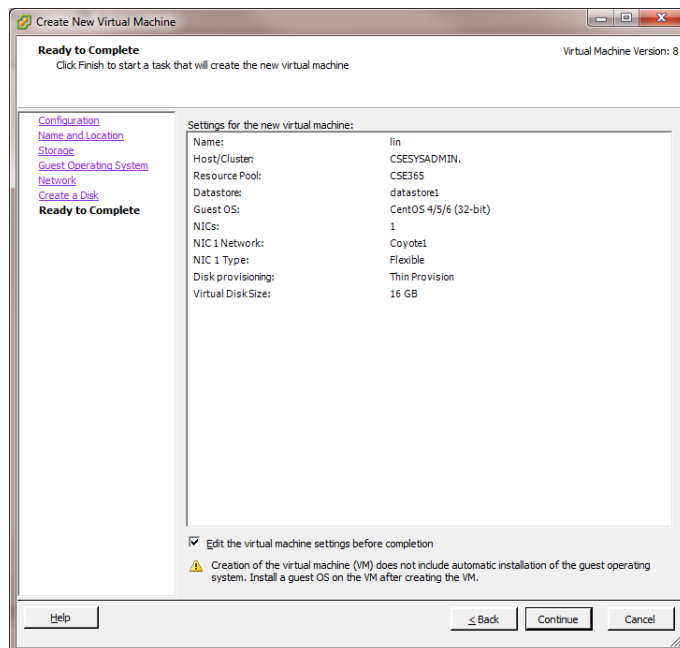
9. Click on triangle near 1GB and Click on "New CD/DVD (adding)
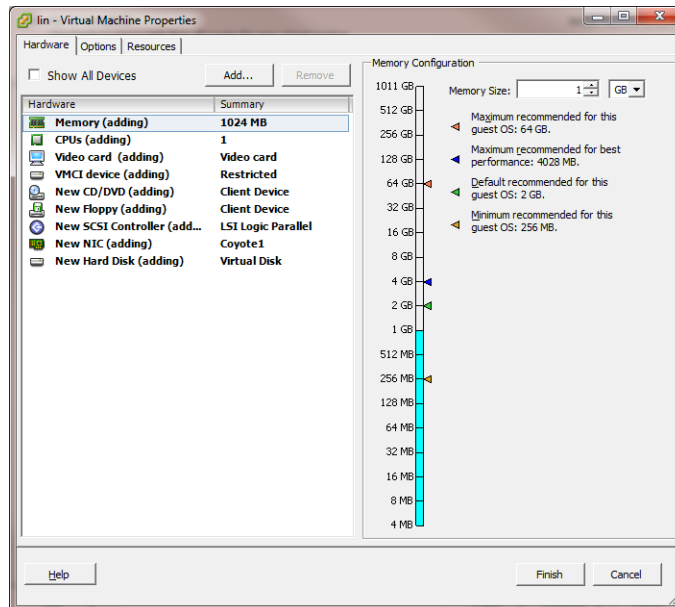
In production environment, you might use much more than we use here.

This is just an experimental lab environment settings.

10. Click on "Datastore ISO File" and Check "Connect on power on" and Click on "Browse…"
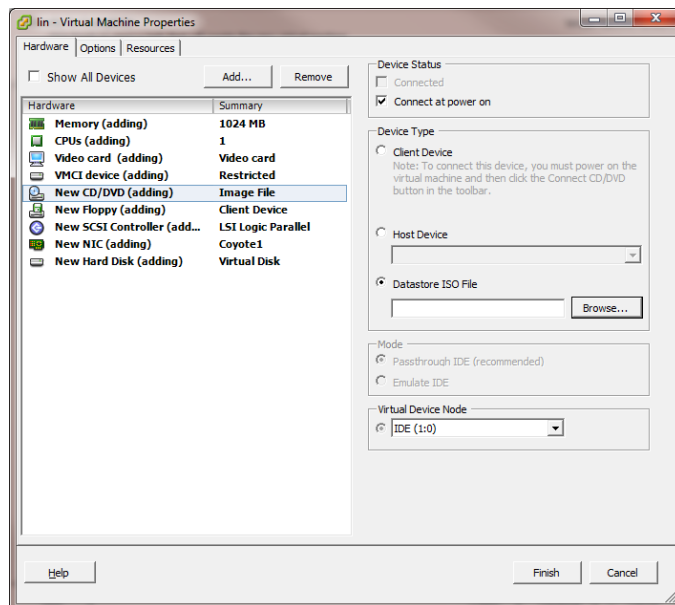
11. Click on "datastore1" and Click on "Open"
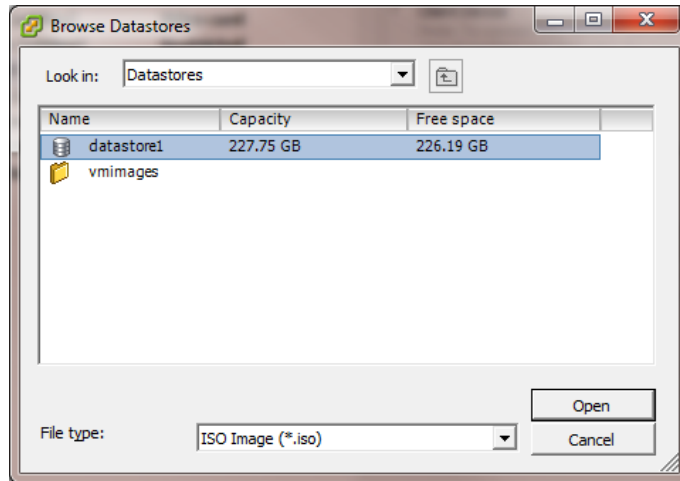
How can we add an external storage on the data stores?

12. Click on "IMG" and Click on "Open"
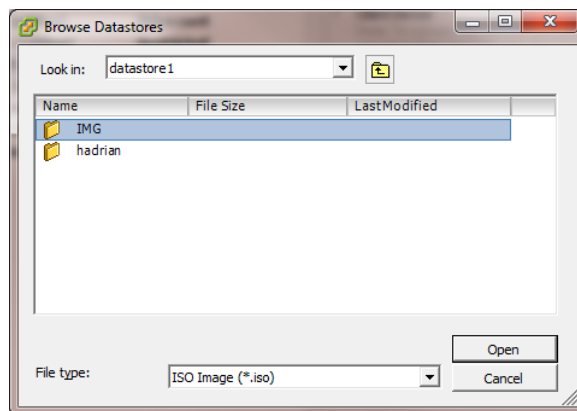
Select "CentOS-7-x86…" and Click "OK"
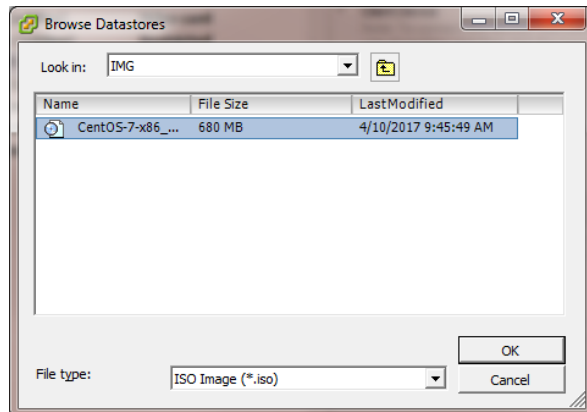
13. Click "Finish"
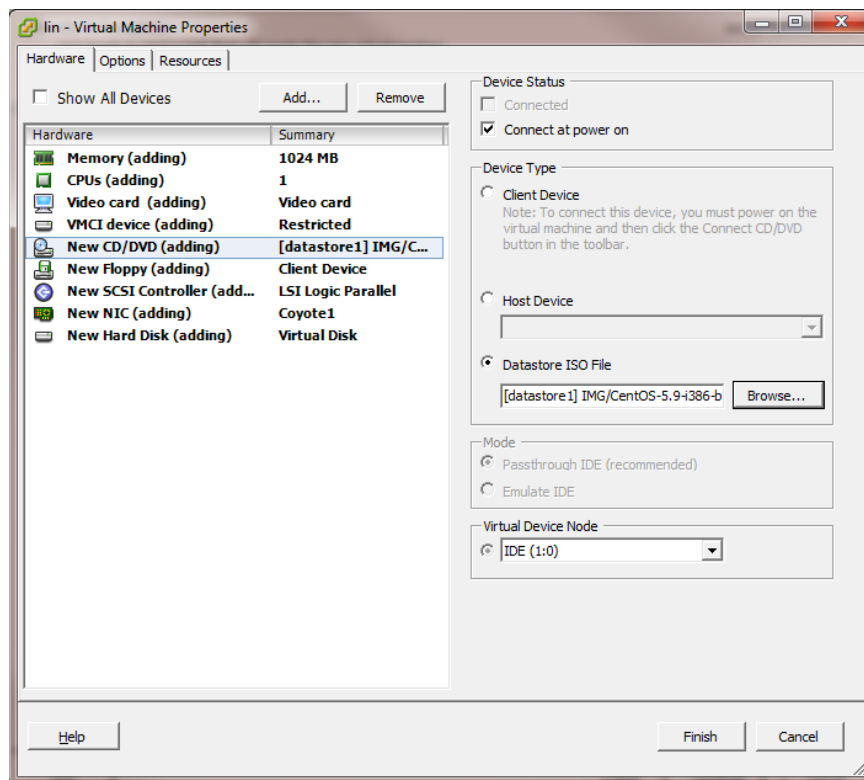
14. The virtual machine "lin" has been created.
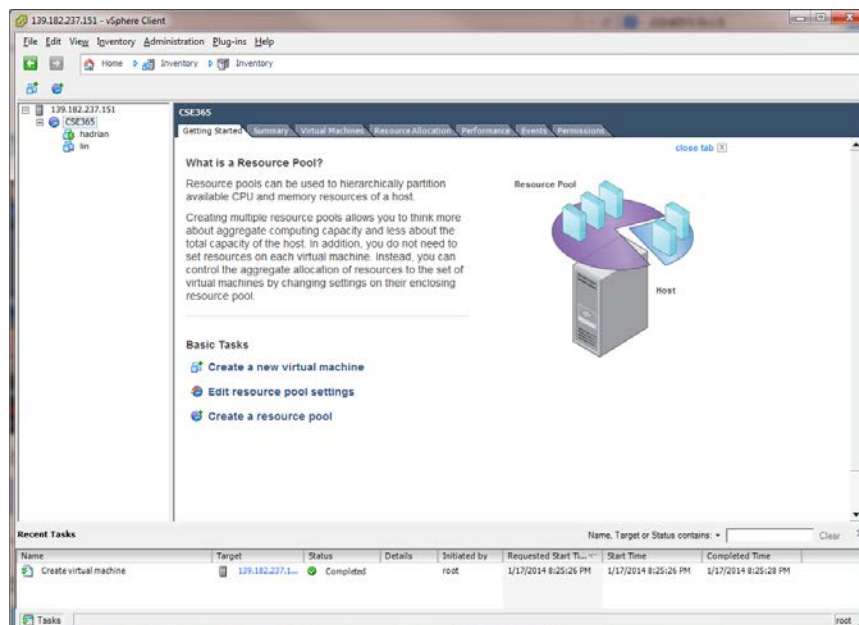
15. Right click on "lin" and Click on "Open Console"
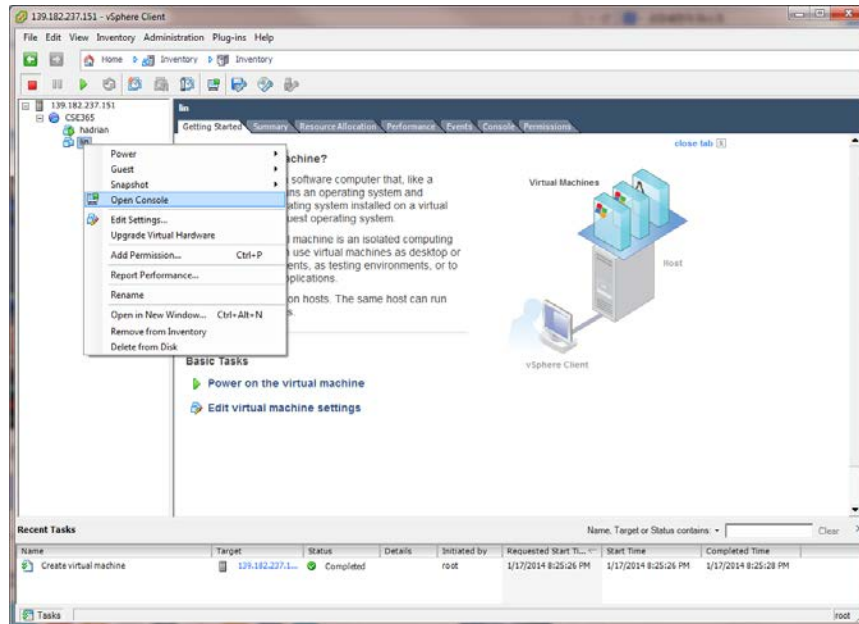
16. Click on "VM" and Click on "Power" and Click on "Power On" or click on the green triangle to turn on the 'lin'
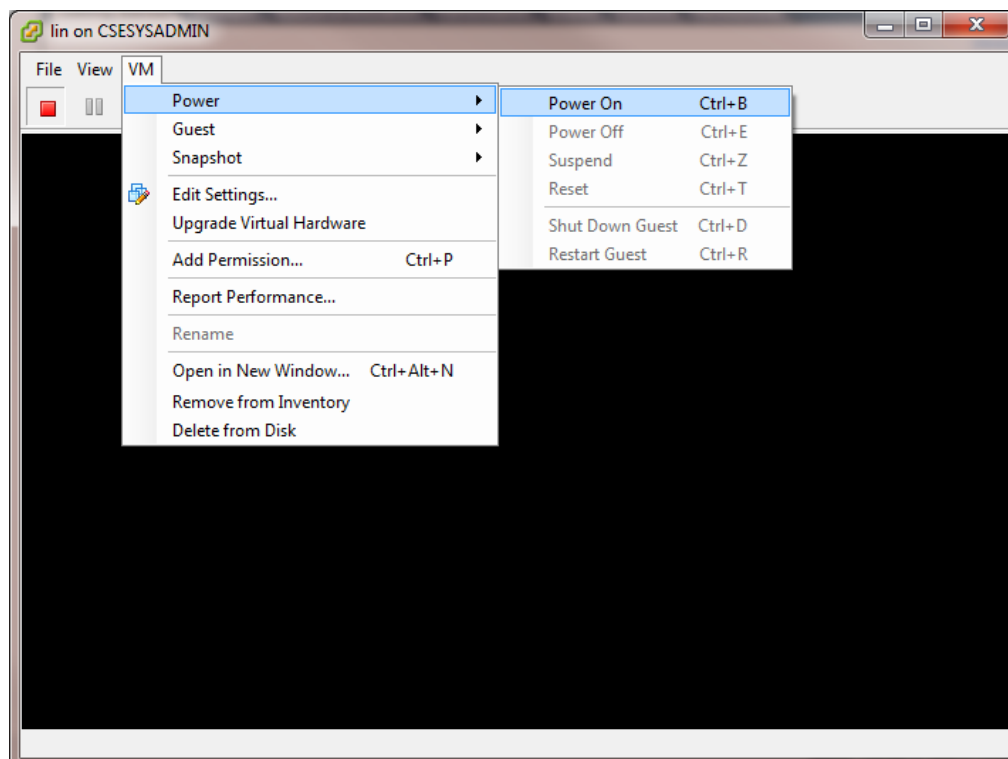
PROCEDURE III

CentOS Linux Installation

To install CentOS Linux on the virtual machine **hadrian**, you have to click on the vSphere client:

1. Right click on **hadrian** and Click **Open Console.**
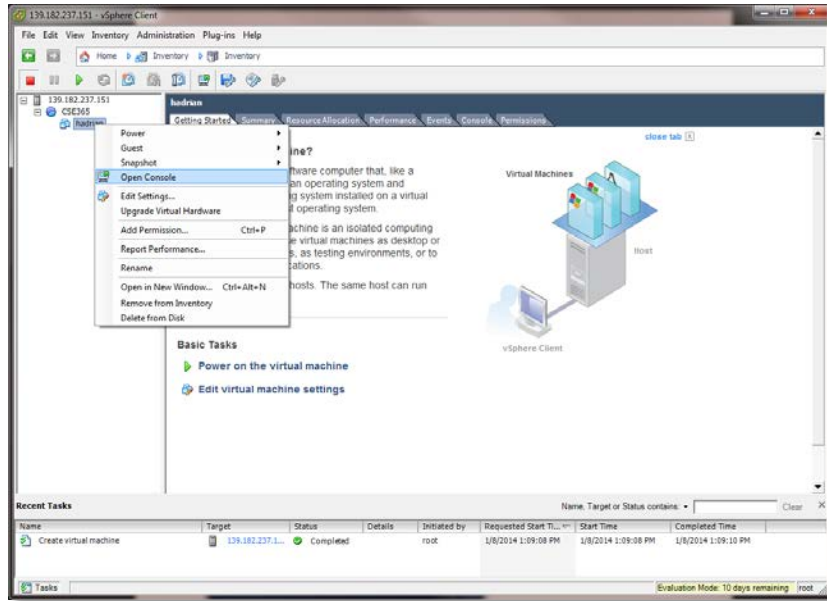
2. Click **VM** and Click **Power** and Click **Power On** or
   Click on the green triangle to turn on the **hadrian.**
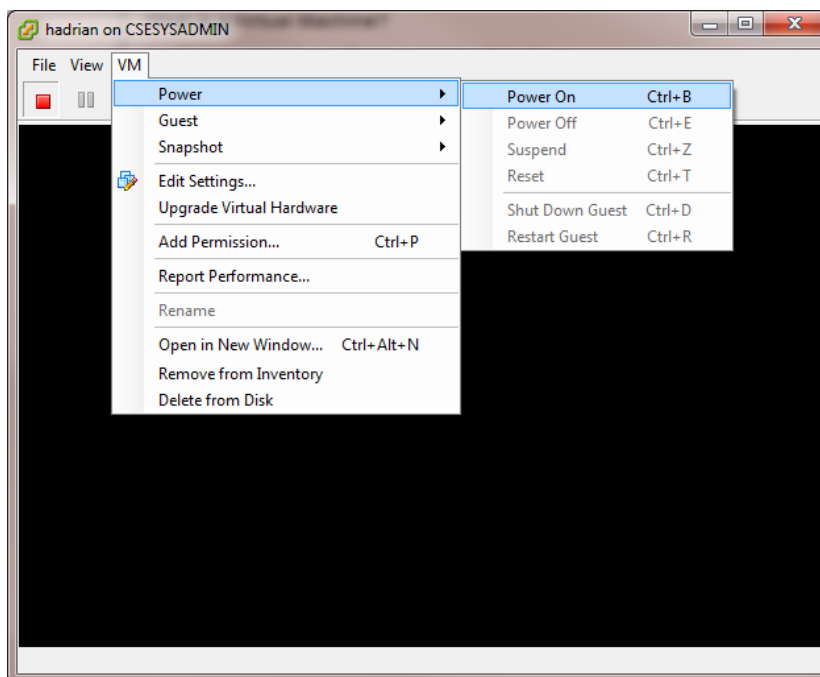
3. Right click on **hadrian** and Click **Open Console.**
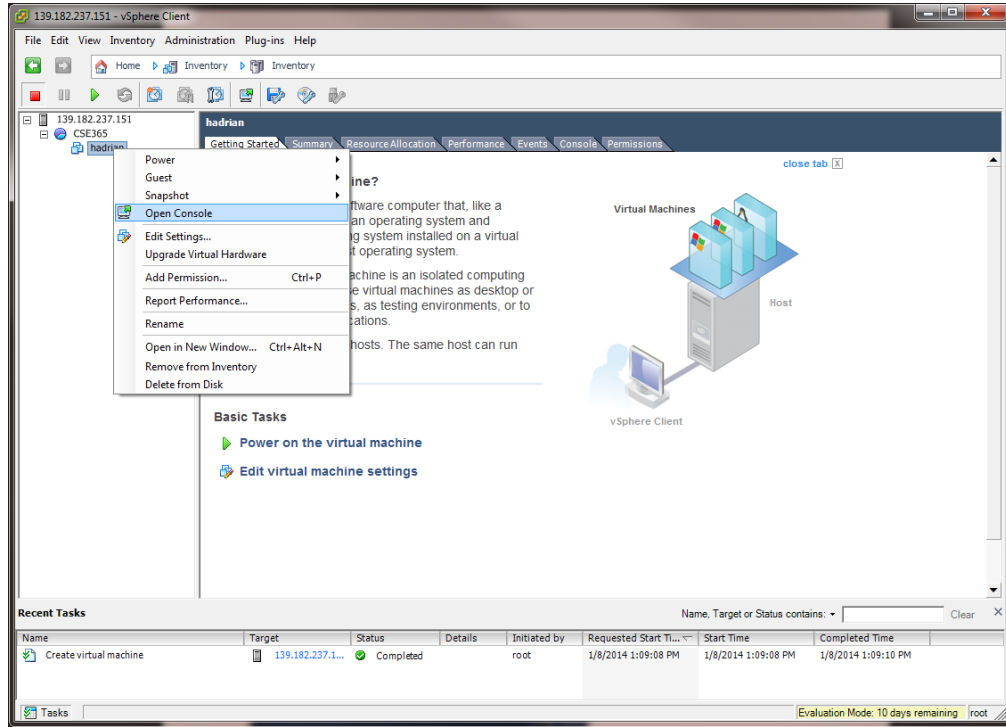
4. Click **VM** and Click **Power** and Click **Power On** or
Click on the green triangle to turn on the **hadrian.**
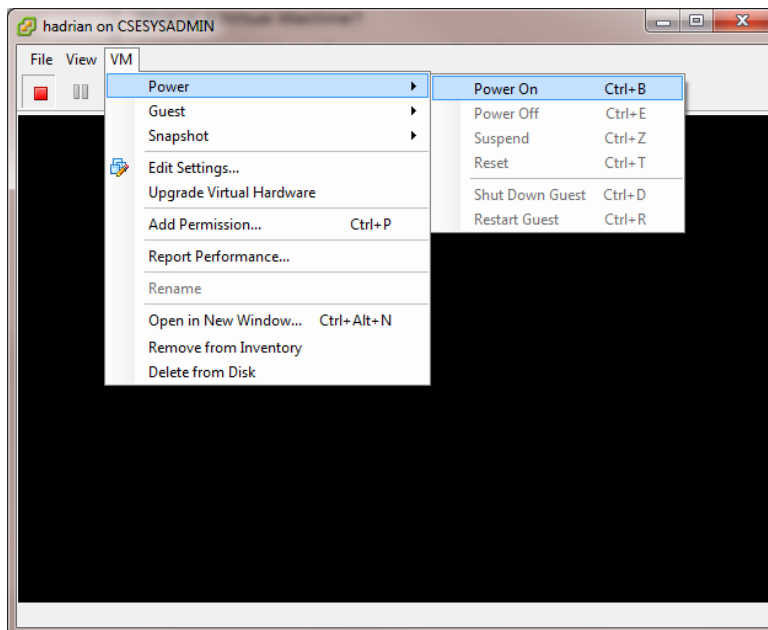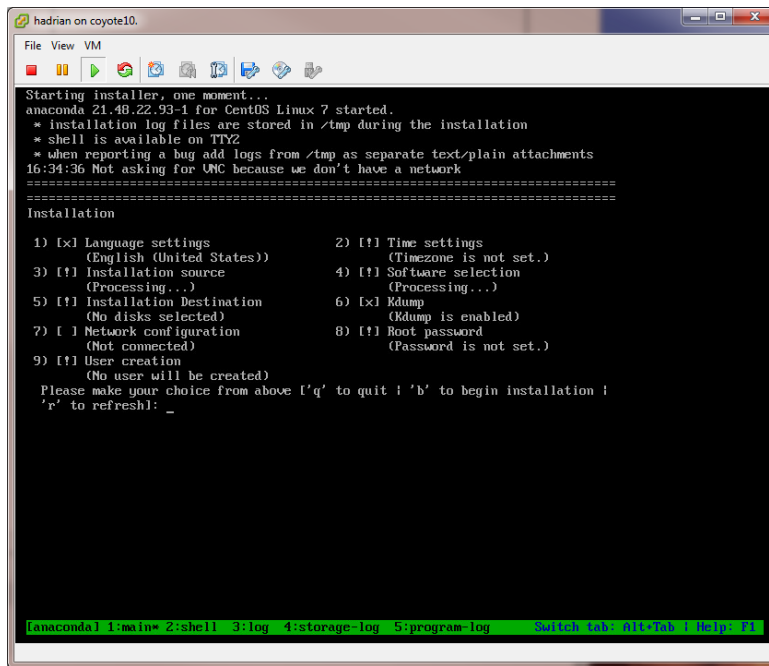
5. **Press Esc key.**
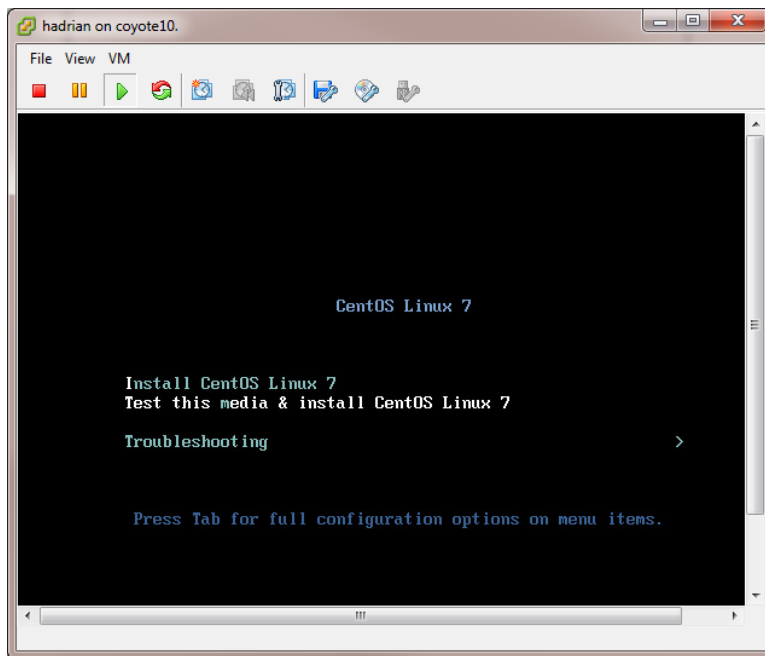
6. Type **"linux text"**

7. Press C for continue.

8. Type **b** for boot

PROCEDURE II

Update CentOS Linux

Updating the system is one of the important roles of systems administrator tasks. It will prevent potential attack or system malfunctioning.
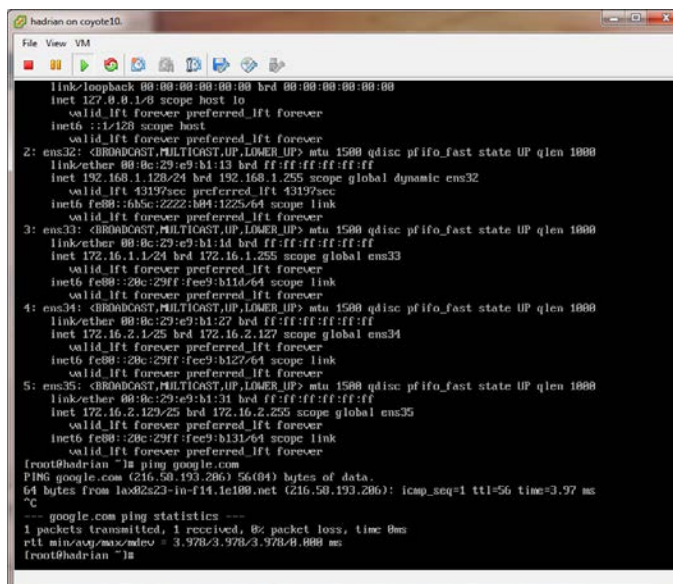
1. Login as **root**.
2. Import RPM GPG KEYS: Type **rpm --import /etc/pki/rpm-gpg/RPM-GPG-KEY-***

3. Check the IP configuration on NIC1 (eth0): Type **ip a**

4. *Disable selinux*
#vi /etc/selinux/config
Type SELINUX=disabled

PROCEDURE IV

[1] Installing X Window System and GNOME Desktop Environment

1. **Login as "root" and check the list: "yum grouplist | less"**
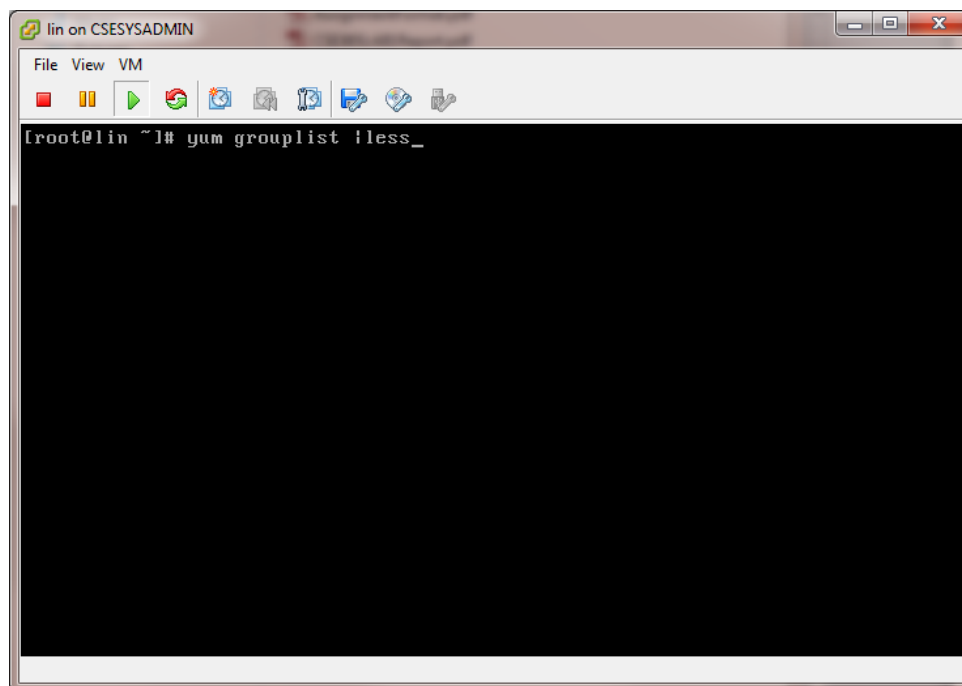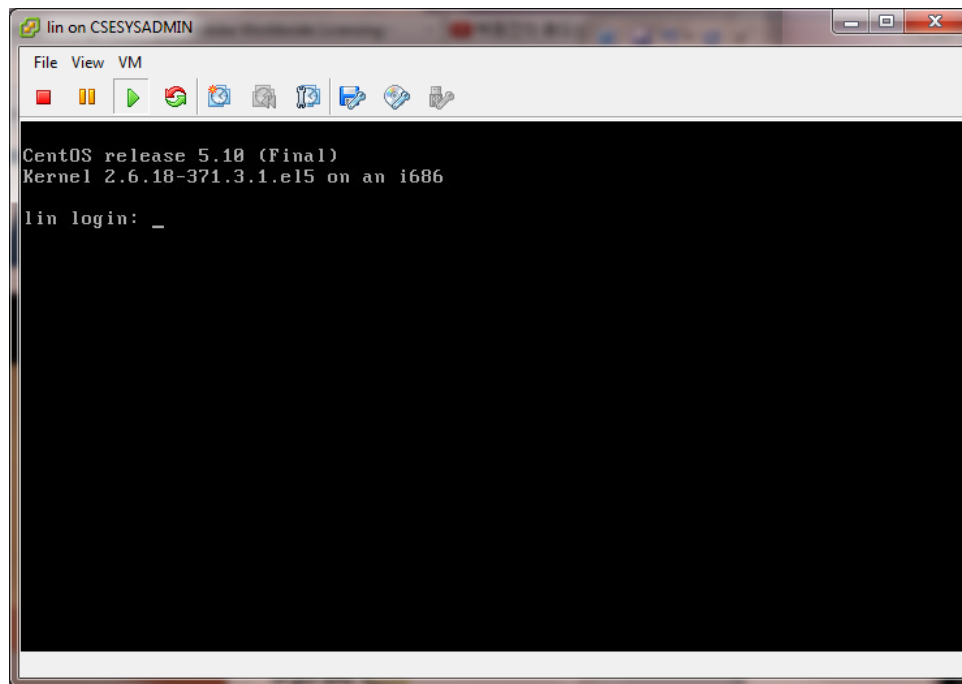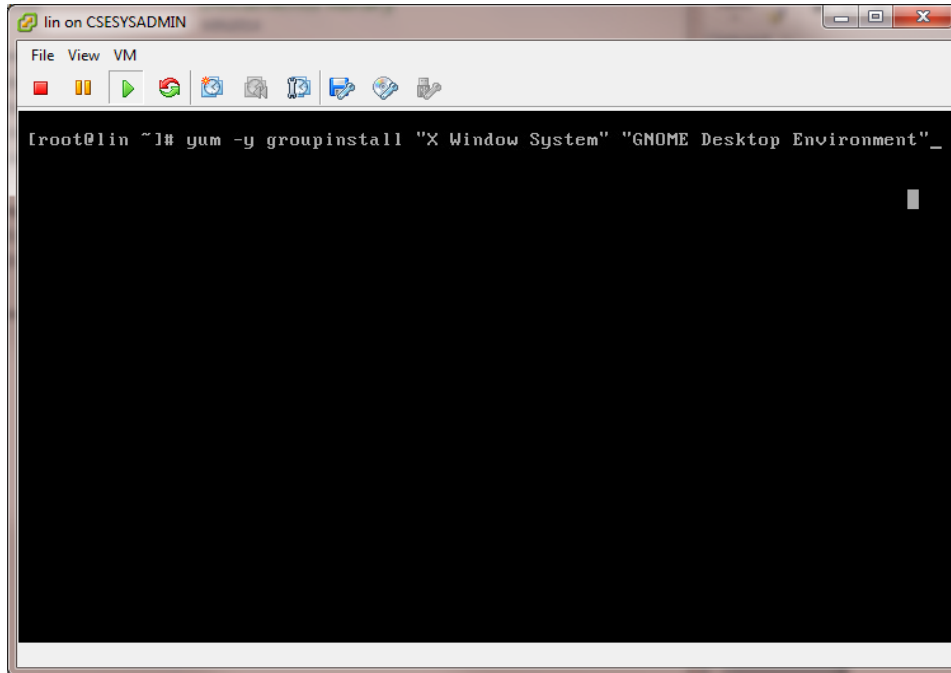
Note: Check the list of Group Packages.

File   View   VM

```
Engineering and Scientific
FTP Server
FreeNX and NX
GNOME Desktop Environment
GNOME Software Development
Games and Entertainment
Graphical Internet
Graphics
Horde
HyperV
Java Development
KDE (K Desktop Environment)
KDE Software Development
Legacy Network Server
Legacy Software Development
Legacy Software Support
Mono
MySQL Database
News Server
Office/Productivity
OpenFabrics Enterprise Distribution
PostgreSQL Database
Printing Support
Server Configuration Tools
:_
```

File   View   VM

```
Java Development
KDE (K Desktop Environment)
KDE Software Development
Legacy Network Server
Legacy Software Development
Legacy Software Support
Mono
MySQL Database
News Server
Office/Productivity
OpenFabrics Enterprise Distribution
PostgreSQL Database
Printing Support
Server Configuration Tools
Sound and Video
Text-based Internet
Tomboy
Web Server
Windows File Server
X Software Development
X Window System
XFCE-4.4
Xen
Done
(END)
```

2. **Install group packages using yum groupinstall option.**
   Note: Do not make any typos here.
   yum -y groupinstall "X Window System" "GNOME Desktop Environment"
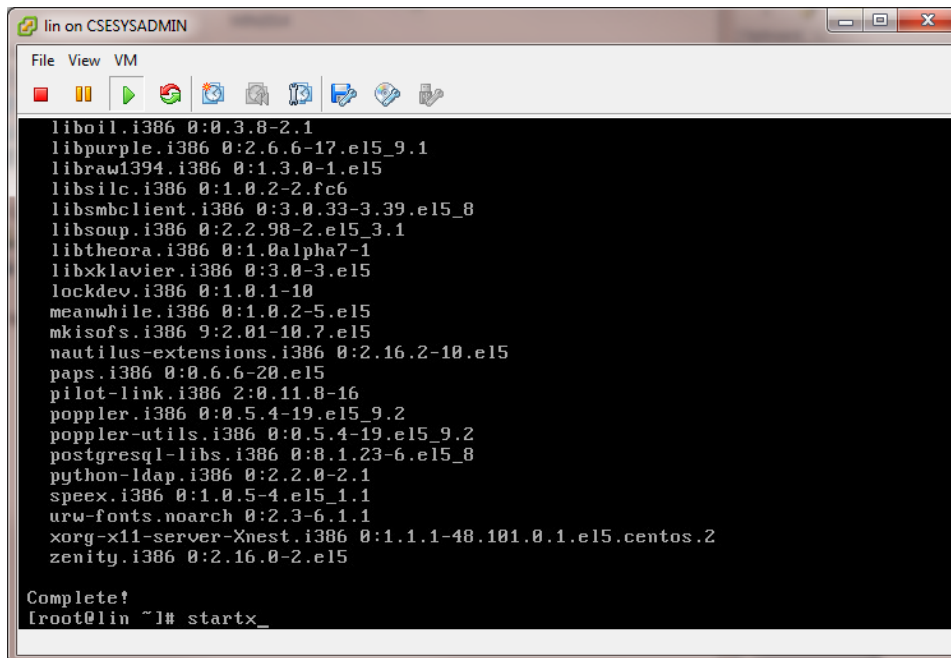
3. **Type "startx" to start X Window**

4. Type **startx**

5. Click on "Applications" and Click on "Add/Remove Software"
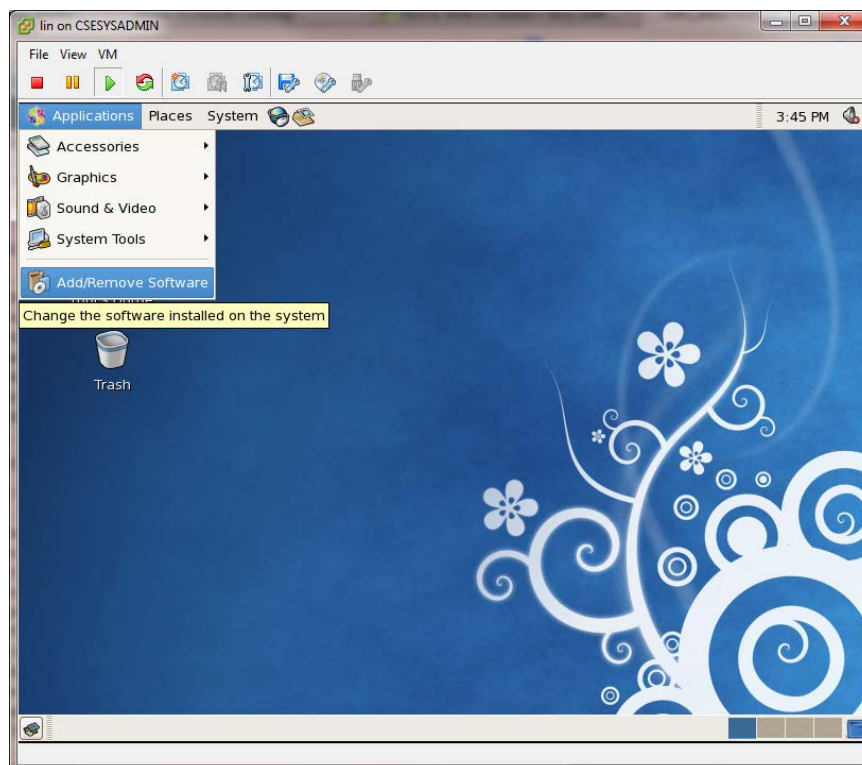
6. Click on "Search" tab and type "Firefox" and press "Search" button and check latest Firefox from the list and click on "Apply" button.
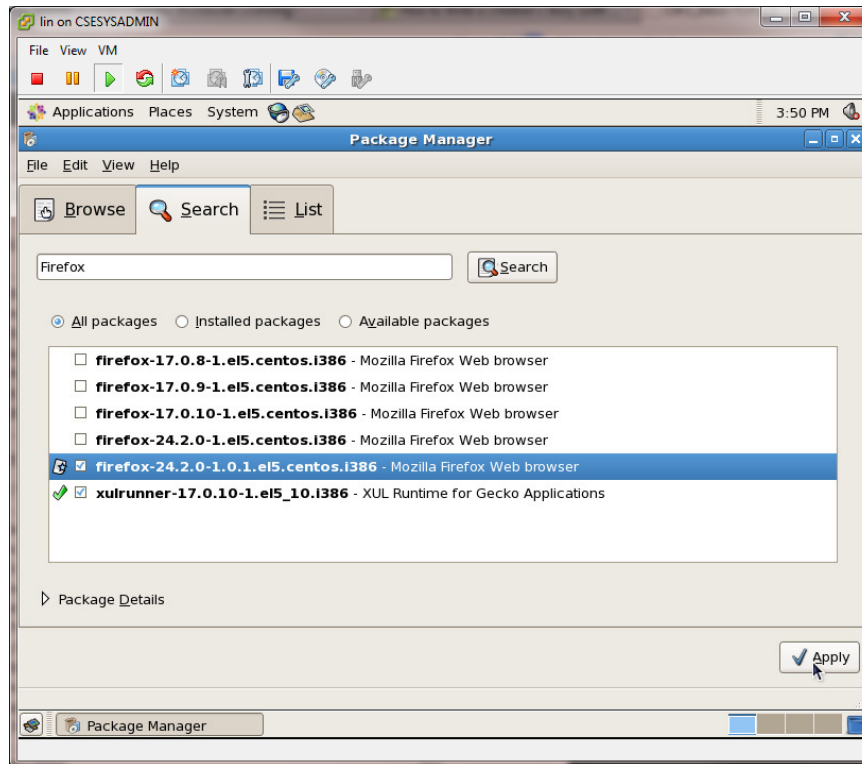
7. Click on "Continue"
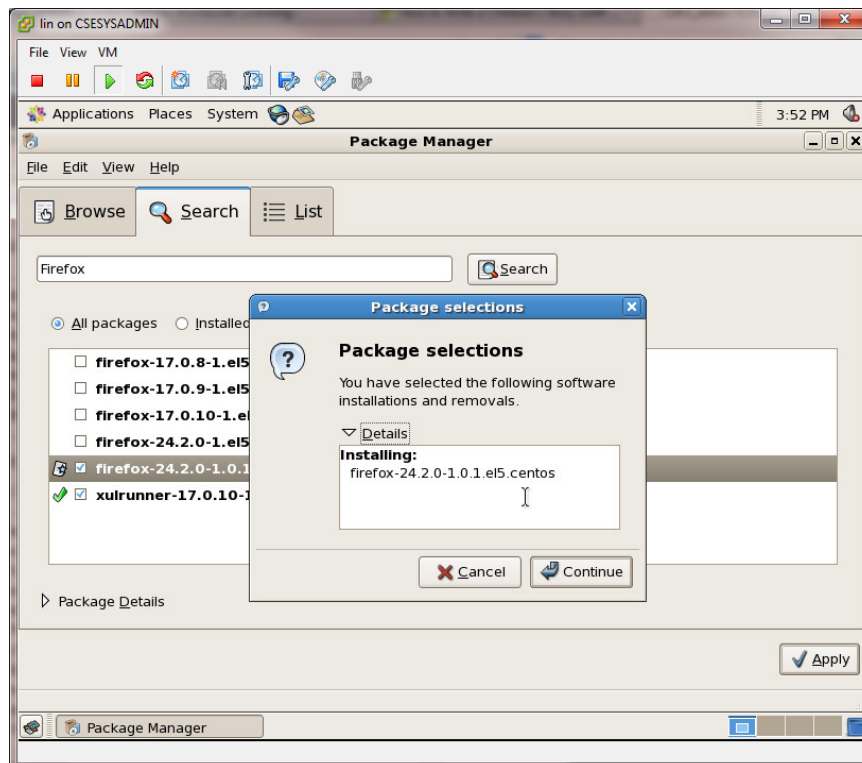
8. Click "OK"
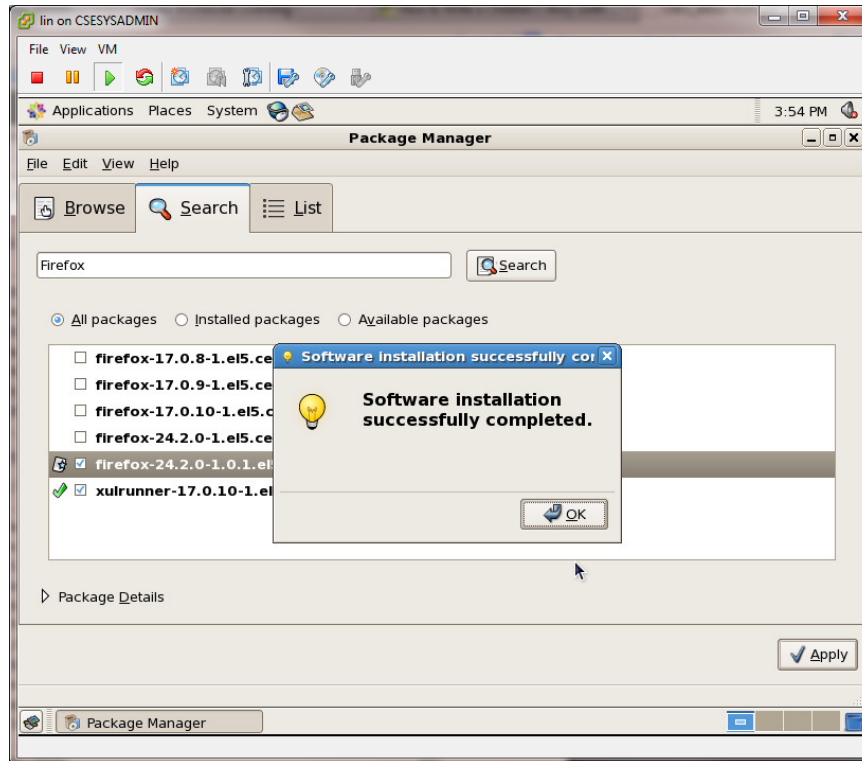
9. Close the "Package Manager" and click on "Application" > "Internet" > "Firefox"
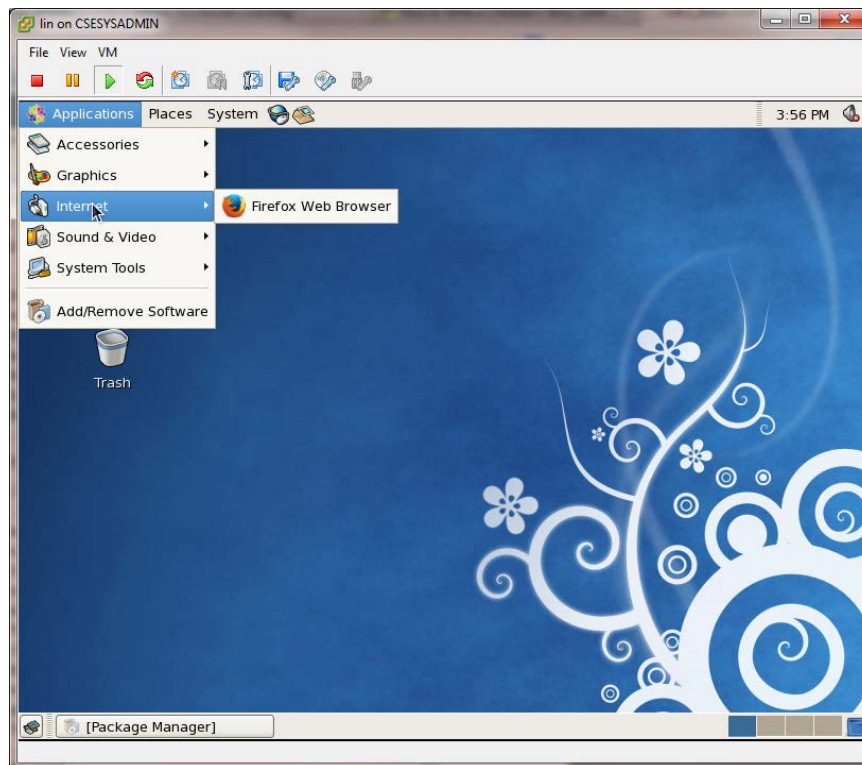
10. Please browse to "http://cse.csusb.edu/ken/"
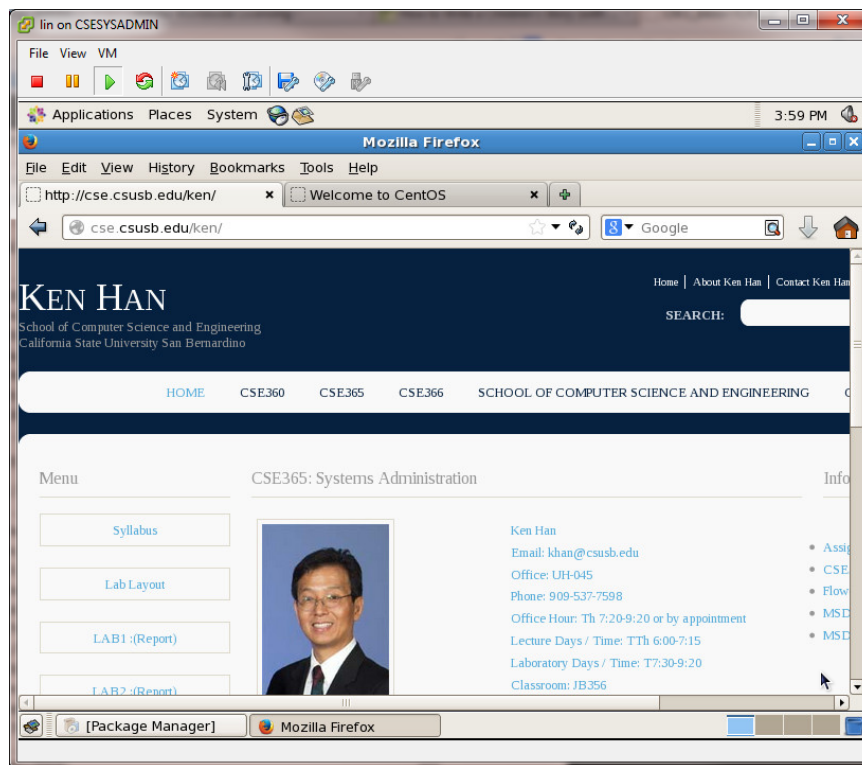
11. Please install "Authoring and Publishing" packages and "Editors" packages.
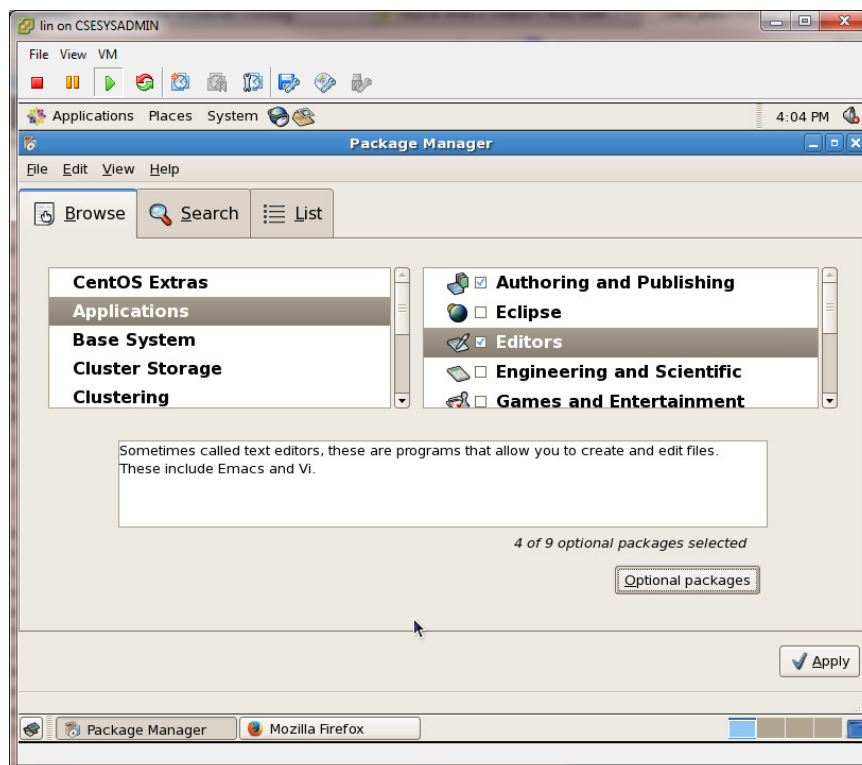
12. Applications > Add/Remove Software

From the Package Manager, Applications > Office/Productivity

Install "openoffice impress" and "openoffice writer"
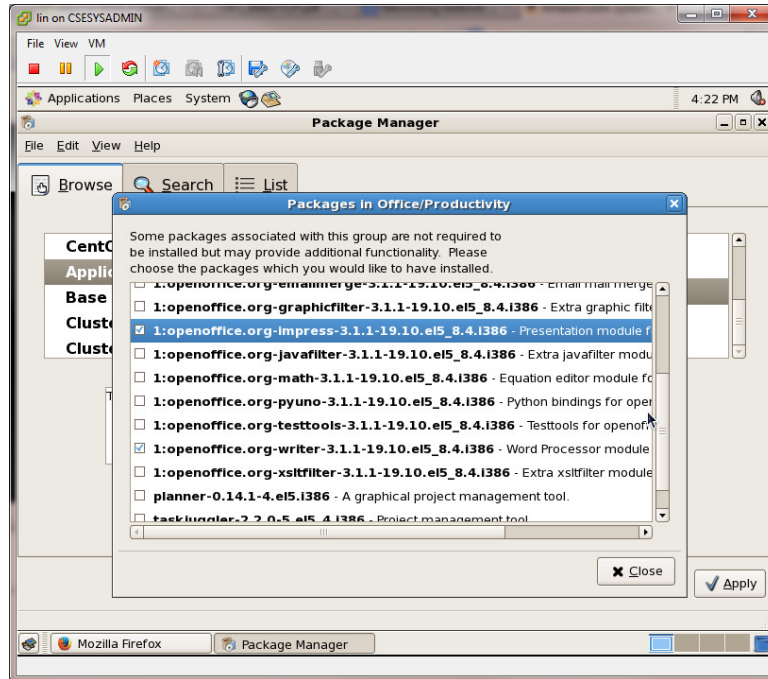
13. Complete the installation.
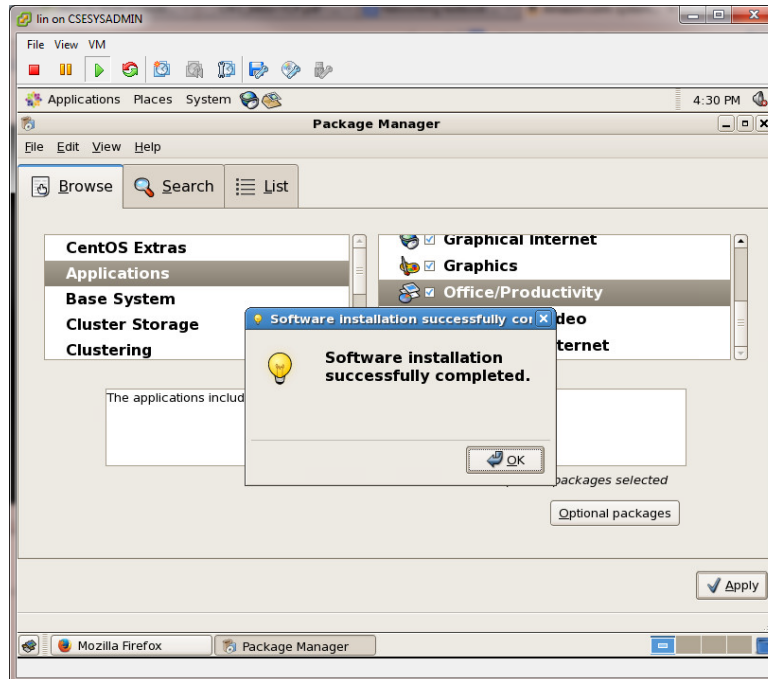
14. Use *ifconfig* command on *lin* to test whether your DHCP server (*hadrian*) is giving out IP to *lin* and find out your network settings on *lin*.

EXERCISE I

Write and bash script that create and DHCP Server configuration file (dhcpd.conf)

OUTPUT:

```
#
# DHCP Server Configuration file.
#
ddns-update-style interim;
ignore client-updates;

subnet 172.16.1.0 netmask 255.255.255.0 {
        option routers 172.16.1.1;
        option subnet-mask 255.255.255.0;
        option domain-name "csusbcoyote.net";
        option domain-name-servers 139.182.2.1, 139.182.2.6;
        option time-offset -28800; # Pacific Standard Time

        range dynamic-bootp       172.16.1.101       172.16.1.254;
        default-lease-time 21600;
        max-lease-time 43200;
}
```

LAB REPORT

NAME: _____

QUESTIONS (40%)

Answer all the questions above lab manual.

Explain following lines line by line?

```
ddns-update-style interim;
ignore client-updates;

subnet 172.16.1.0 netmask 255.255.255.0 {
option routers 172.16.1.1;
option subnet-mask 255.255.255.0;
option domain-name "csusbcoyote.net";
option domain-name-servers 139.182.2.1, 139.182.2.6;          option
time-offset -28800; # Pacific Standard Time

range dynamic-bootp     172.16.1.101      172.16.1.254;
default-lease-time 21600;
max-lease-time 43200;
}
```

TROUBLESHOOTING (50%)

From this lab what troubles did you have?
(Describe all the troubleshooting skills you have learn from this lab.)

Identify the problem:
Problem 1:
Problem 2:

How did you solve the problem?
Solution 1:
Solution 2:

LINUX COMMANDS (10%)

1. List all the UNIX Commands that you used in this lab:

2. Explain systemctl command:
    1. How to enabling service?
    2. How to disabling service?
    3. How to check the status of the service?
    4. How to list all services?
    5. How to display dependencies?
    6. How to check the properties of service?