



IT3010
Network Design & Management
3rd Year, 2nd Semester

Lab 1

Practical 1

Y3.S2.WE.IT.02.02

Submitted to

Sri Lanka Institute of Information Technology

In partial fulfillment of the requirements for the
Bachelor of Science Special Honors Degree in Information Technology

Declaration

I certify that this report does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any university, and to the best of my knowledge and belief it does not contain any material previously published or written by another person, except where due reference is made in text.

Registration Number: IT21271700

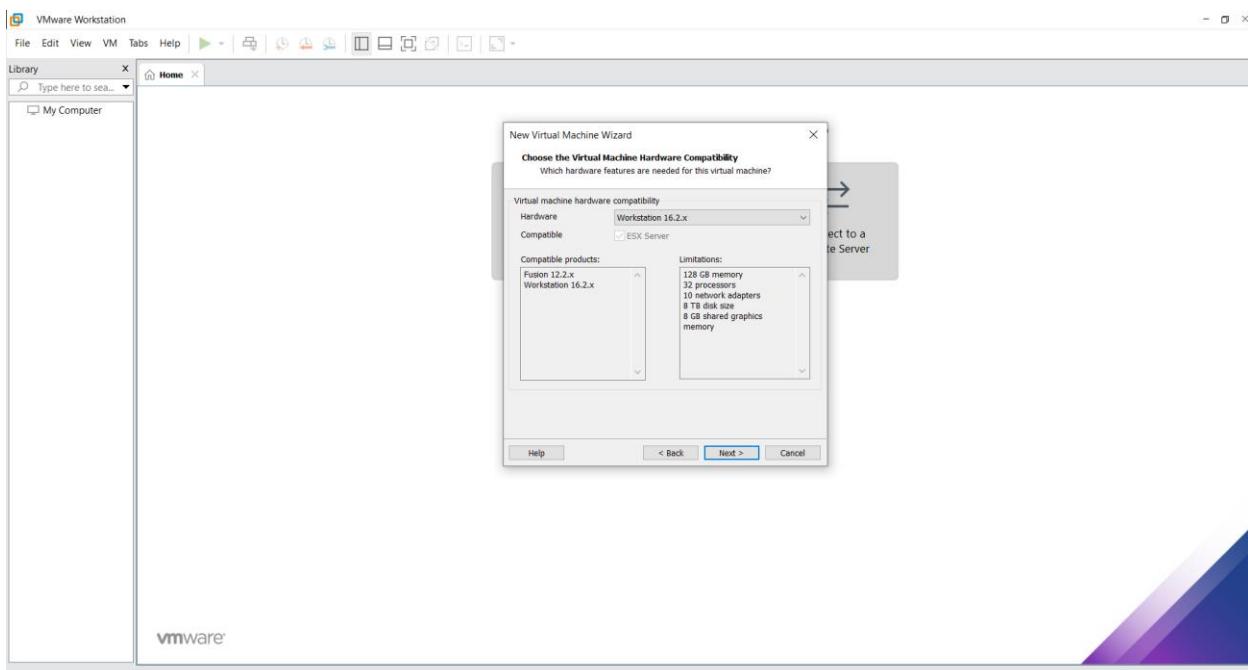
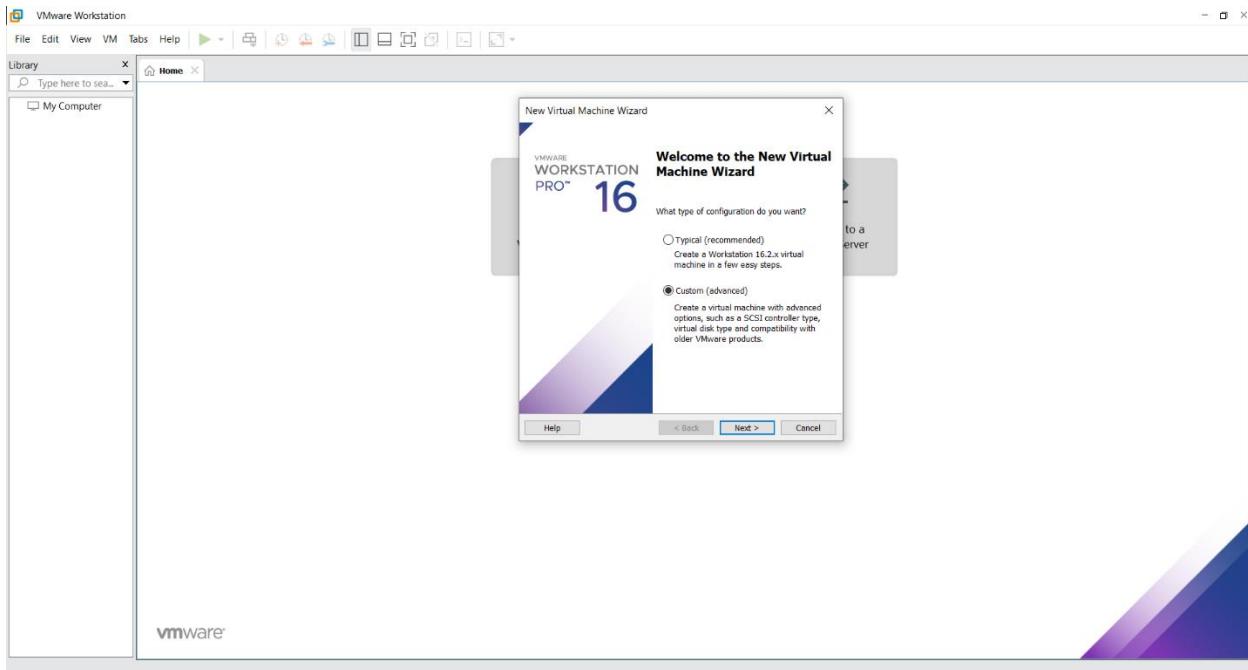
Name: Gunawardane K.C.

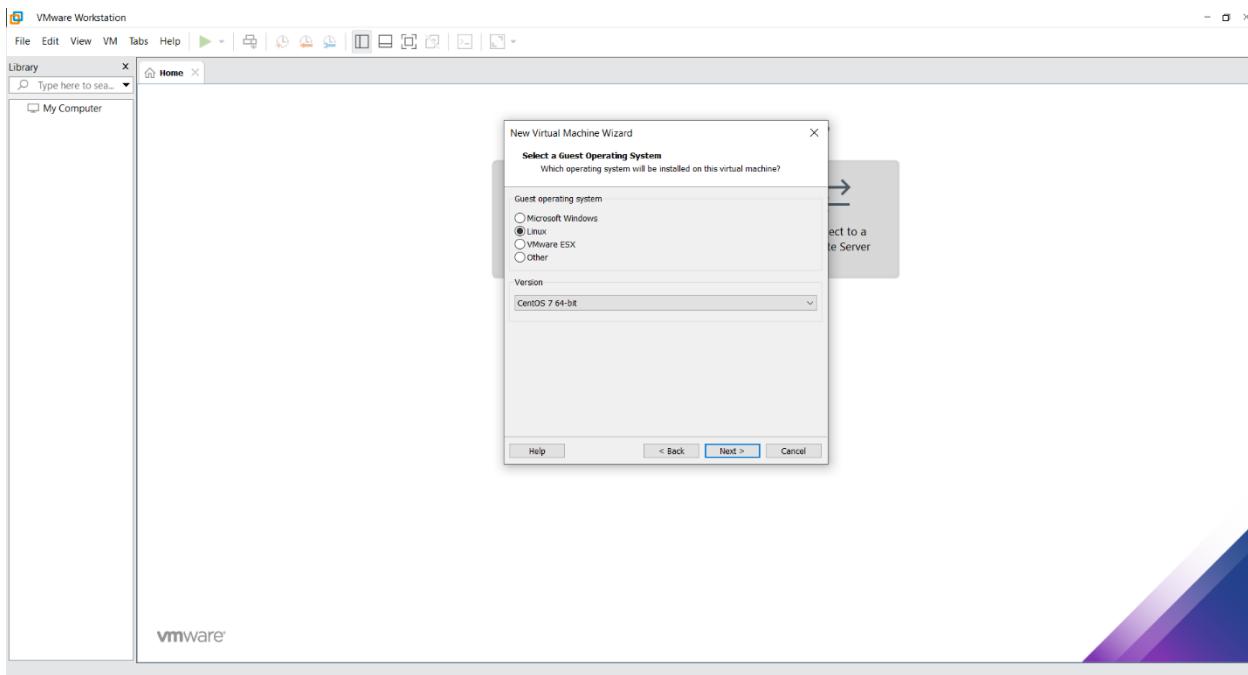
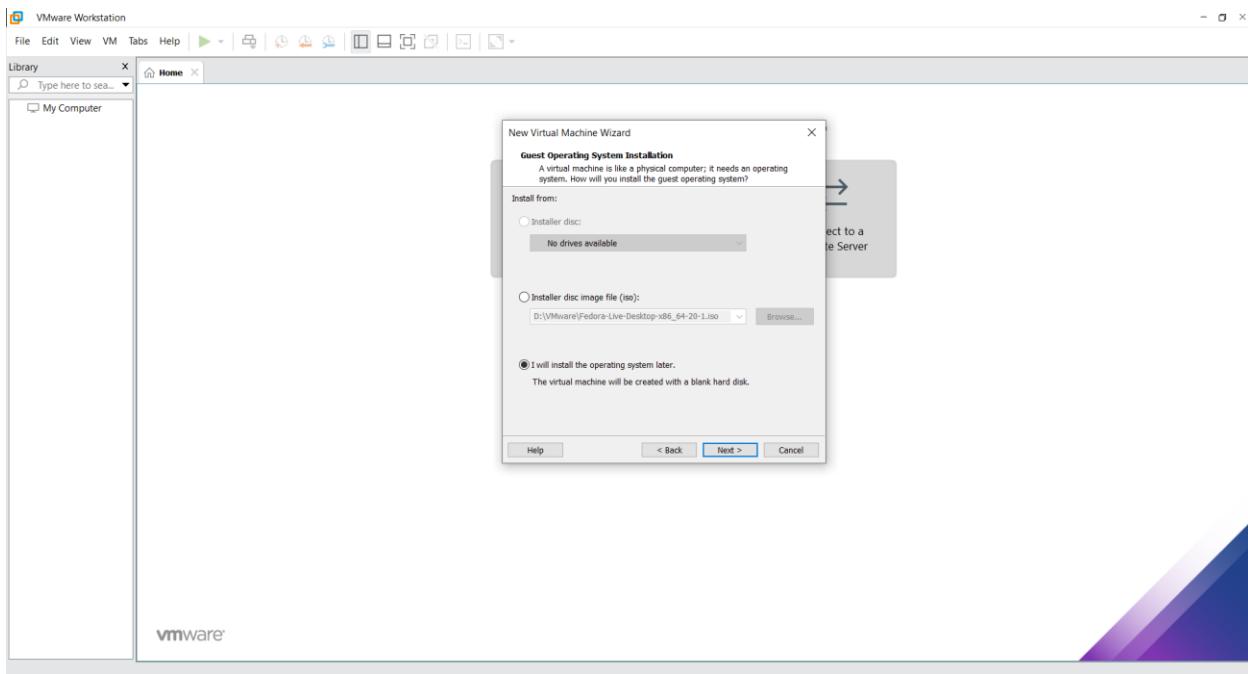
01. Creating virtual machines using VMware workstation.

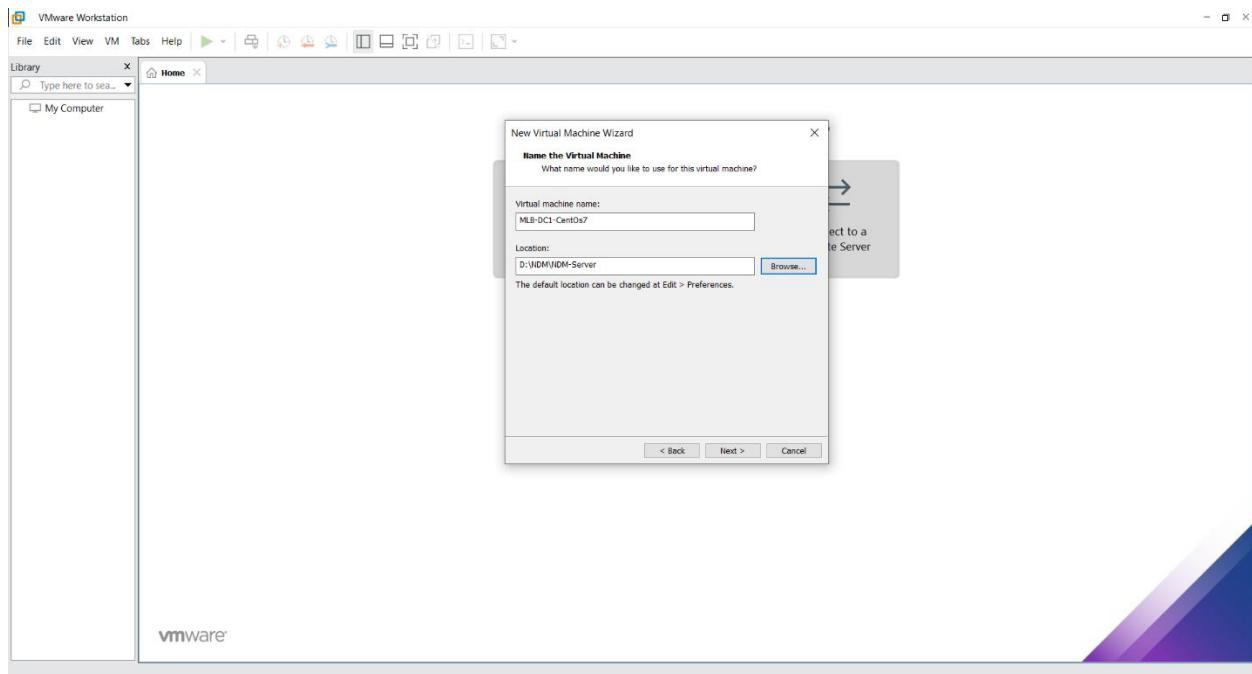
01.01. creating virtual machine for the server (CentOS)

Step-by-step screenshots are mentioned below for the entire process of creating virtual machine for the server.

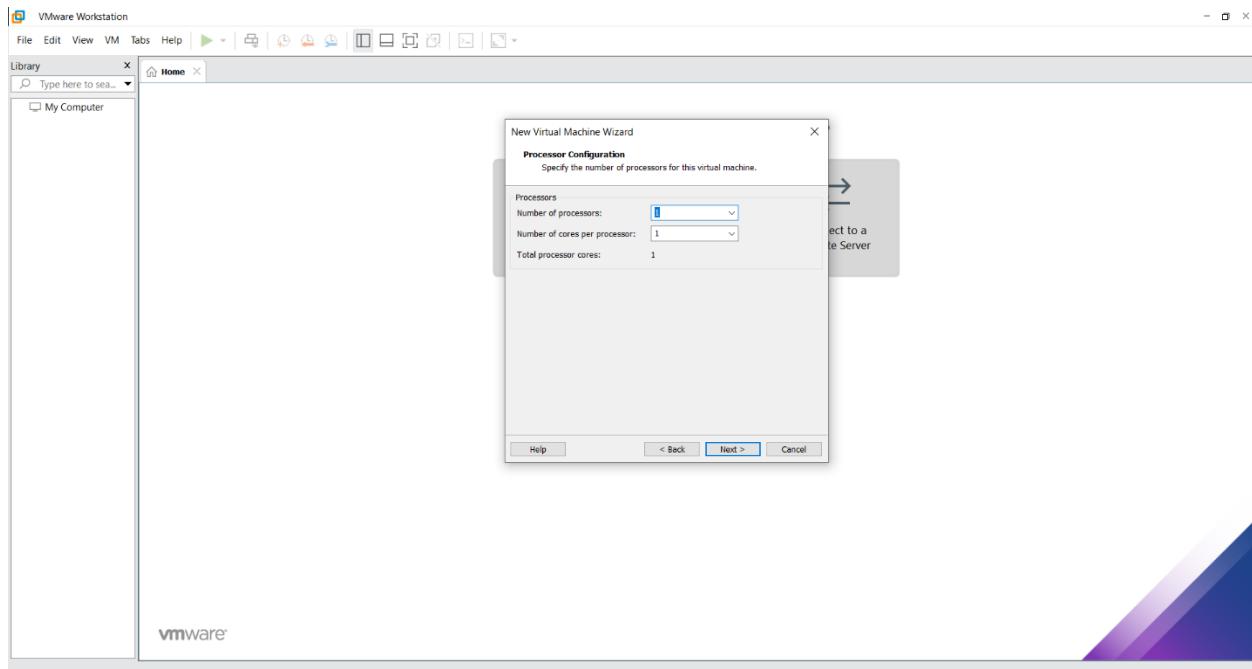
Select create new virtual machine from the home tab.

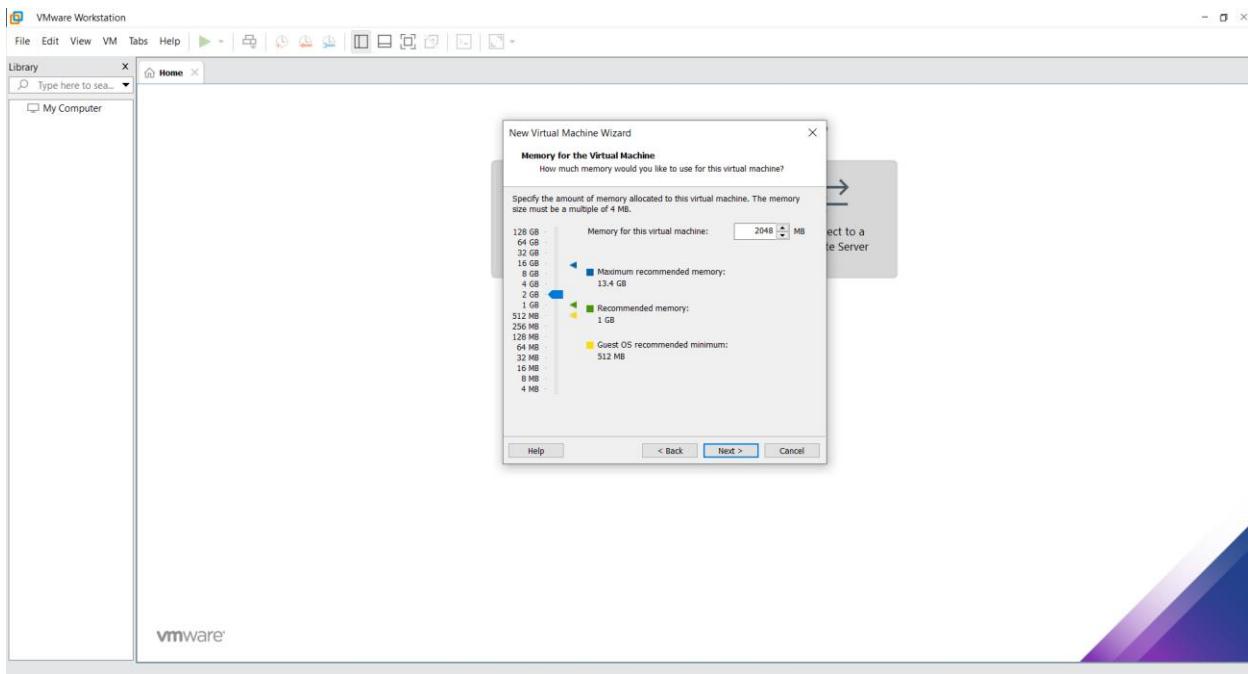




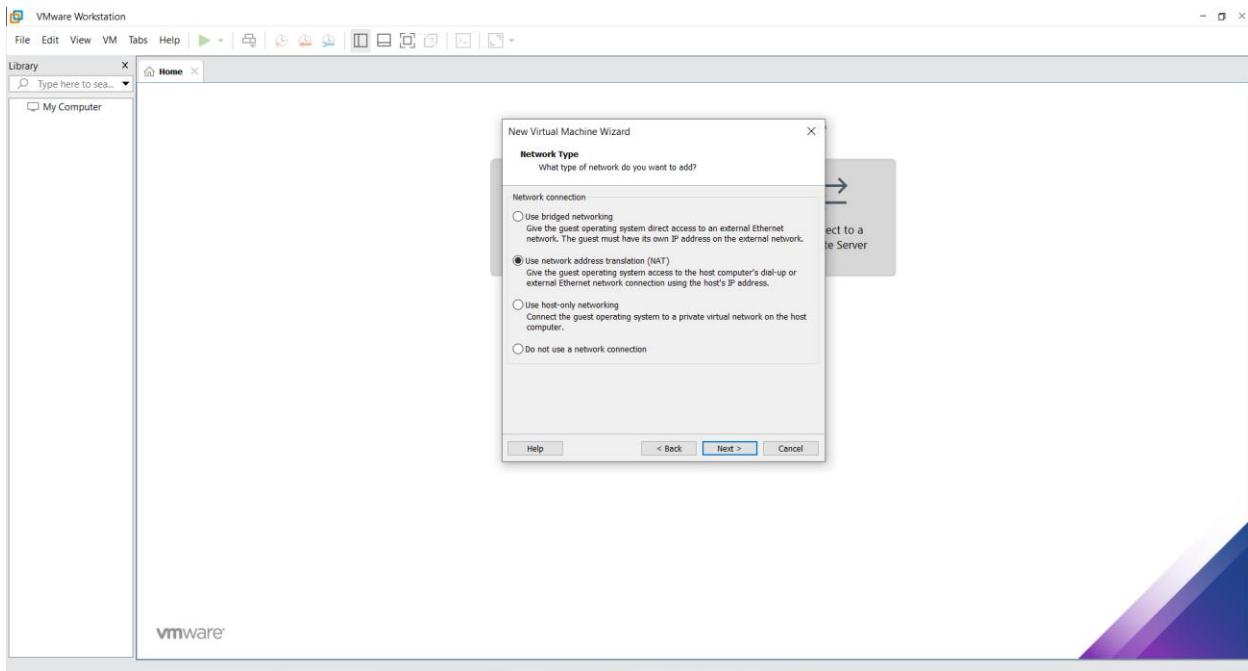


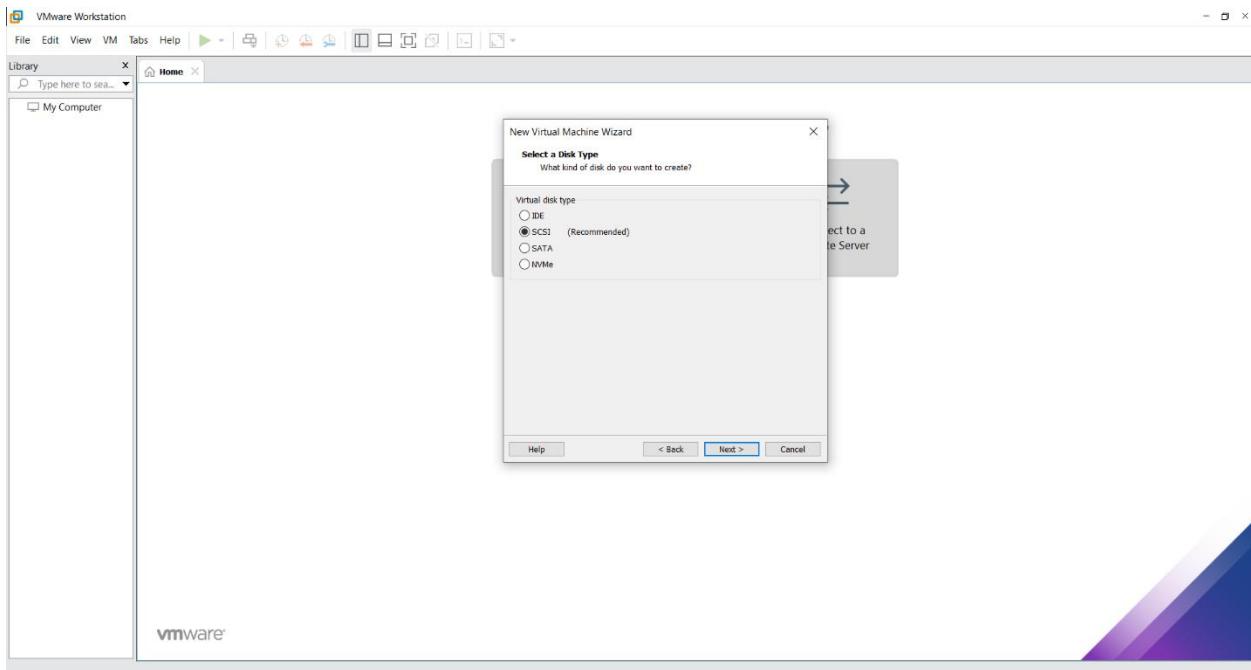
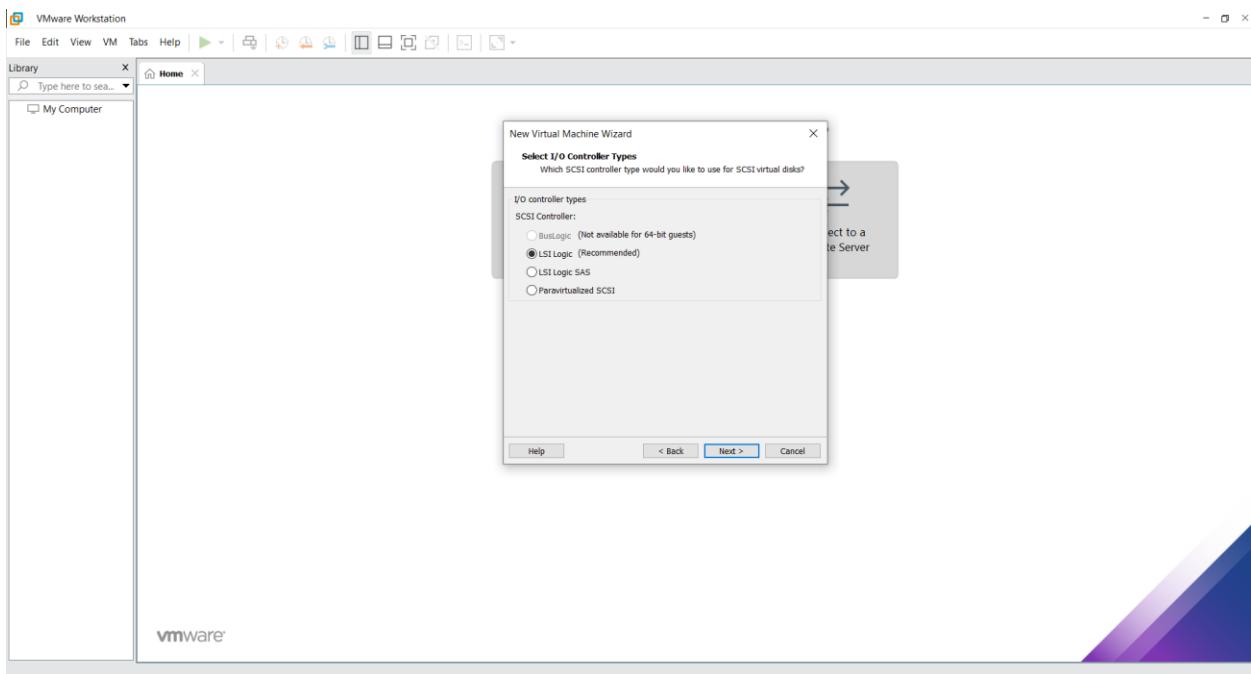
Change the VM name as MLB-DC1-CentOs7 and select the location as the subfolder named NDM-Server which has created.

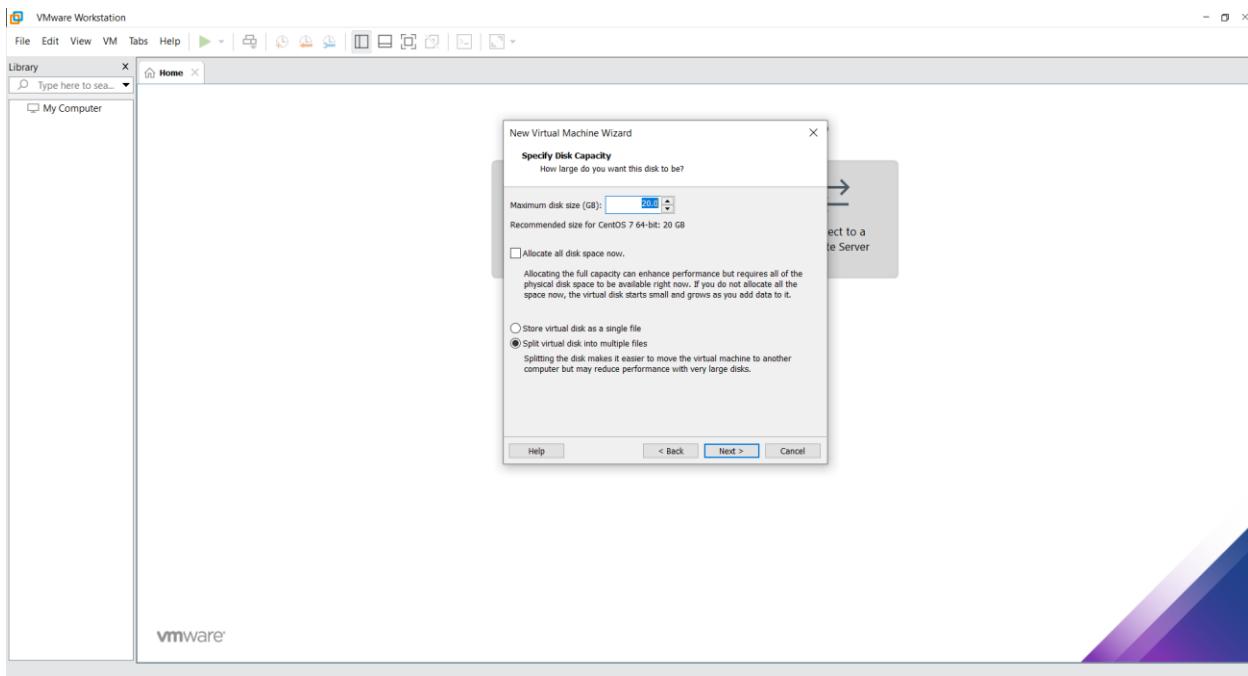
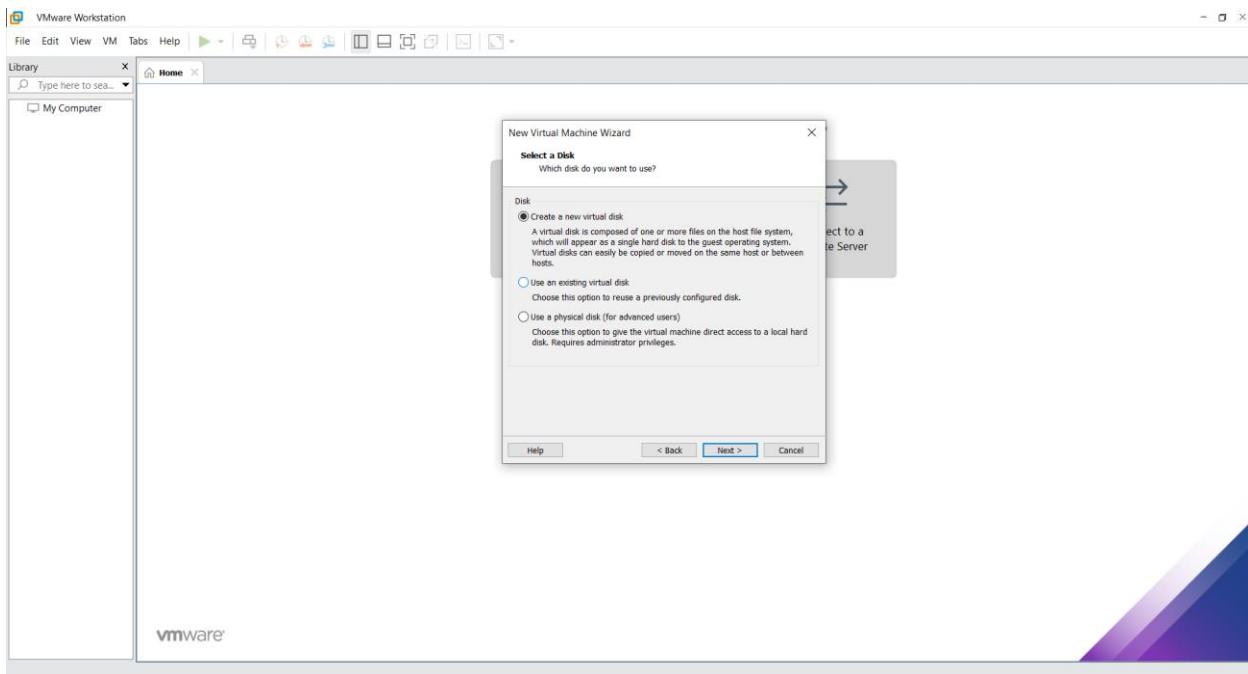




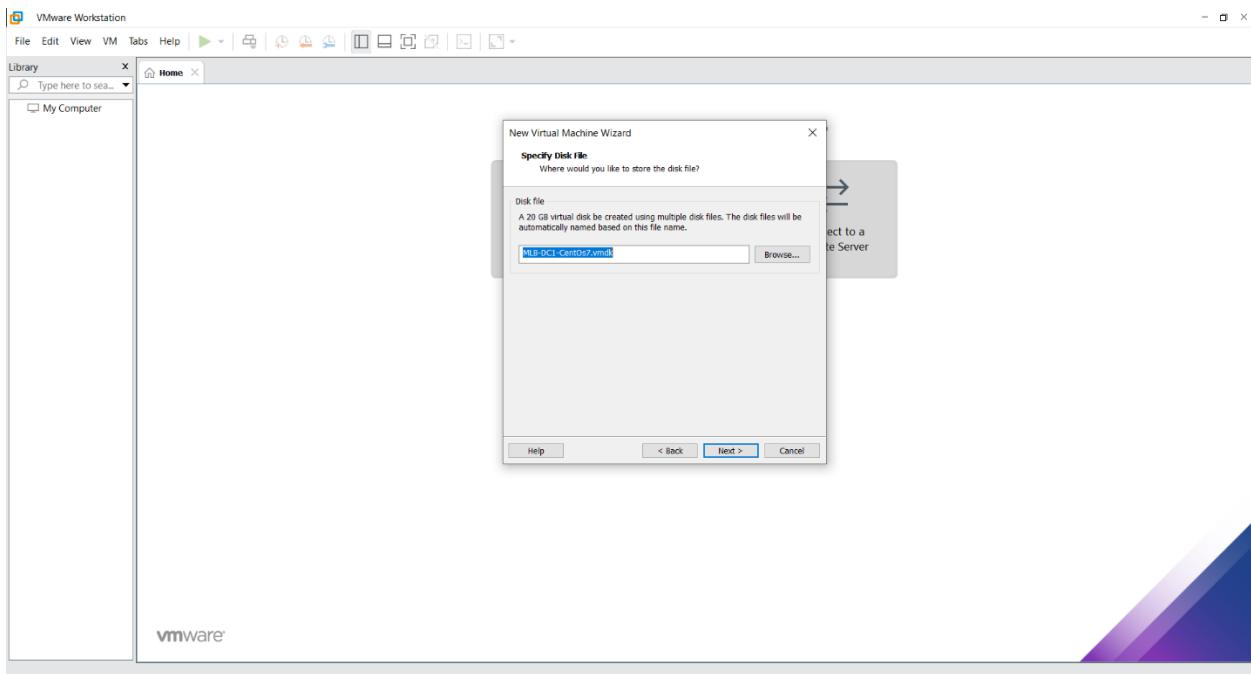
Select 2GB for the usable Ram of the VM



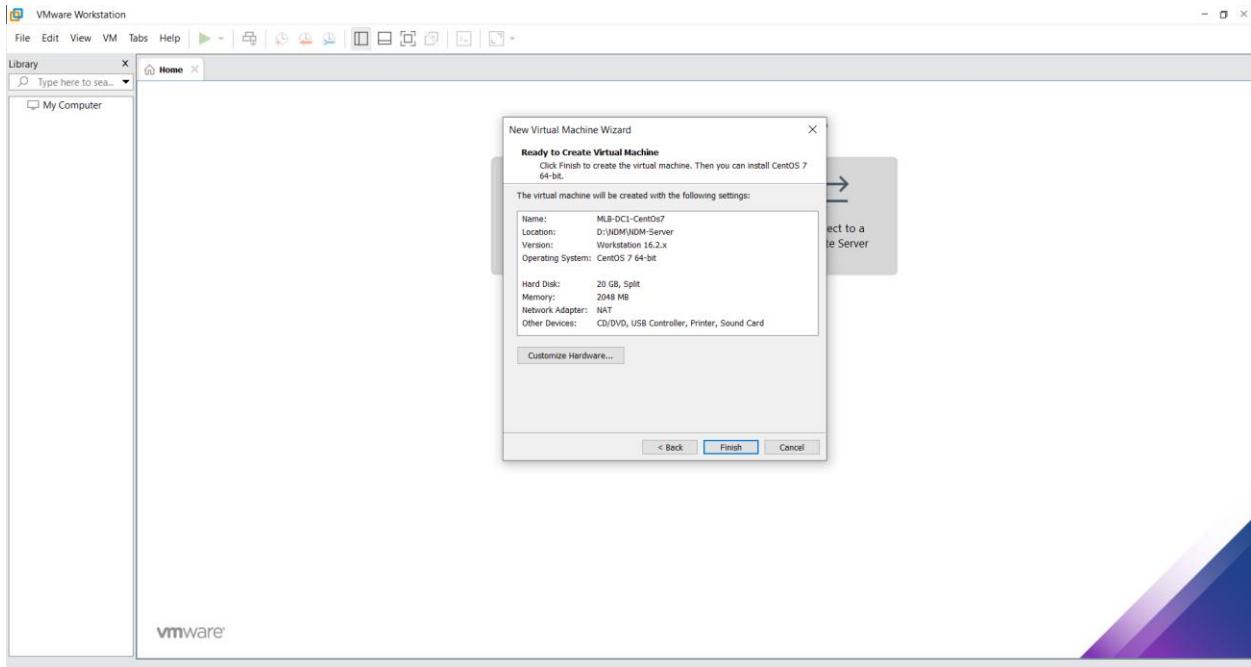


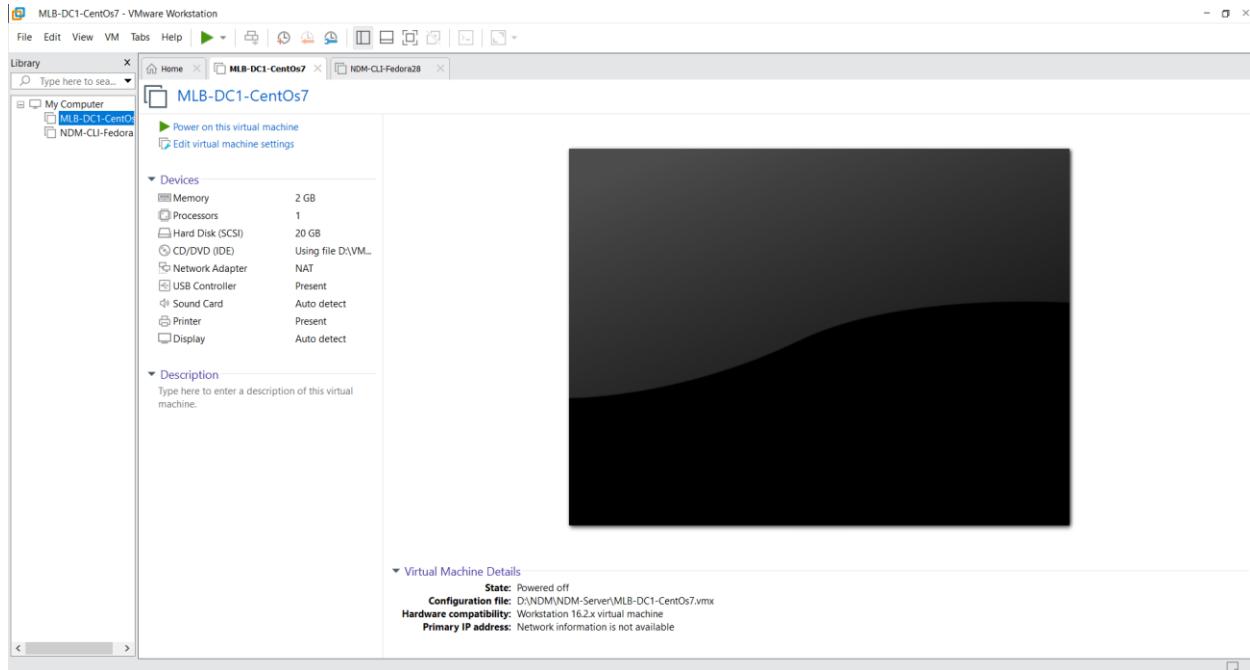


Select 20GB for the hard disk size for the VM as recommended.

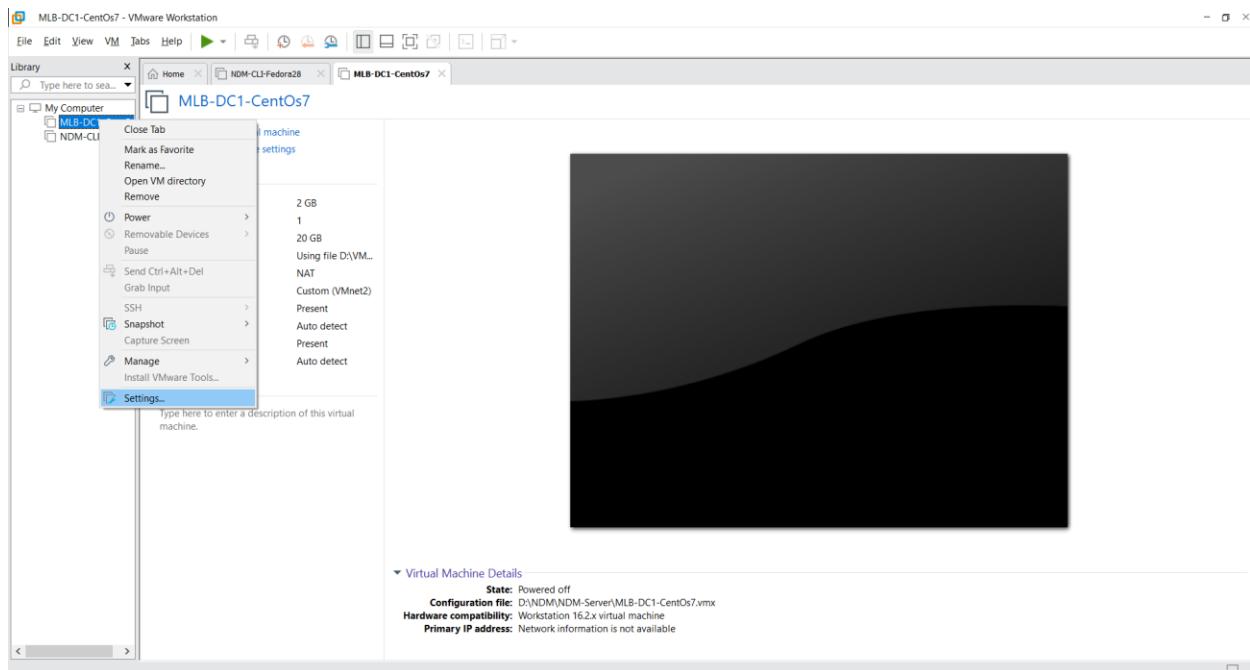


Keep the disk file name as default.

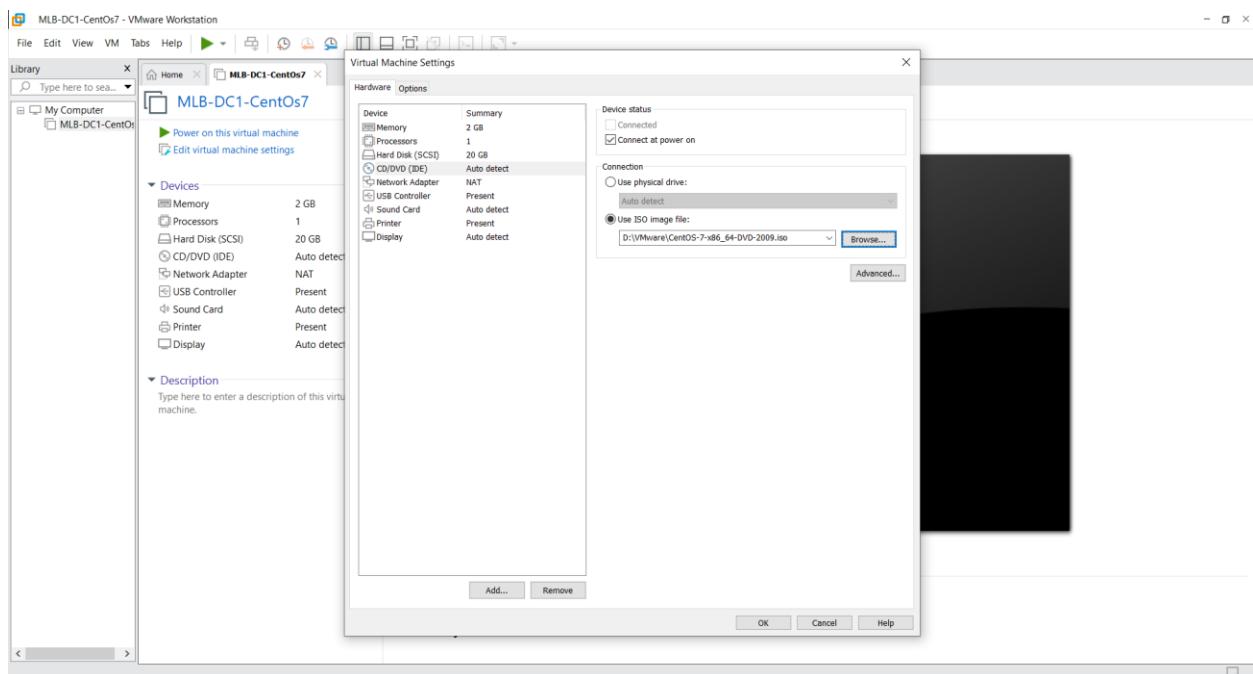
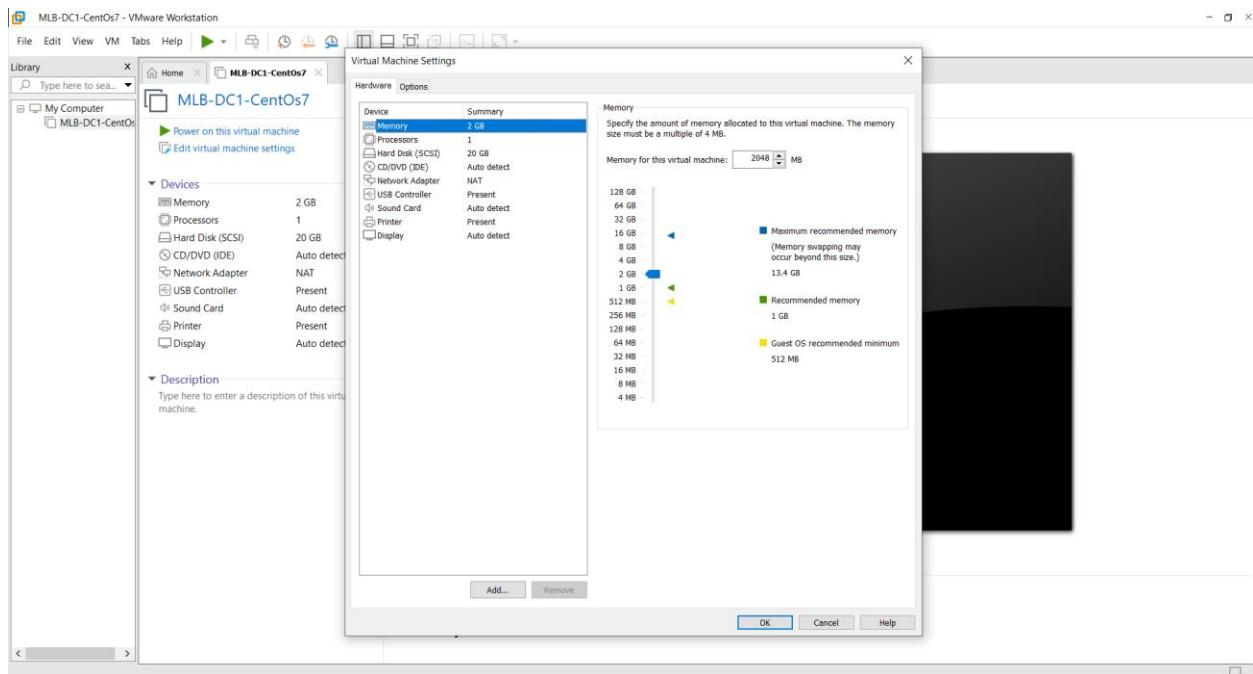




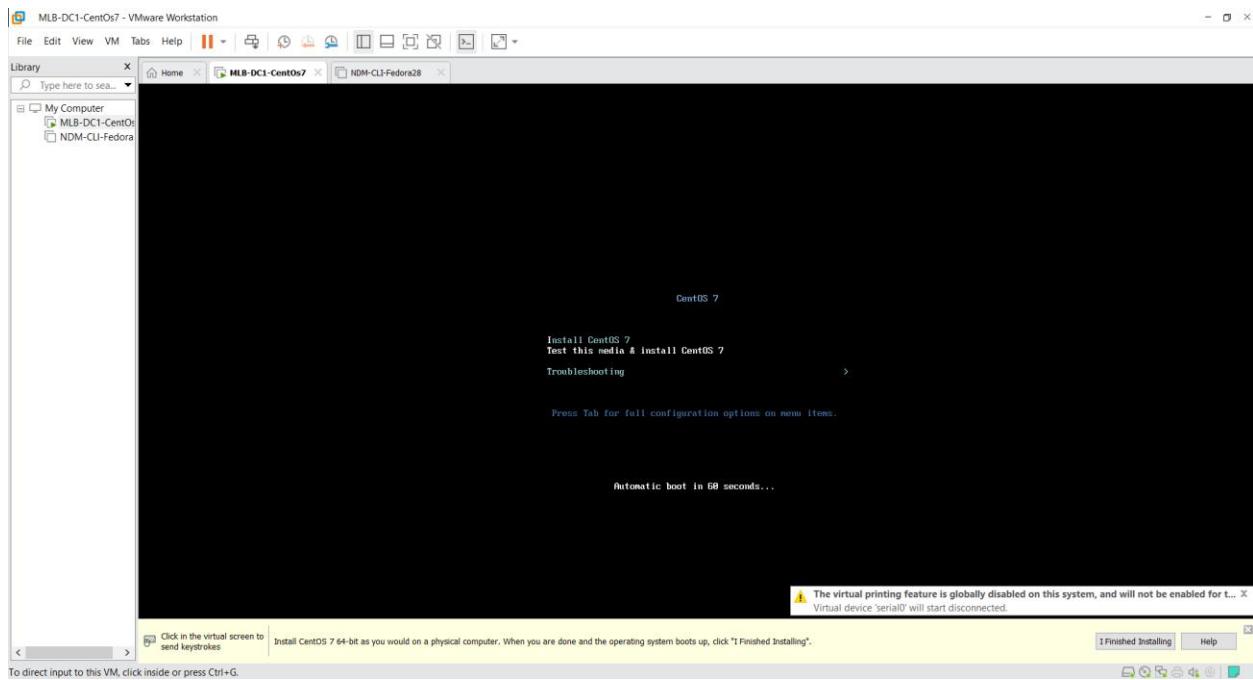
After finish the process virtual machine displays like this.



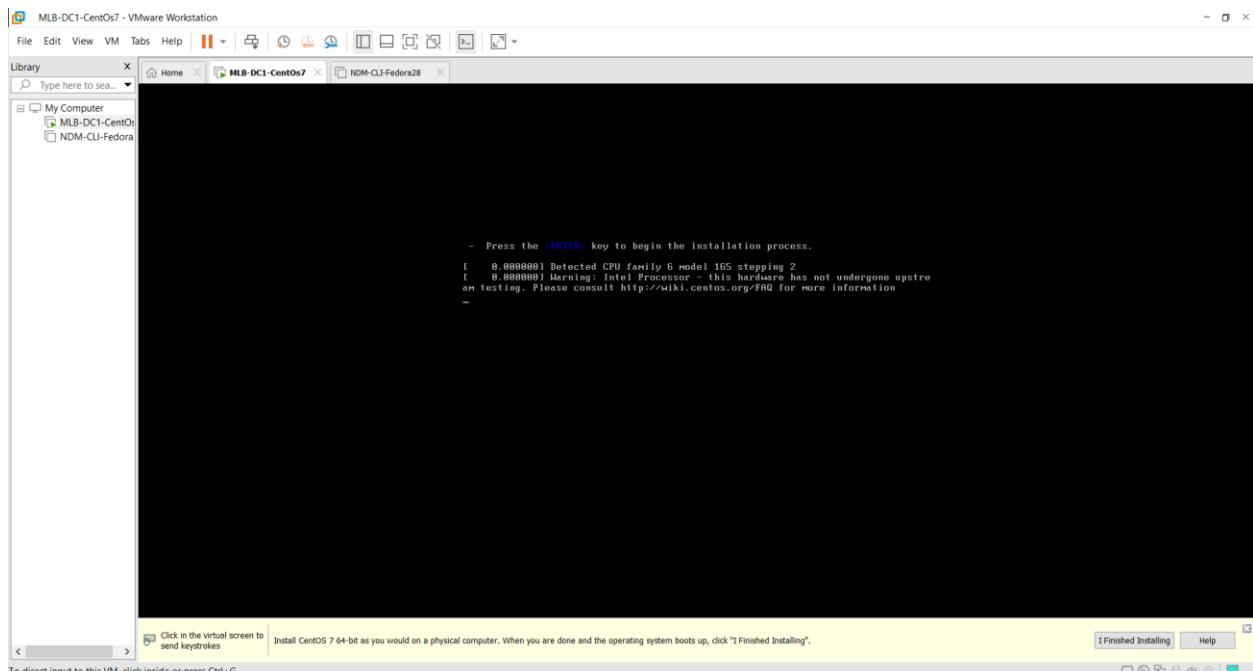
Right click on VM and go to settings to select the iso file to run the VM.



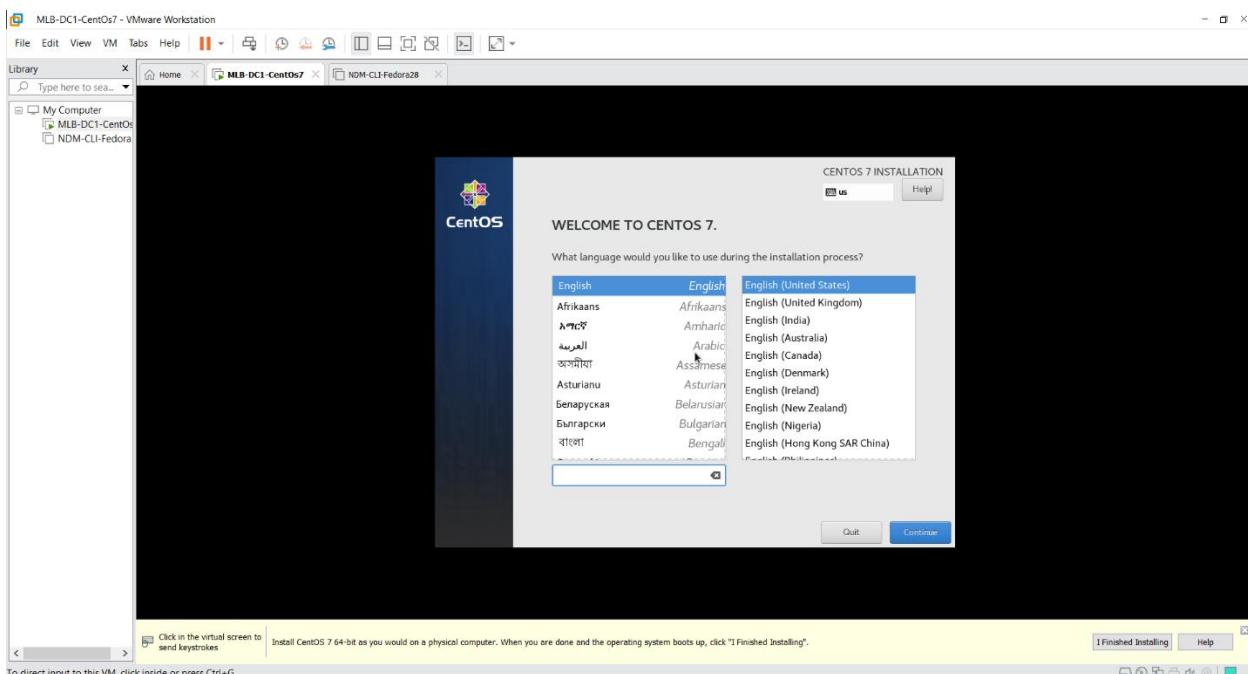
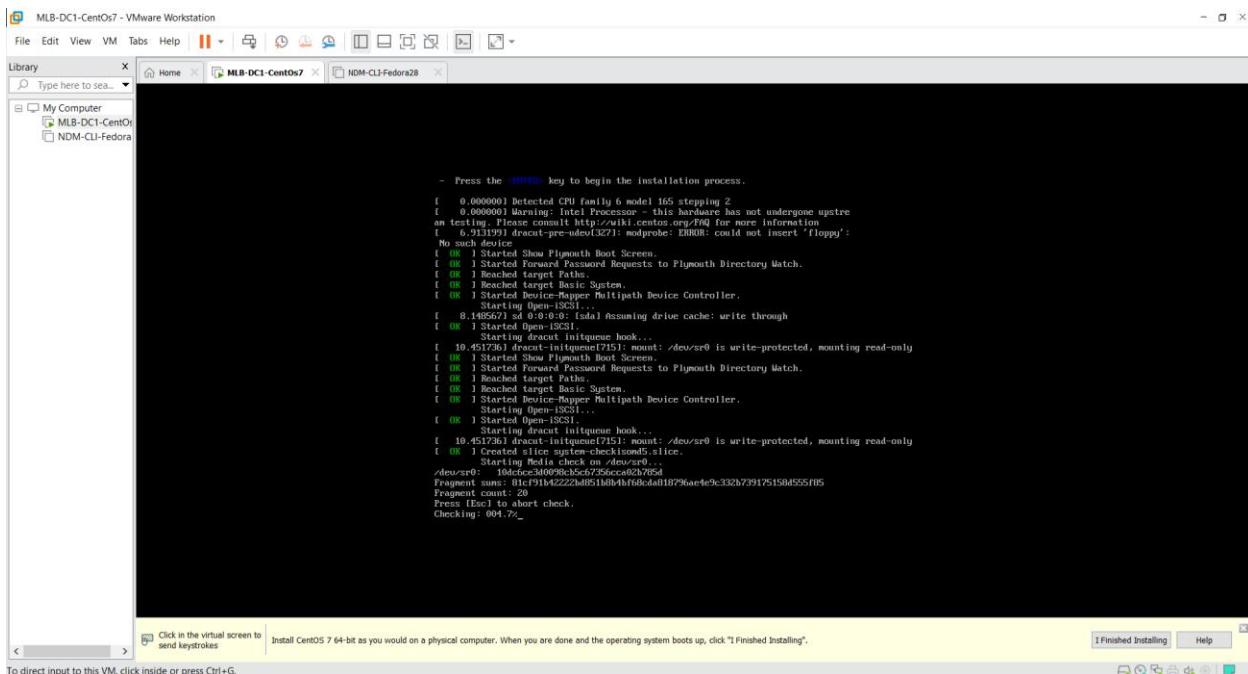
Go to CD/DVD (IDE) and choose the connection option as Use ISO image file. Then brows and select the downloaded iso file of the CentOS.



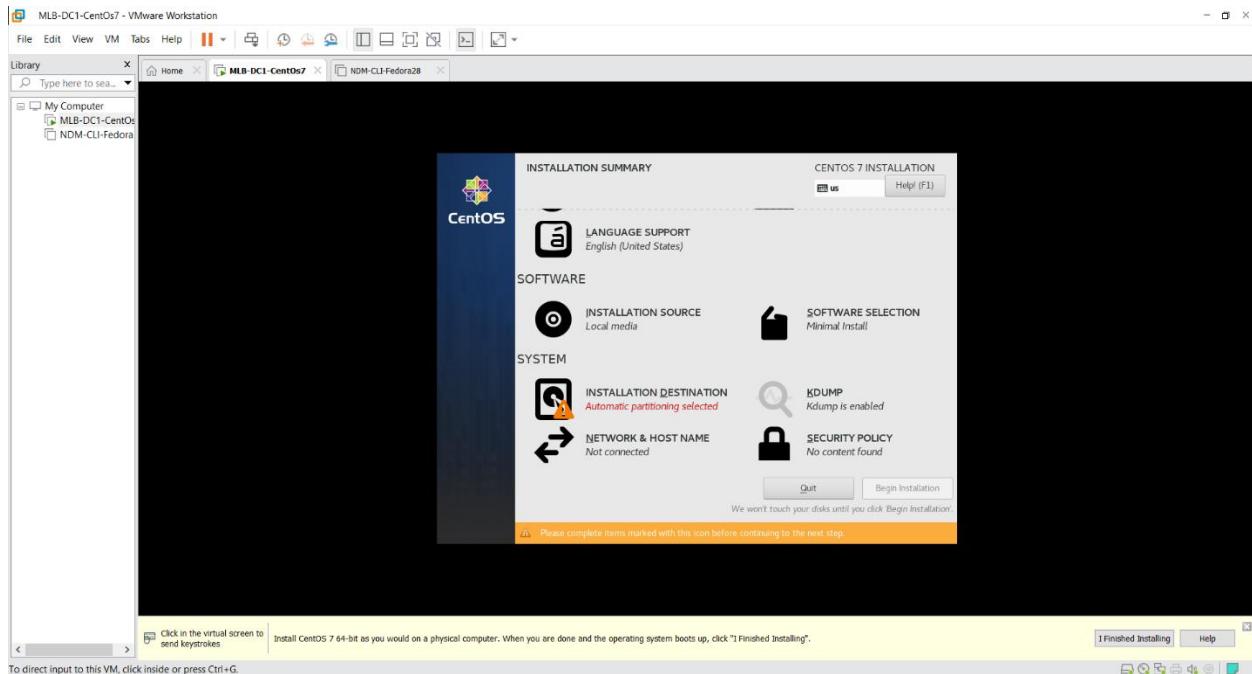
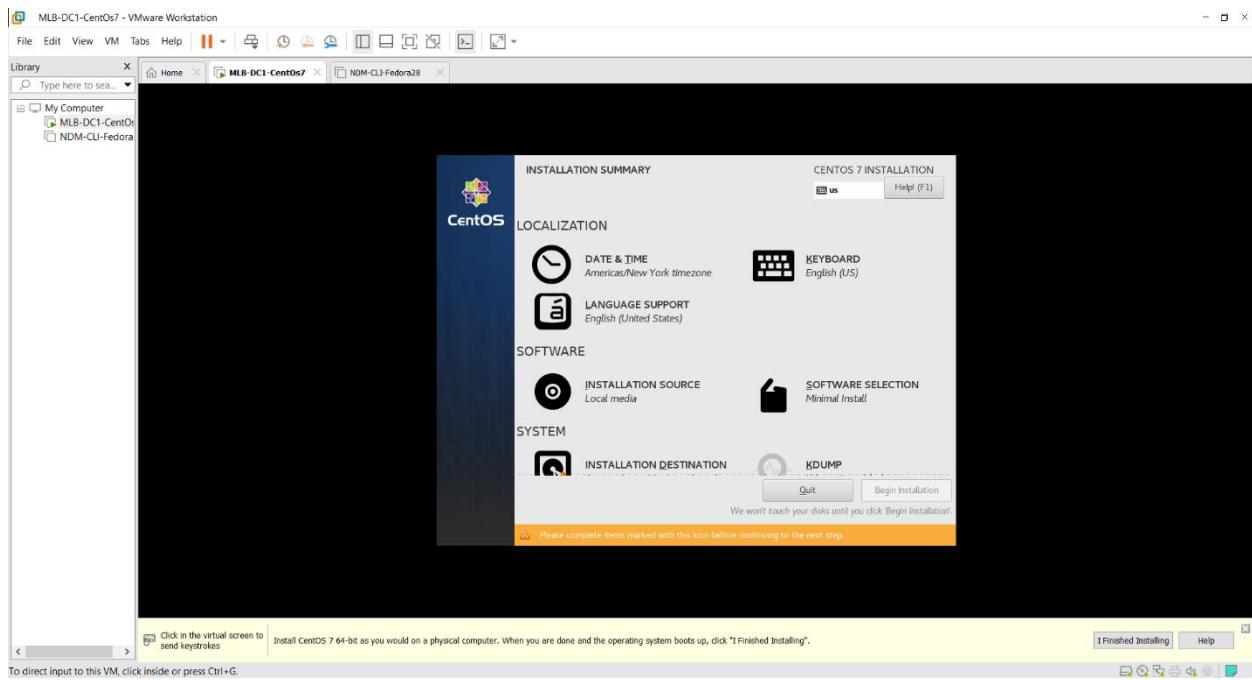
After power on the virtual machine CentOS will load and choose the first option (install CentOS 7) to install the OS.



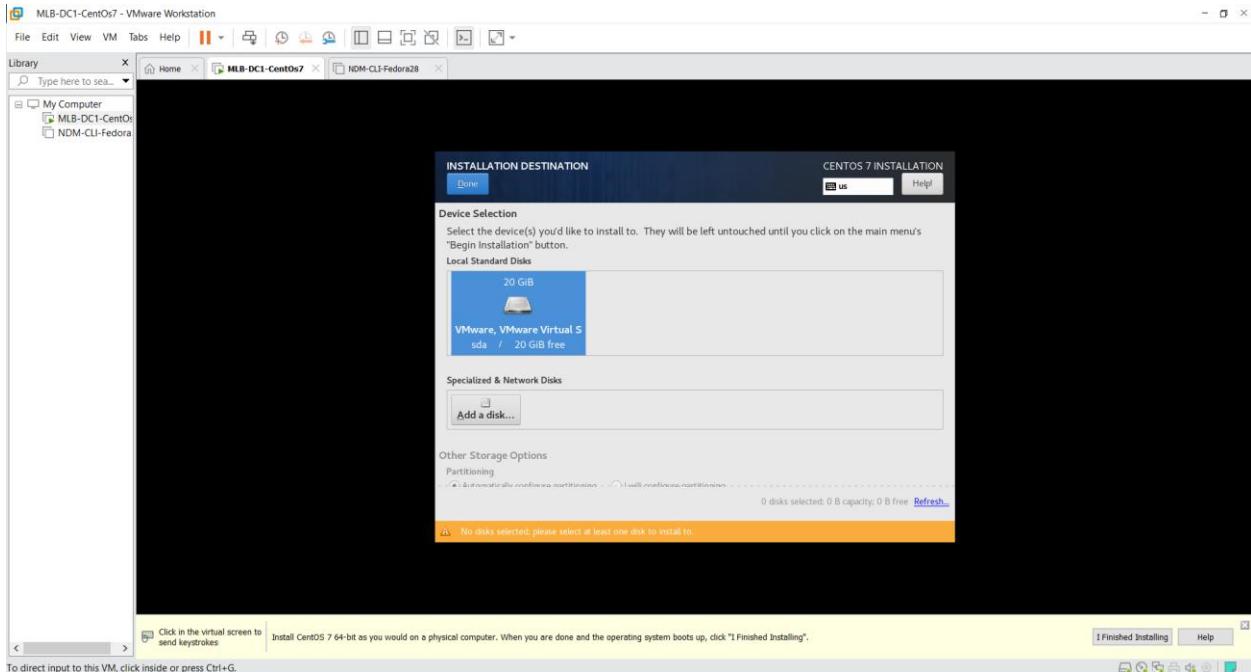
When after press the ENTER the installation process begin to start.



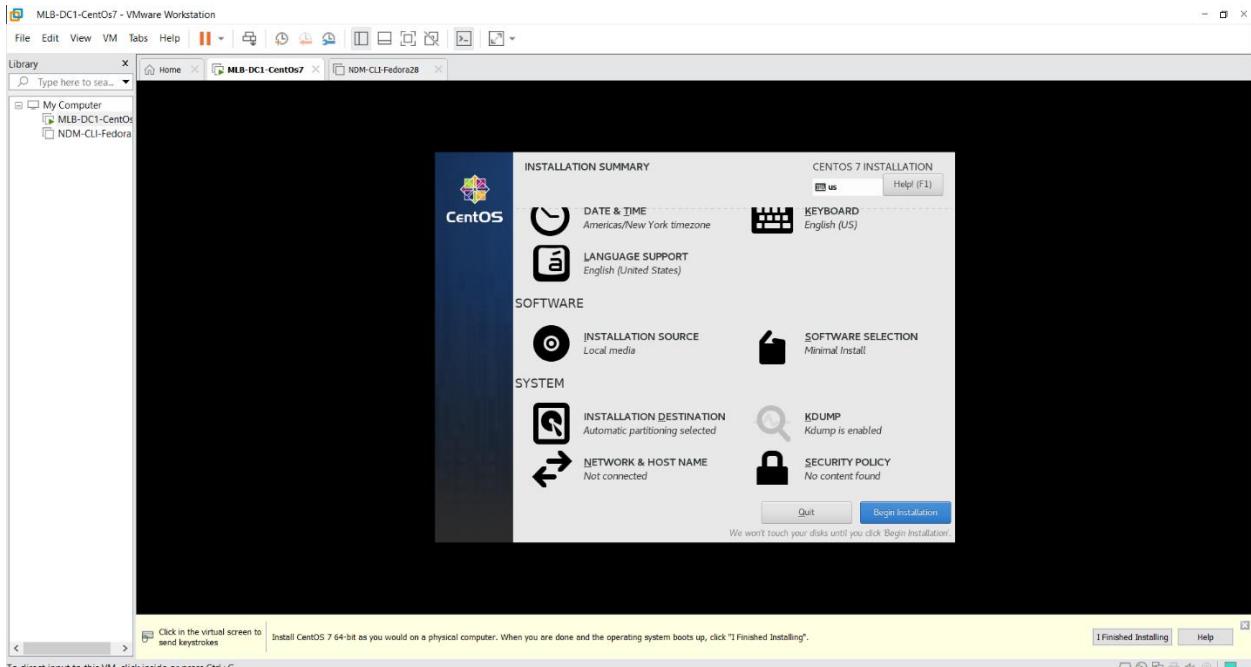
Select language as English and continue.



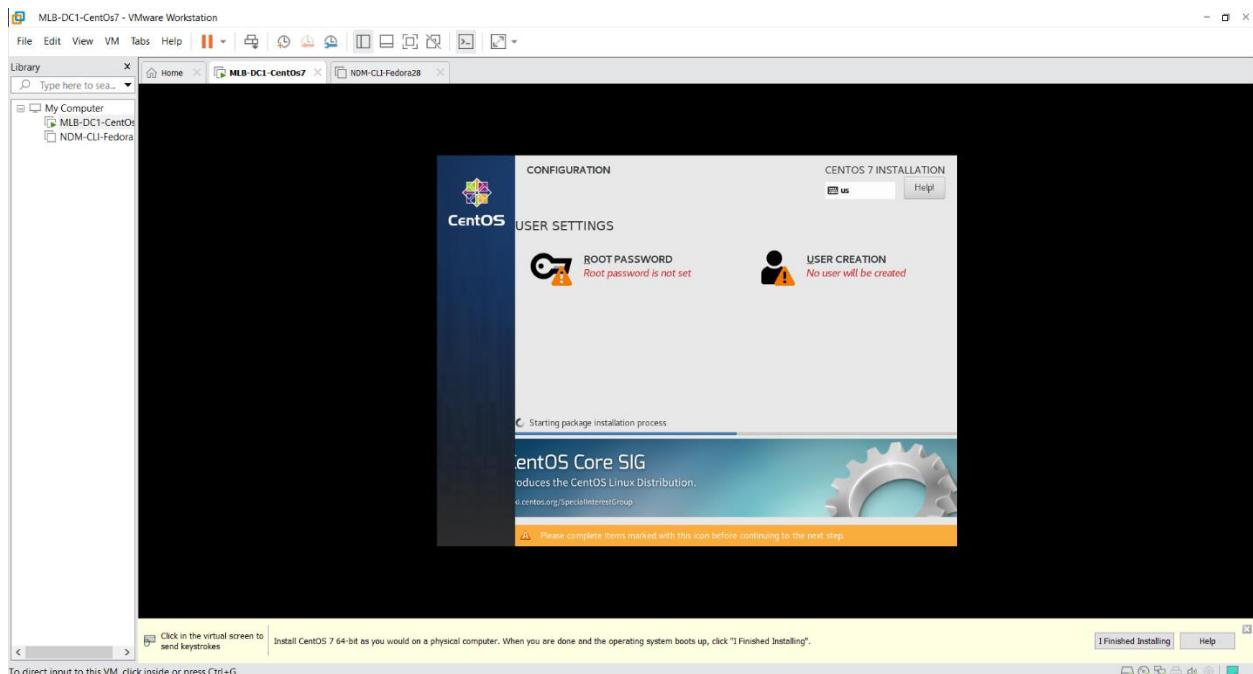
Click on Installation Destination to select the hard disk.



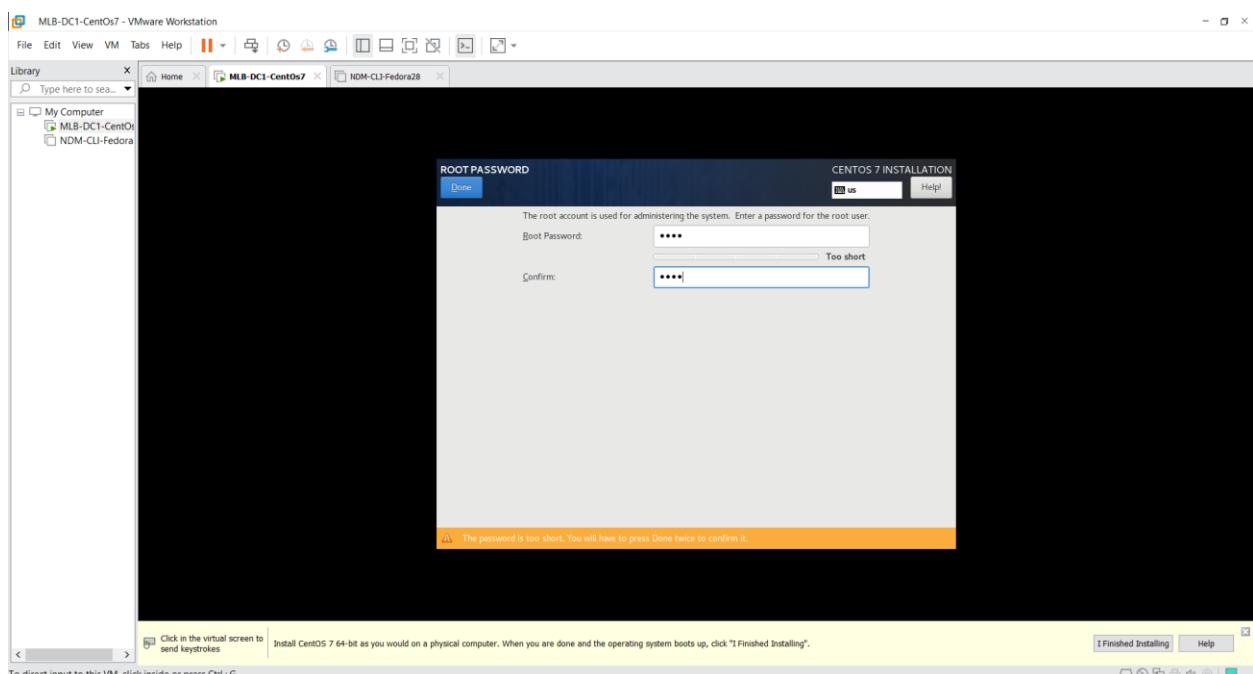
Select the hard disk which have created for the VM before and click on done.



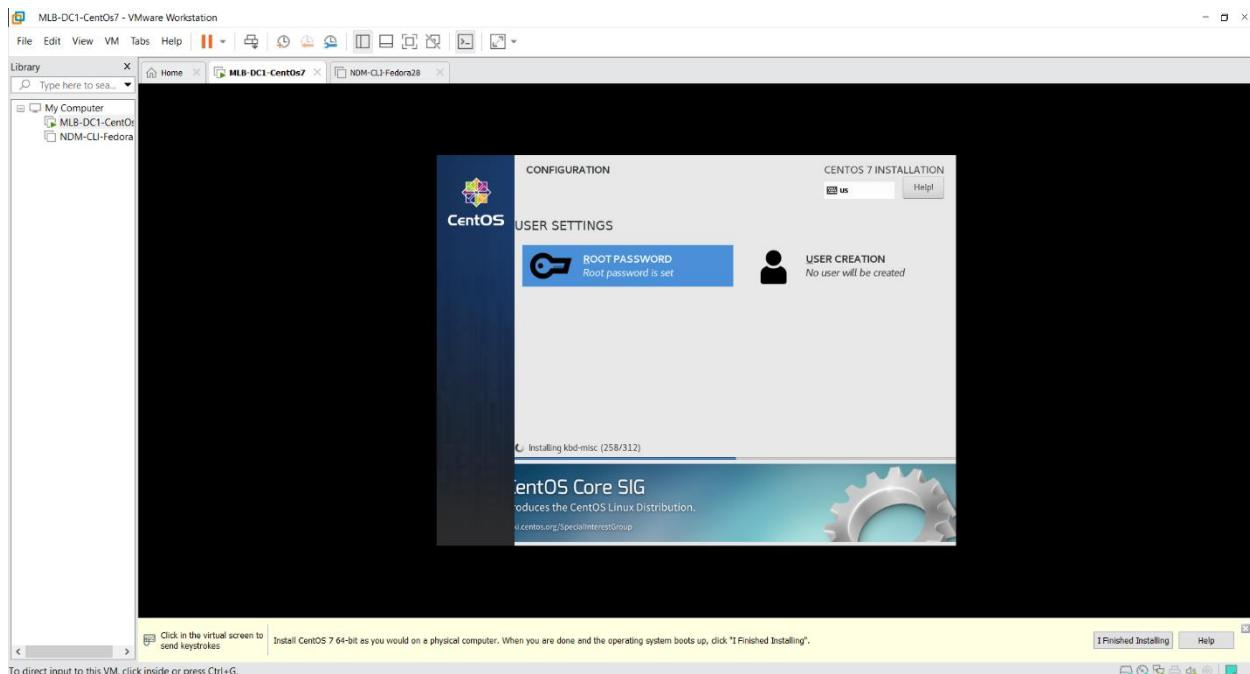
Installation destination will change as Automatic partitioning selected.



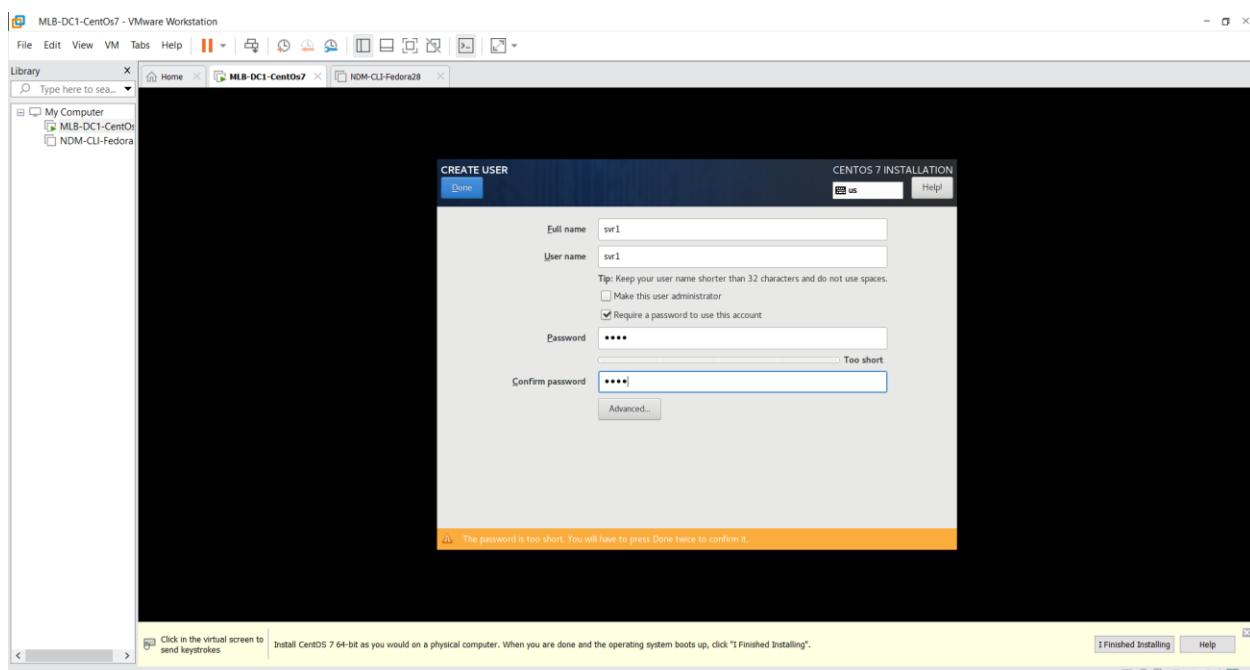
After begin the installation go to root password to set the root password.



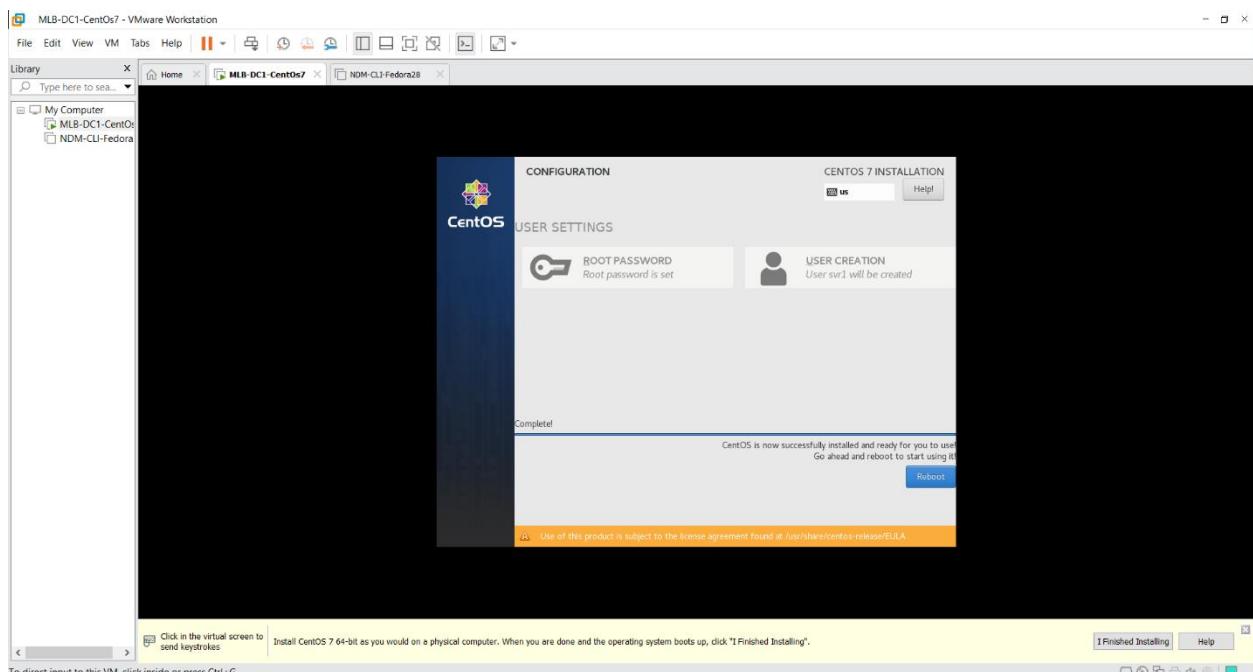
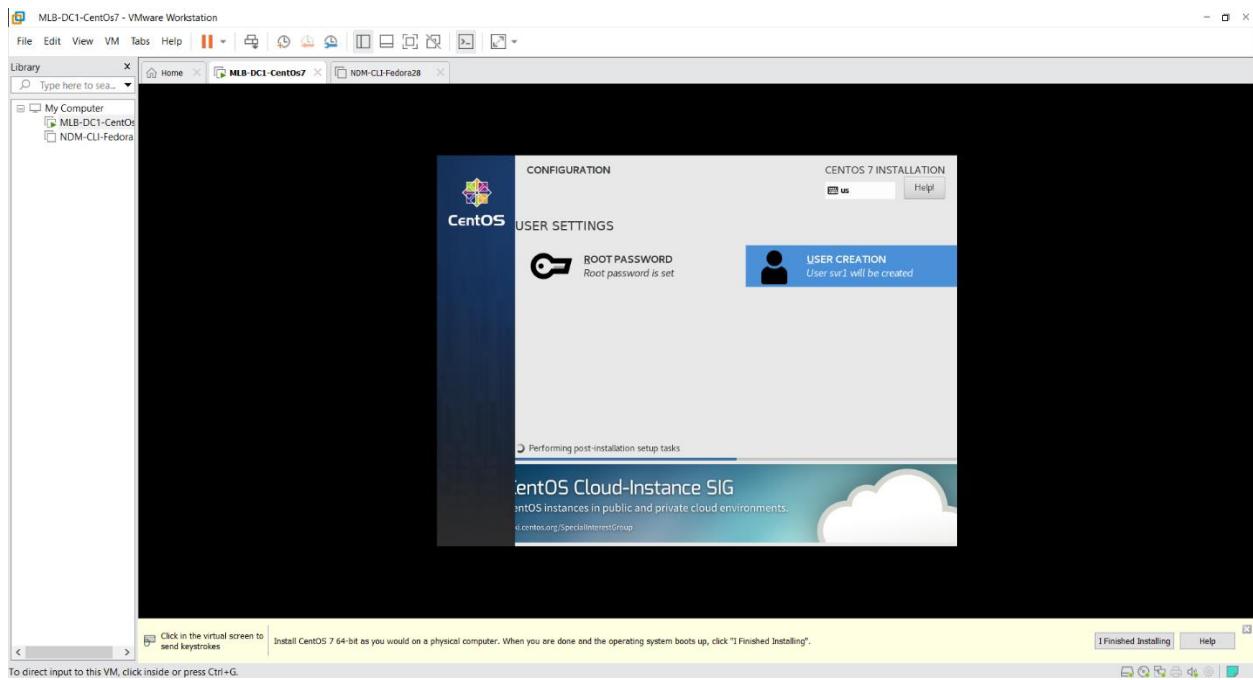
Set “root” as the password and click done.



Go to user creation to set up the user profile.



Type “svr1” as both username and password and click on done.

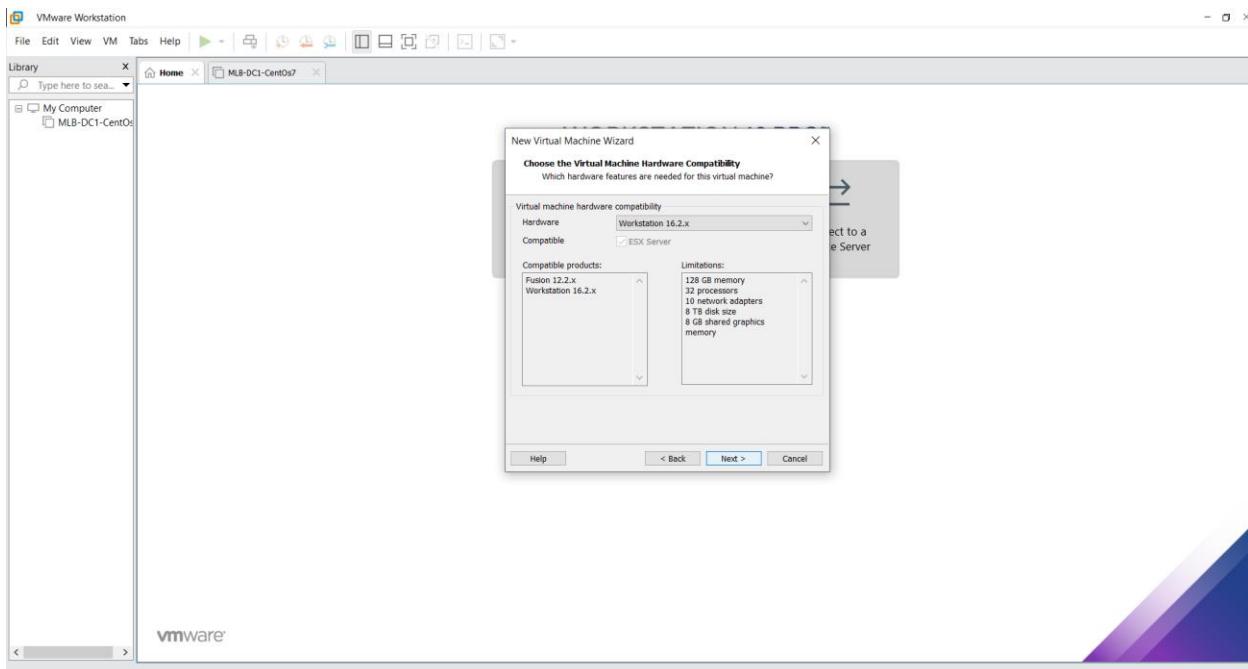
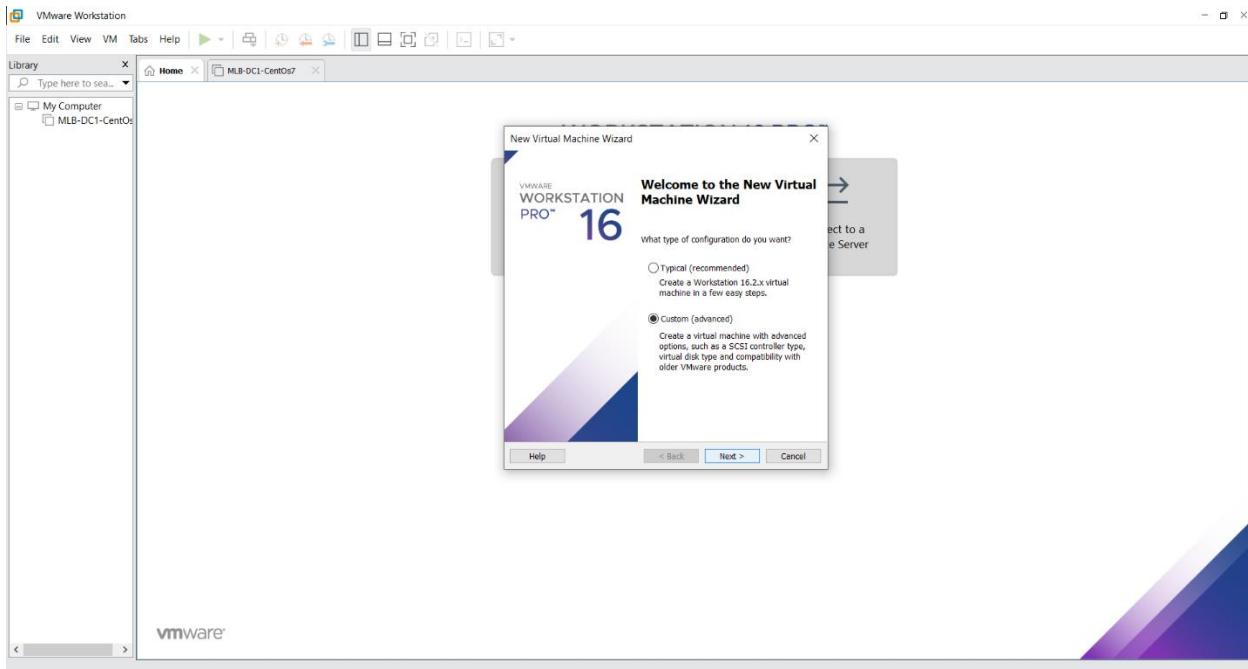


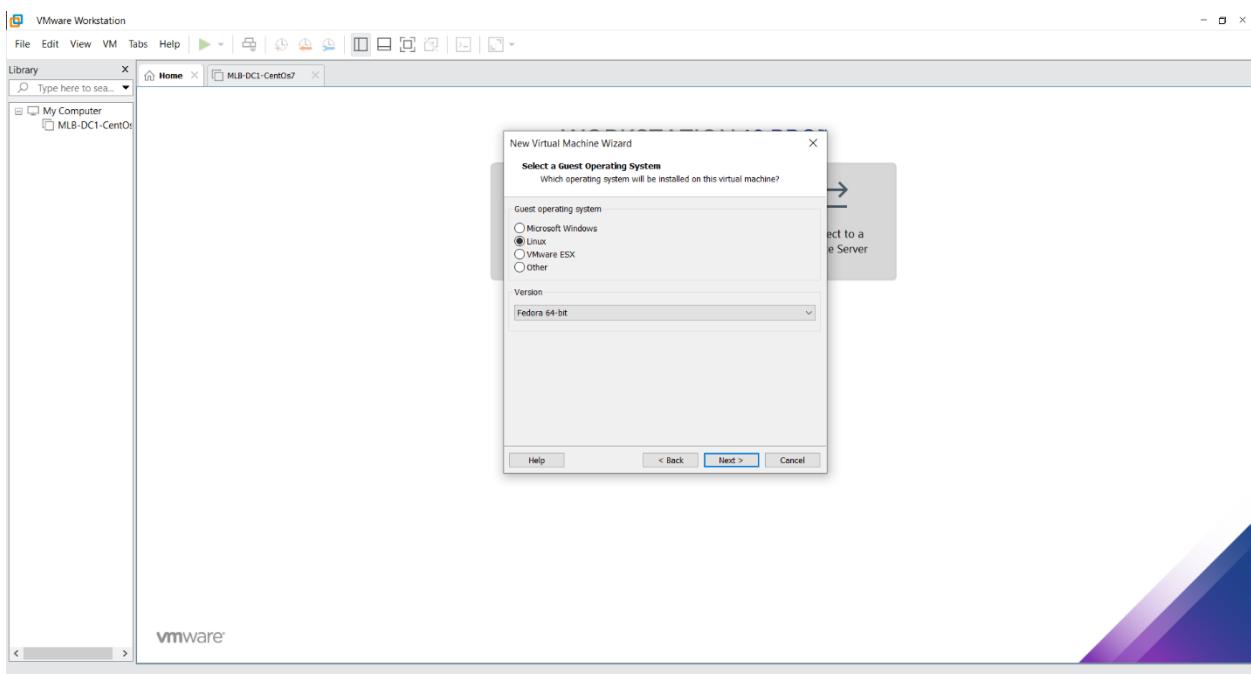
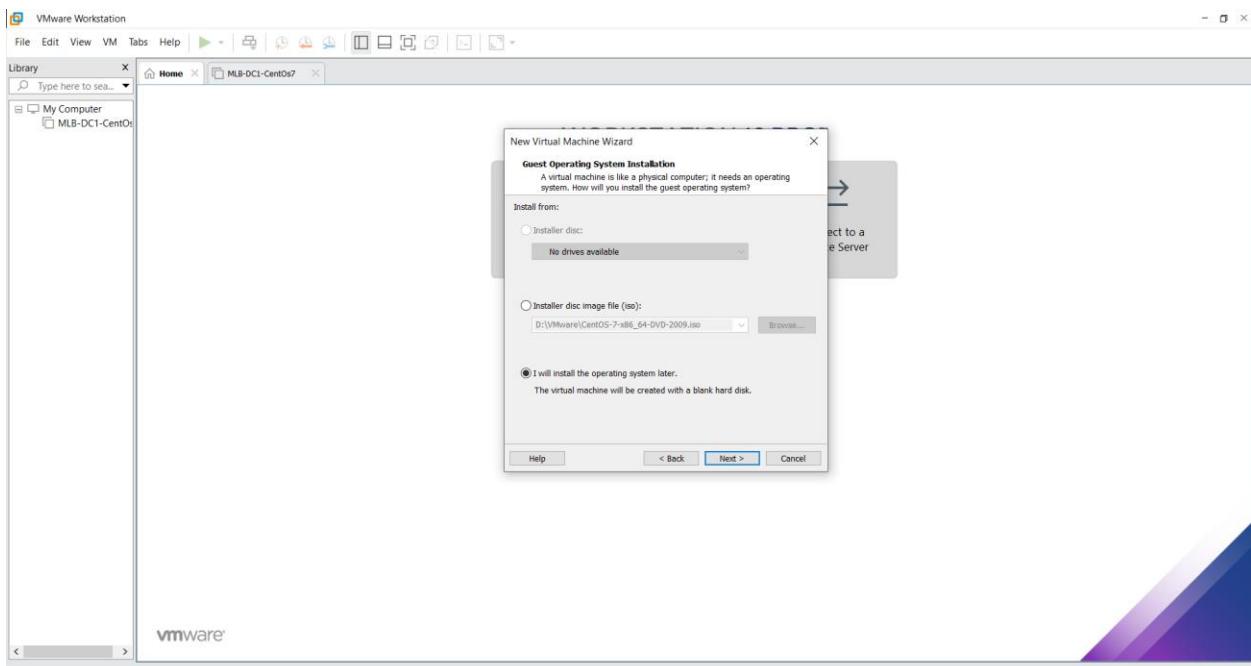
Reboot the system after finish the installation.

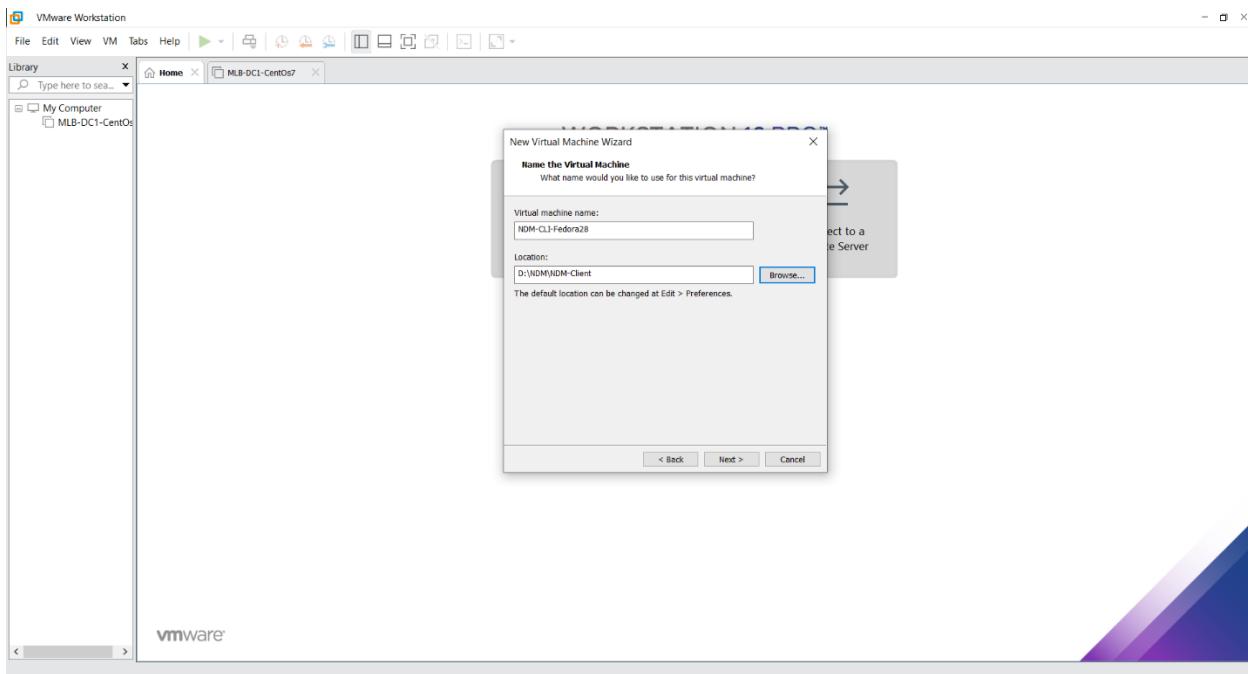
01.02. creating virtual machine for the Client (Fedora)

Step-by-step screenshots are mentioned below for the entire process of creating virtual machine for the client.

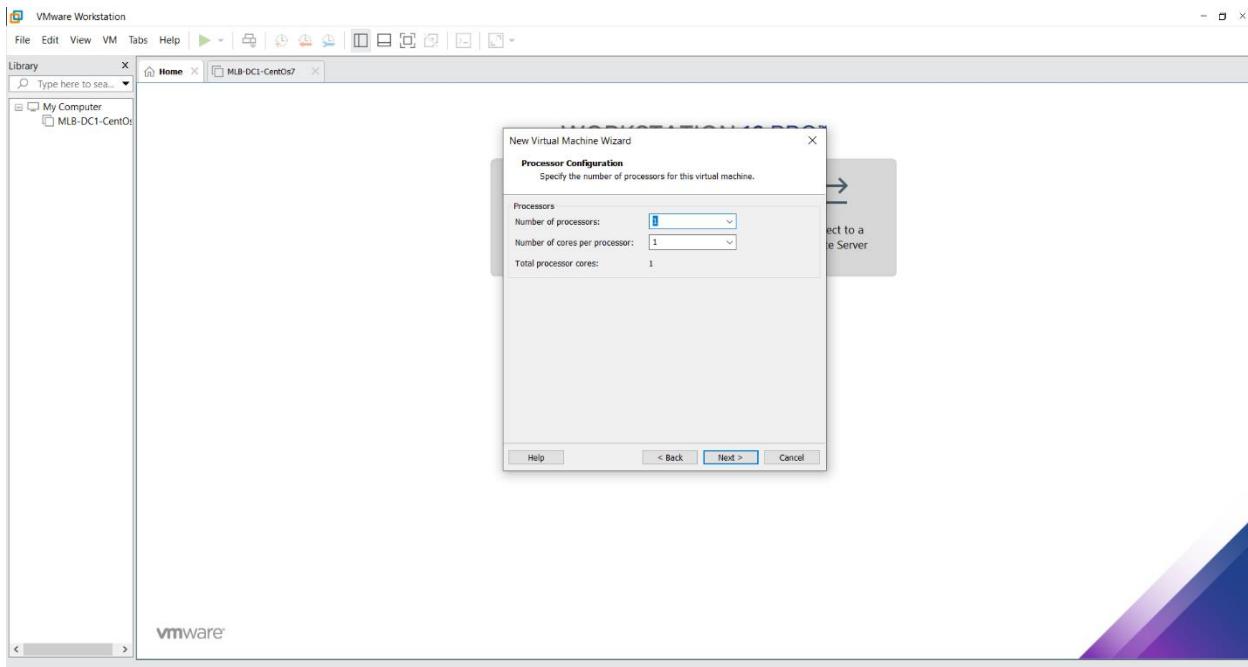
Select create new virtual machine from the home tab.

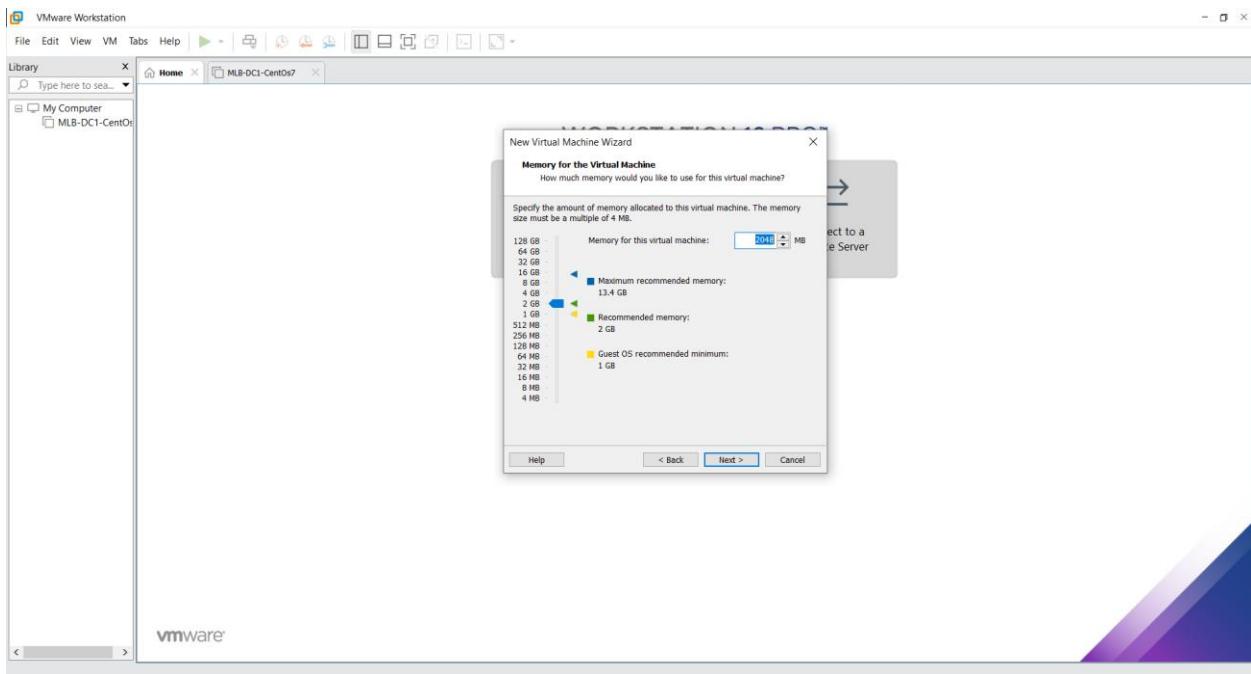




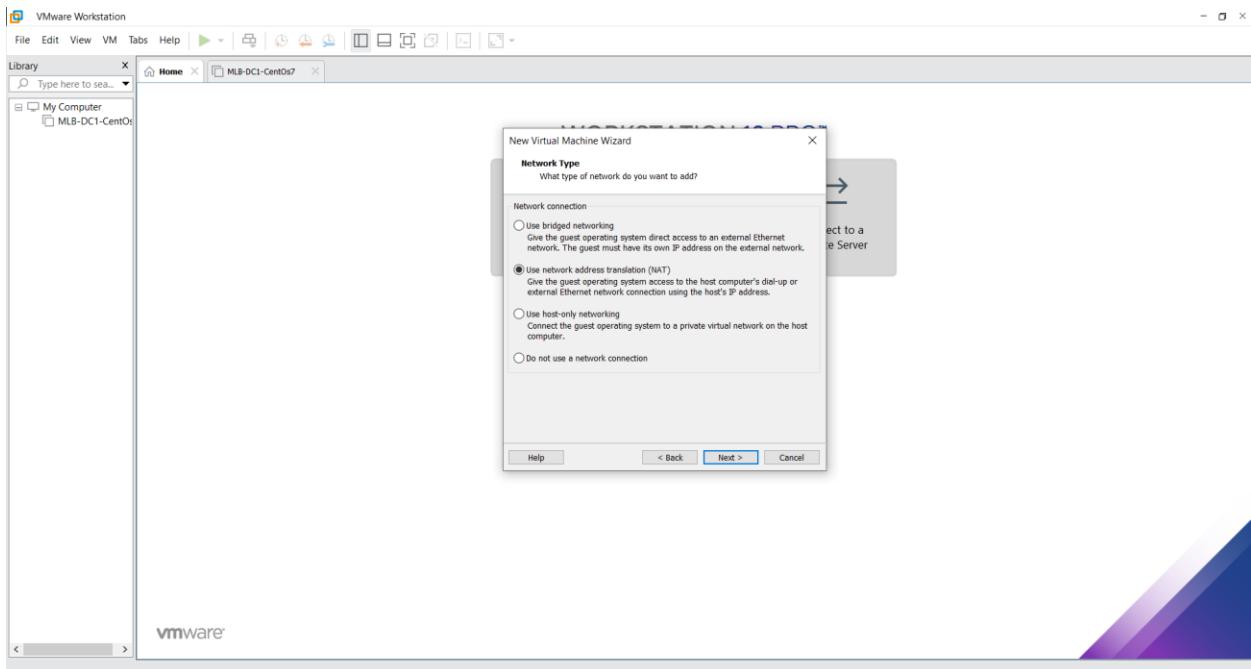


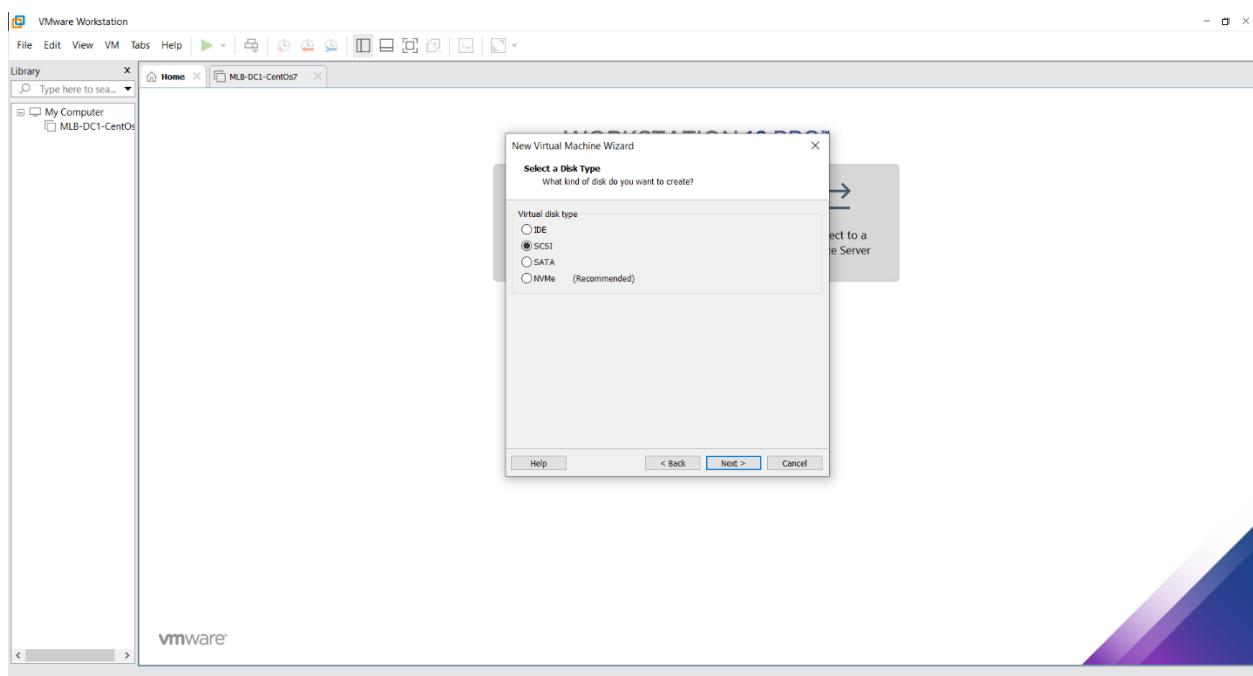
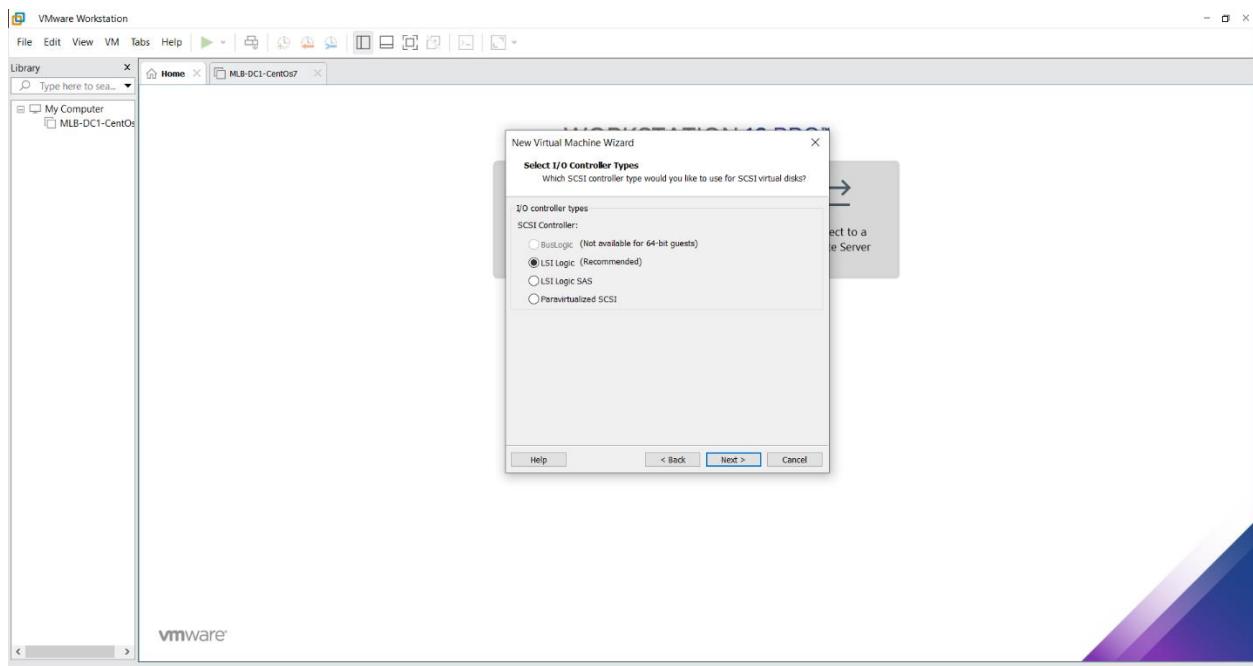
Change the VM name as NDM-CLI-Fedora28 and select the location as the subfolder named NDM-Client which has created

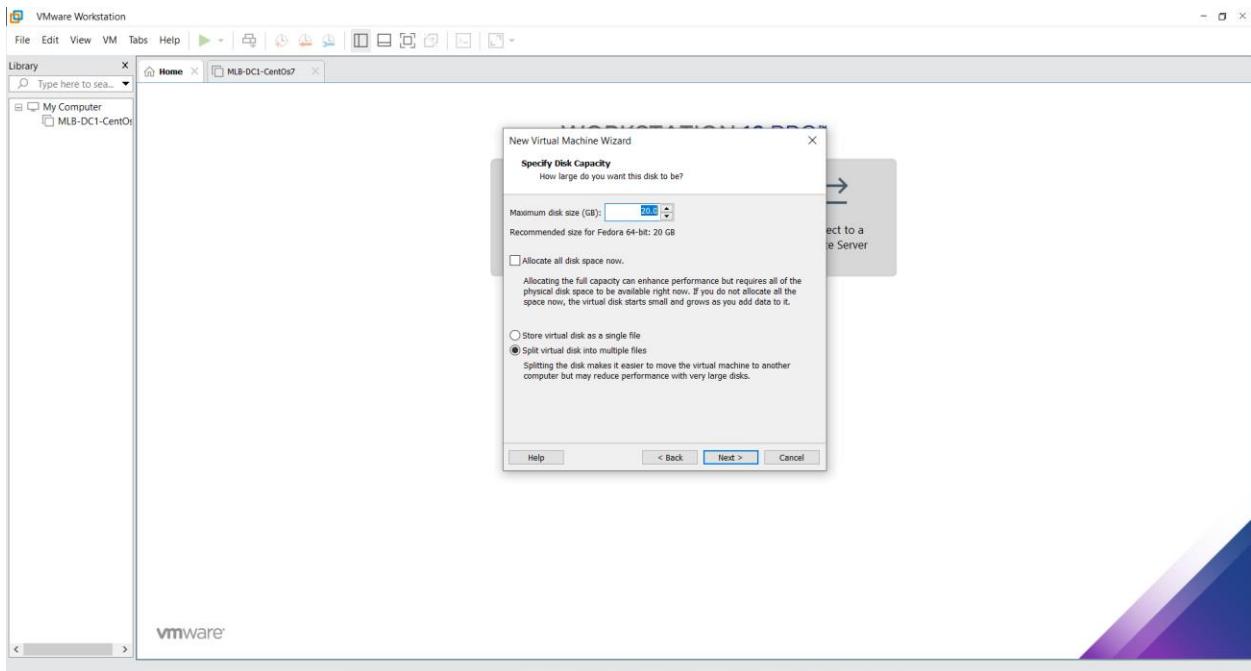
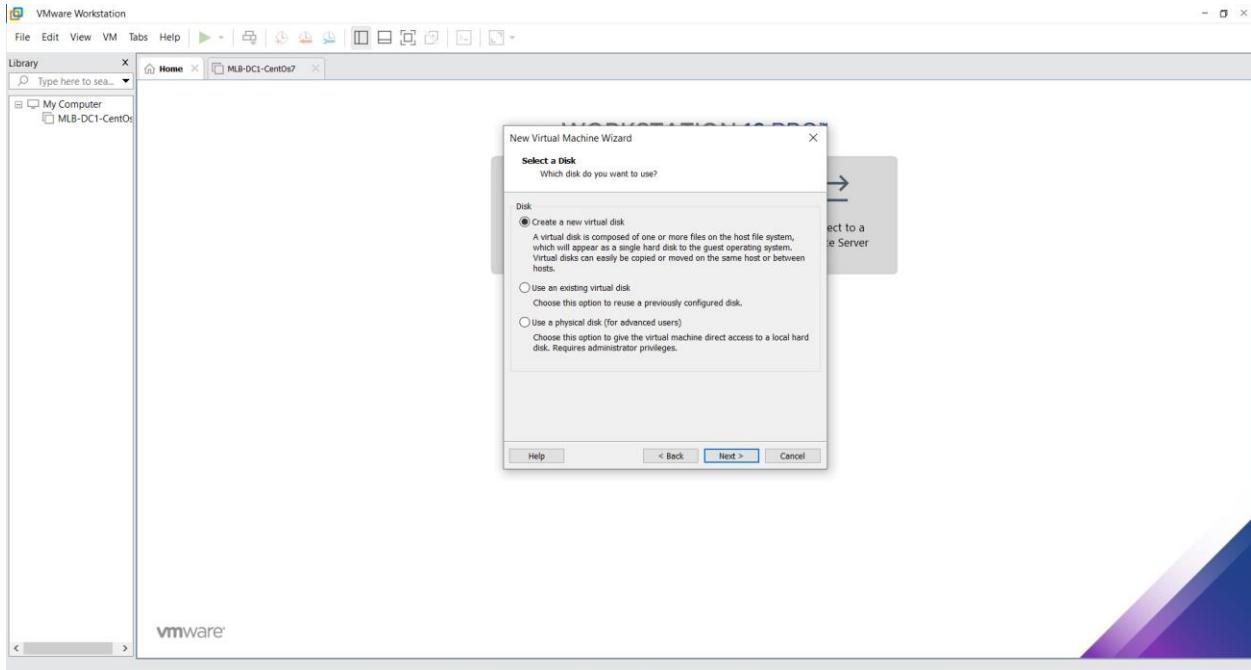




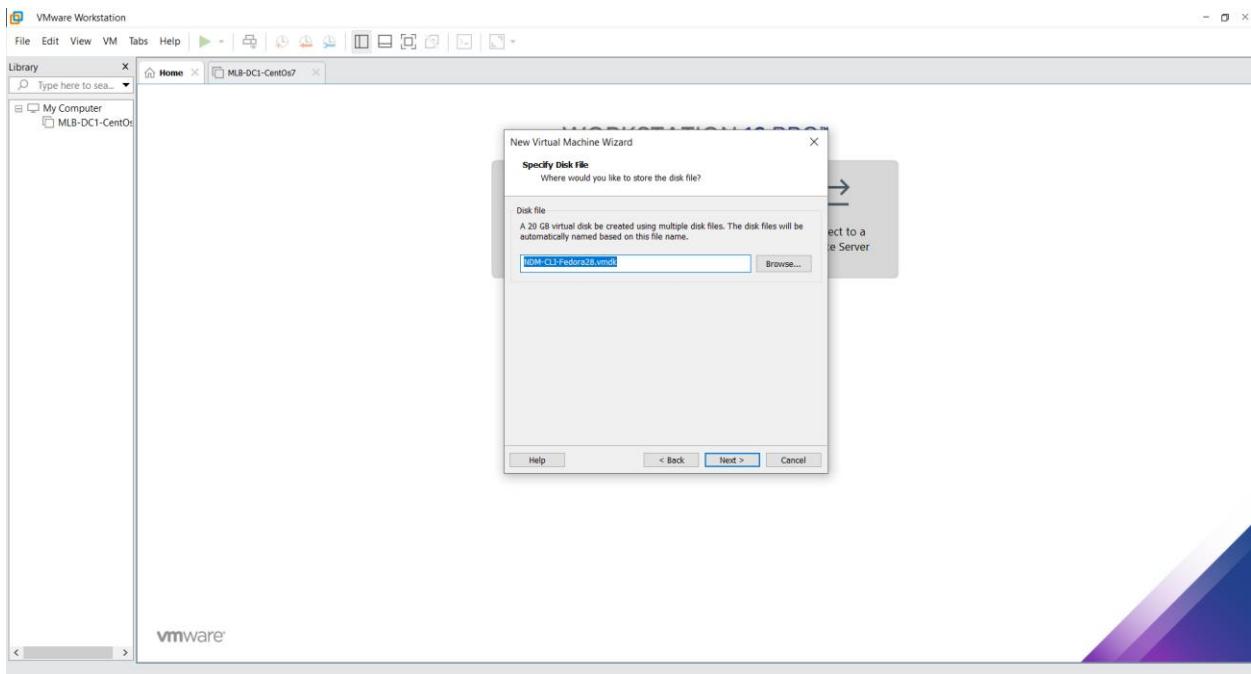
Select 2GB for the usable Ram of the VM



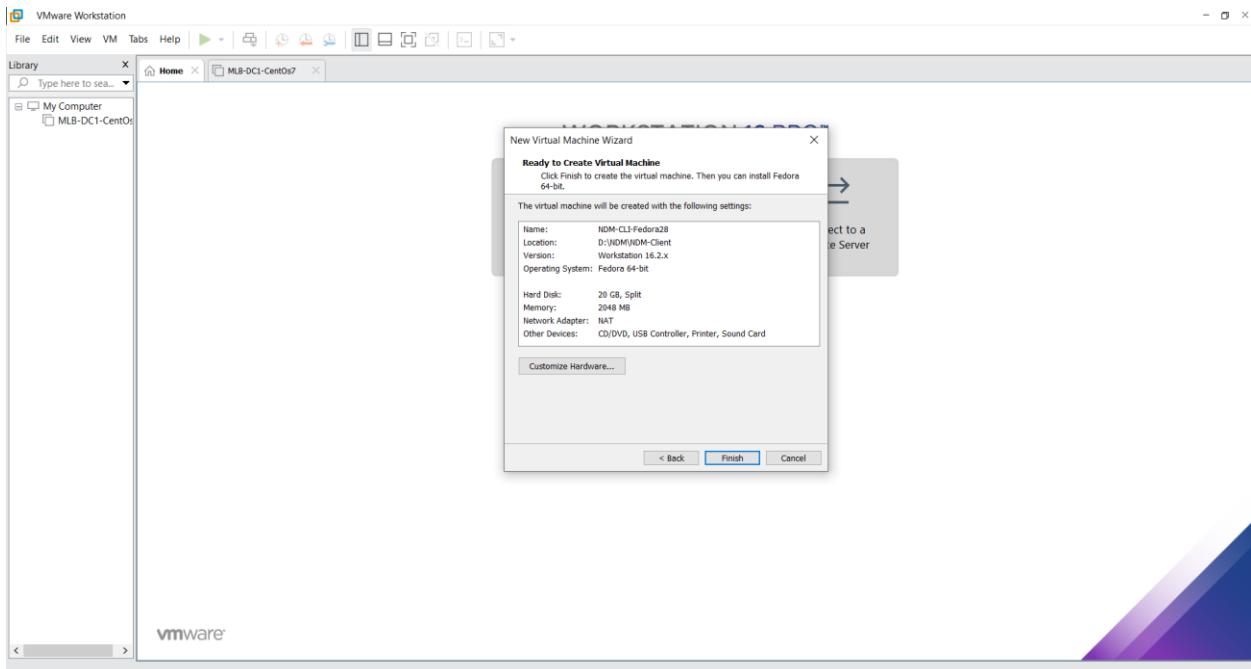


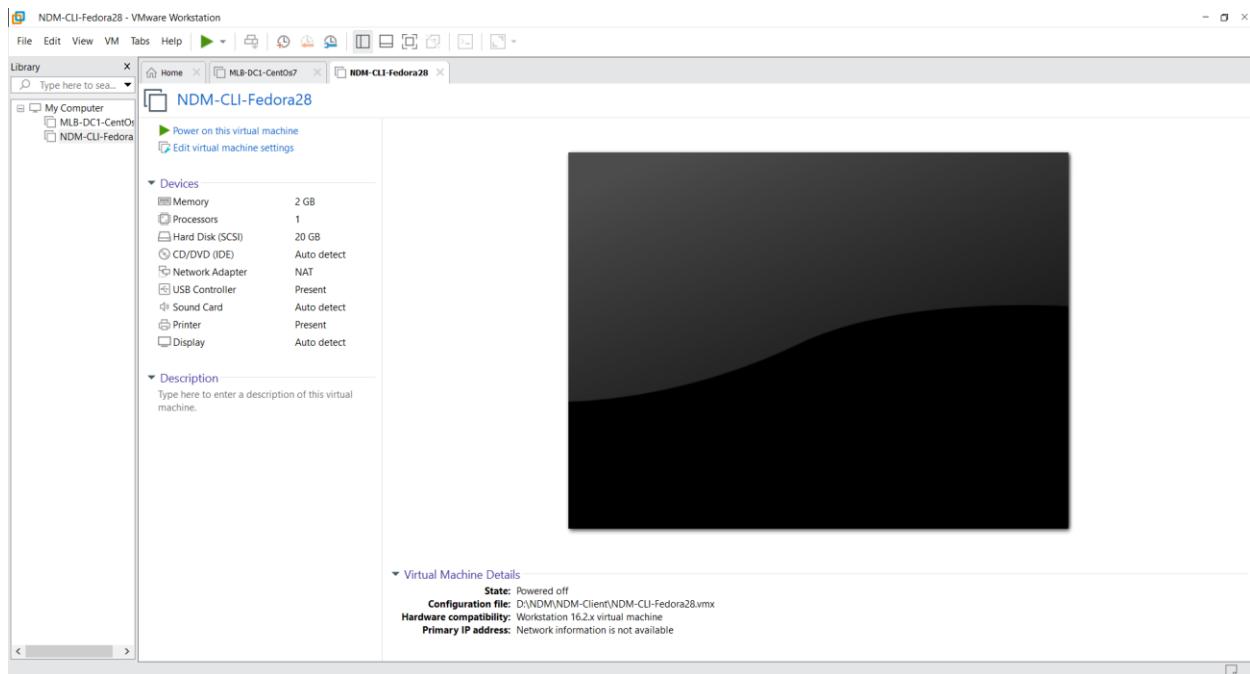


Select 20GB for the hard disk size for the VM as recommended.

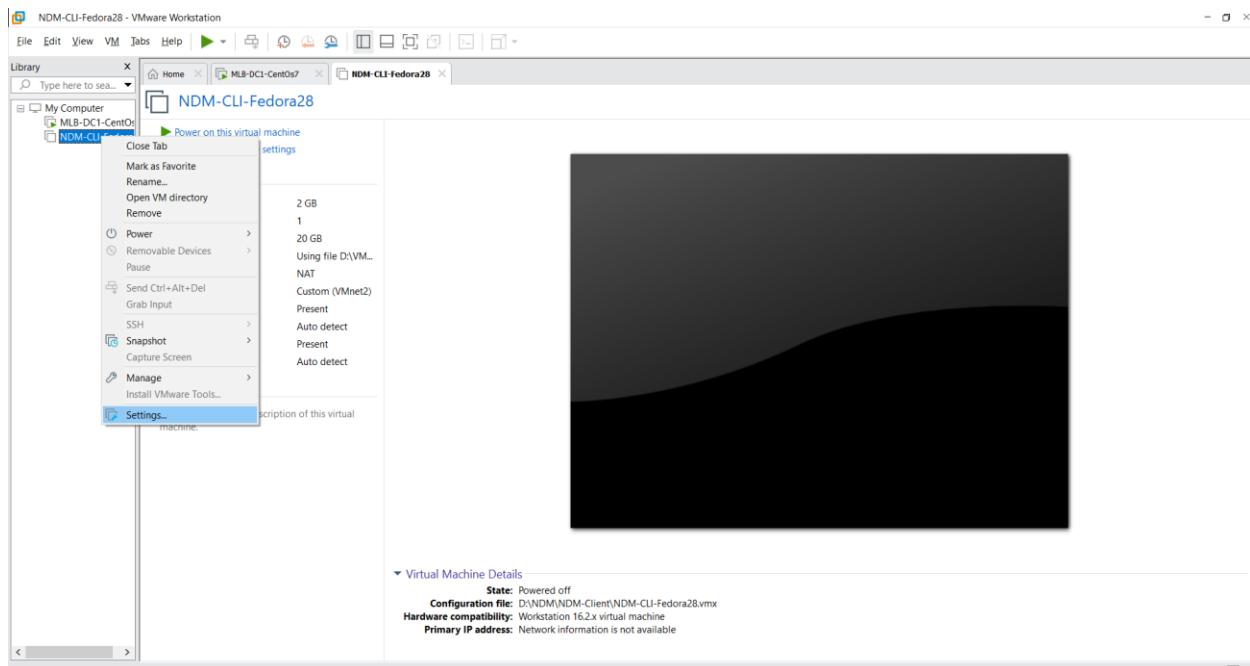


Keep the disk file name as default.

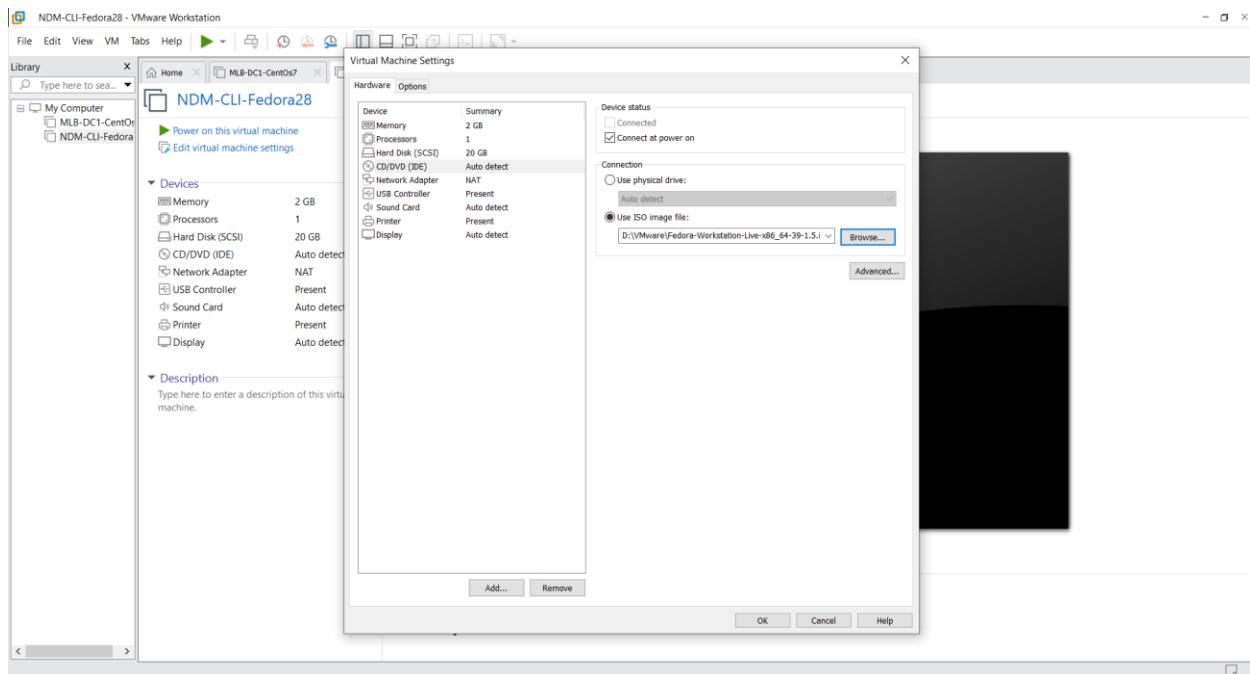




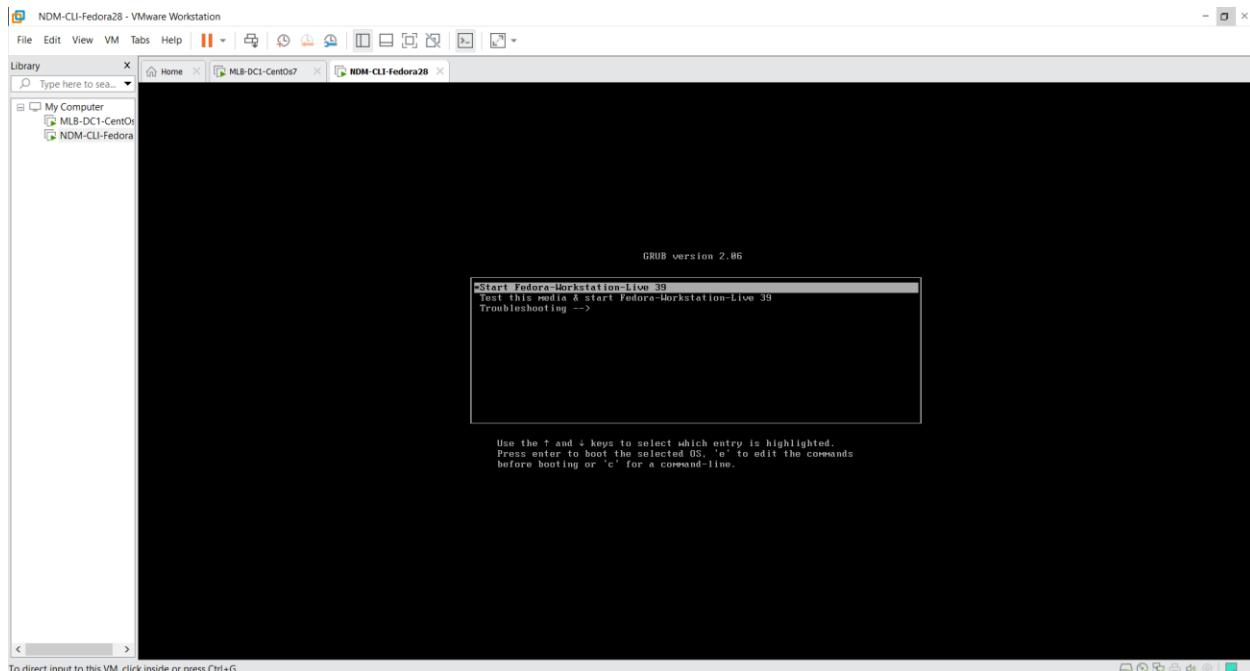
After finish the process virtual machine displays like this.



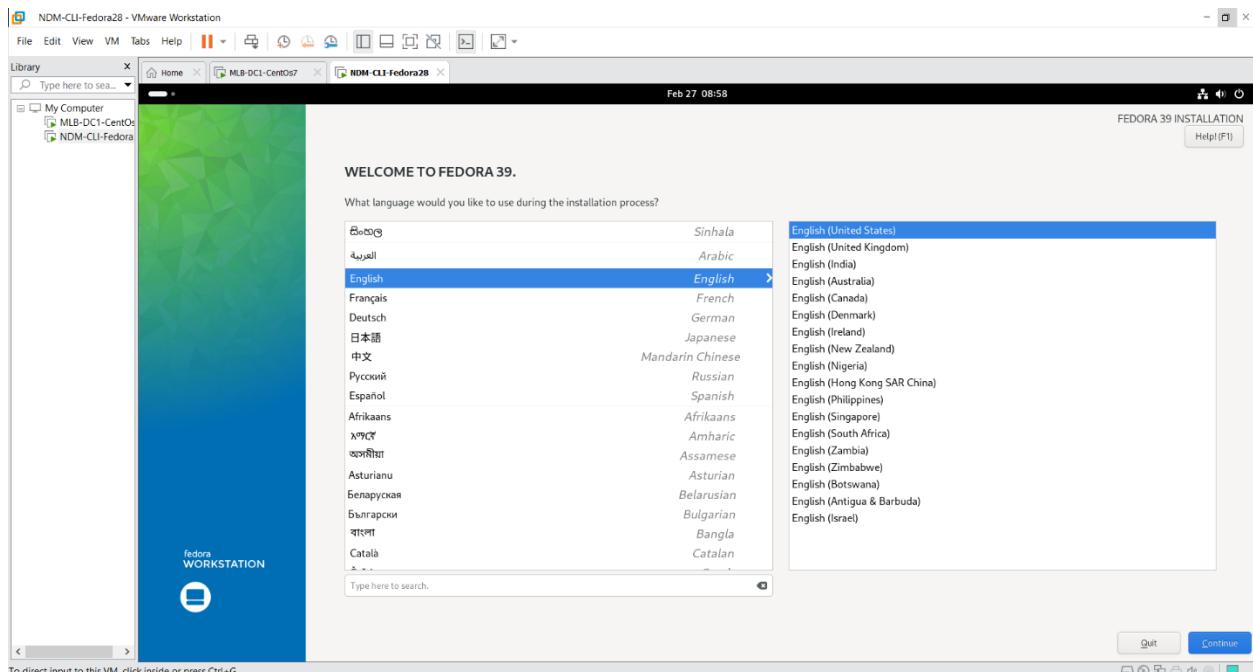
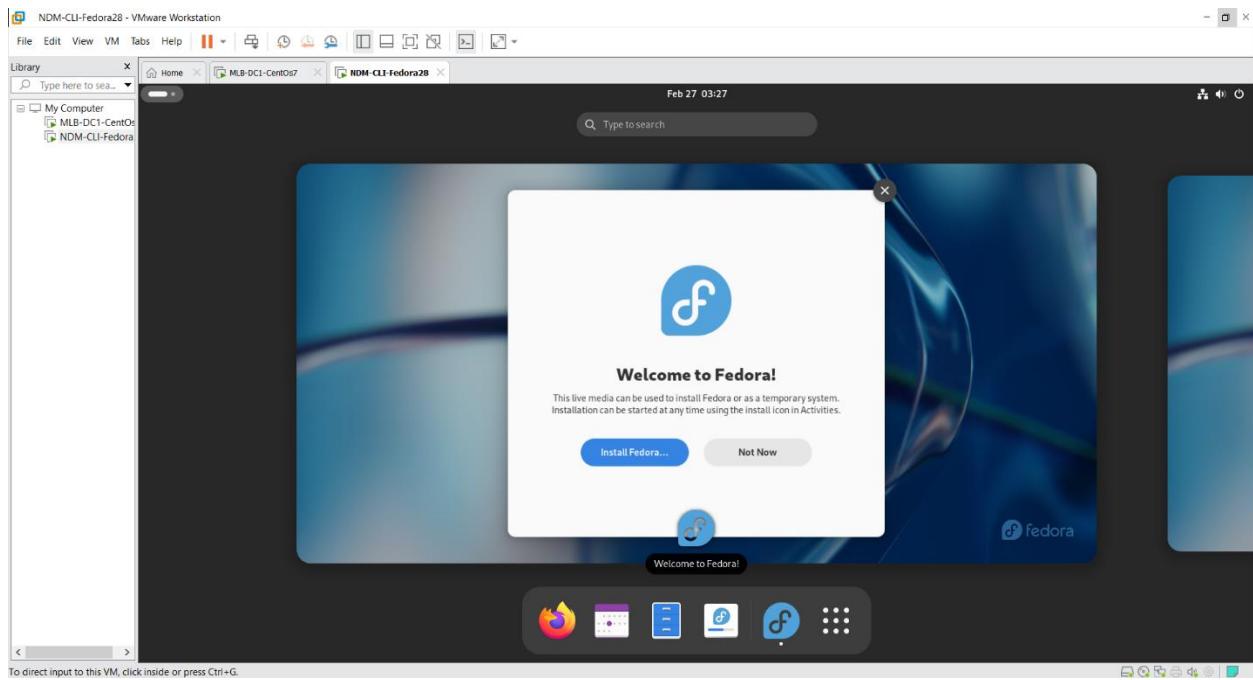
Right click on VM and go to settings to select the iso file to run the VM.



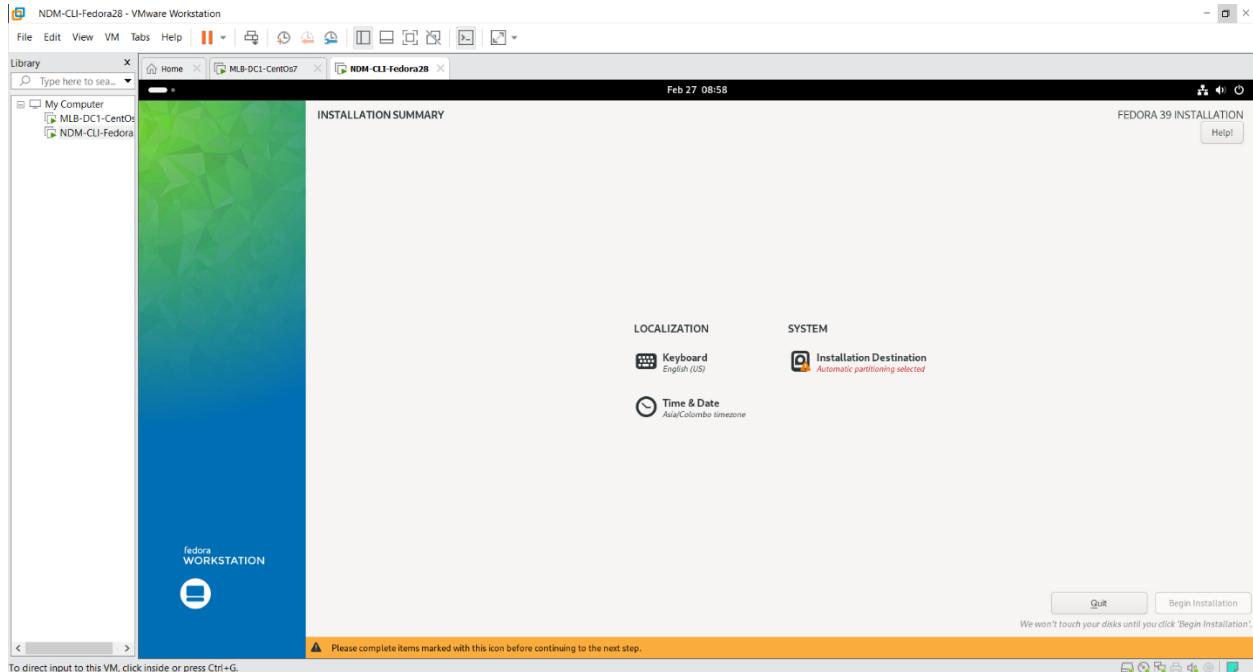
Go to CD/DVD (IDE) and choose the connection option as Use ISO image file. Then brows and select the downloaded iso file of the FedoraOS.



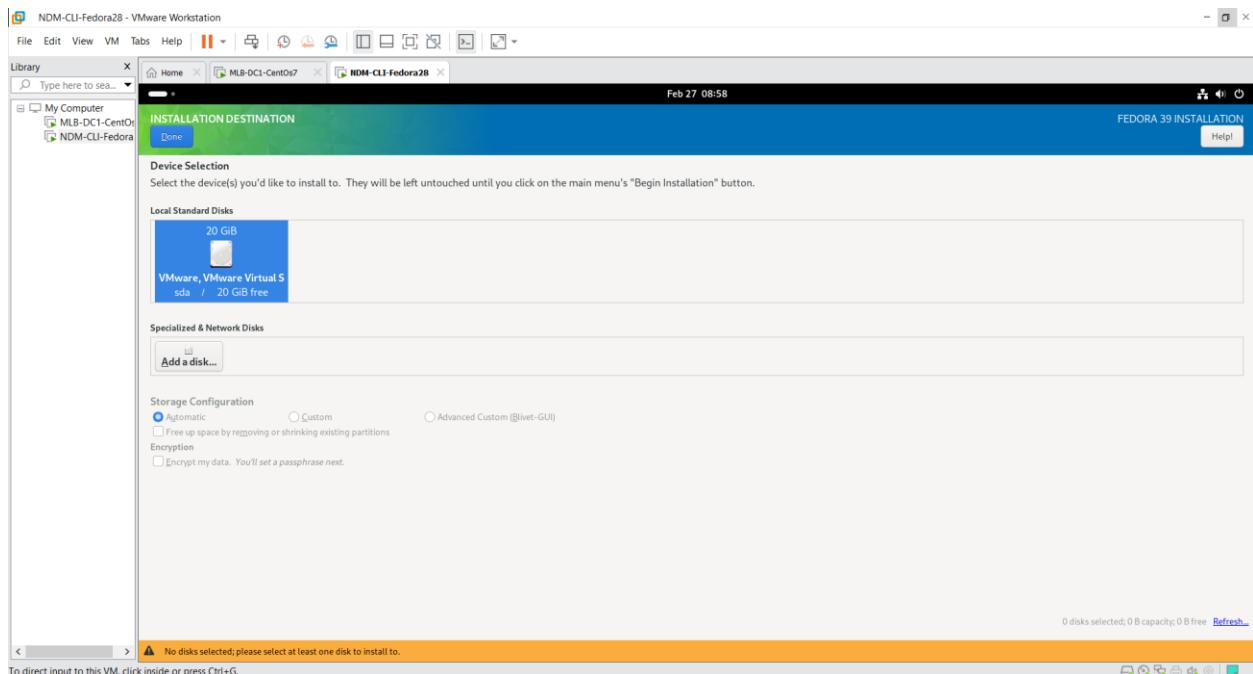
After power on the virtual machine FedoraOS will load and choose the first option to install the OS.



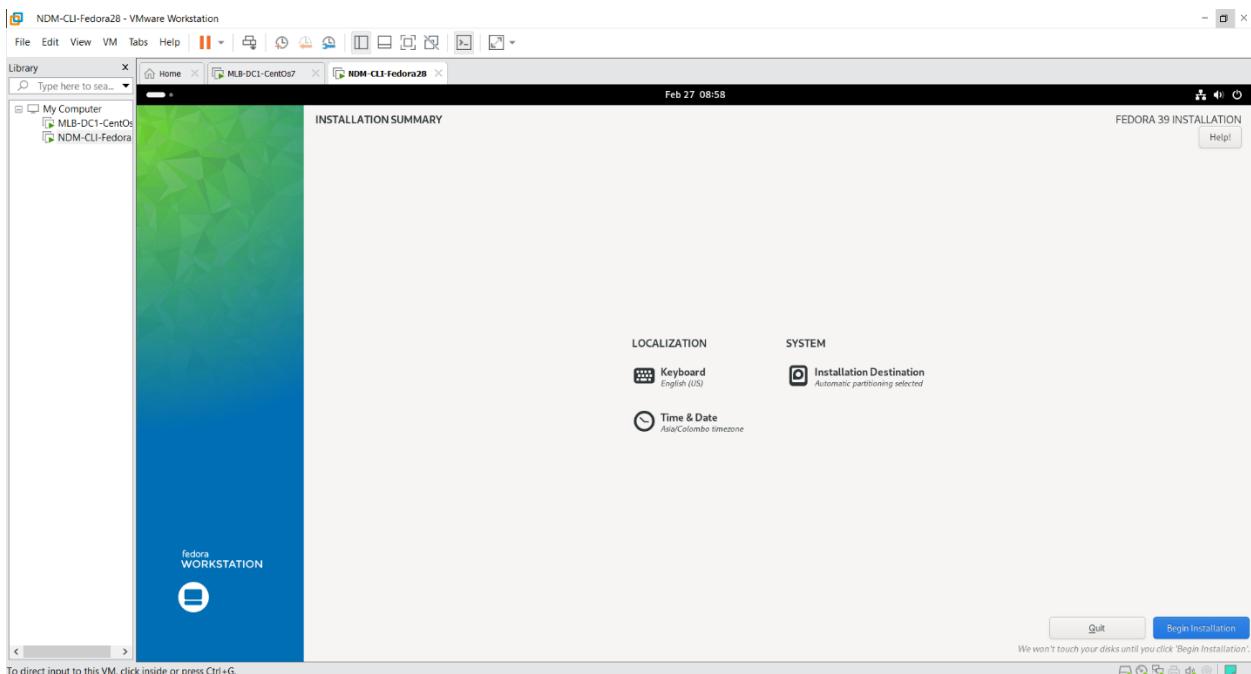
Select English as Language and continue.



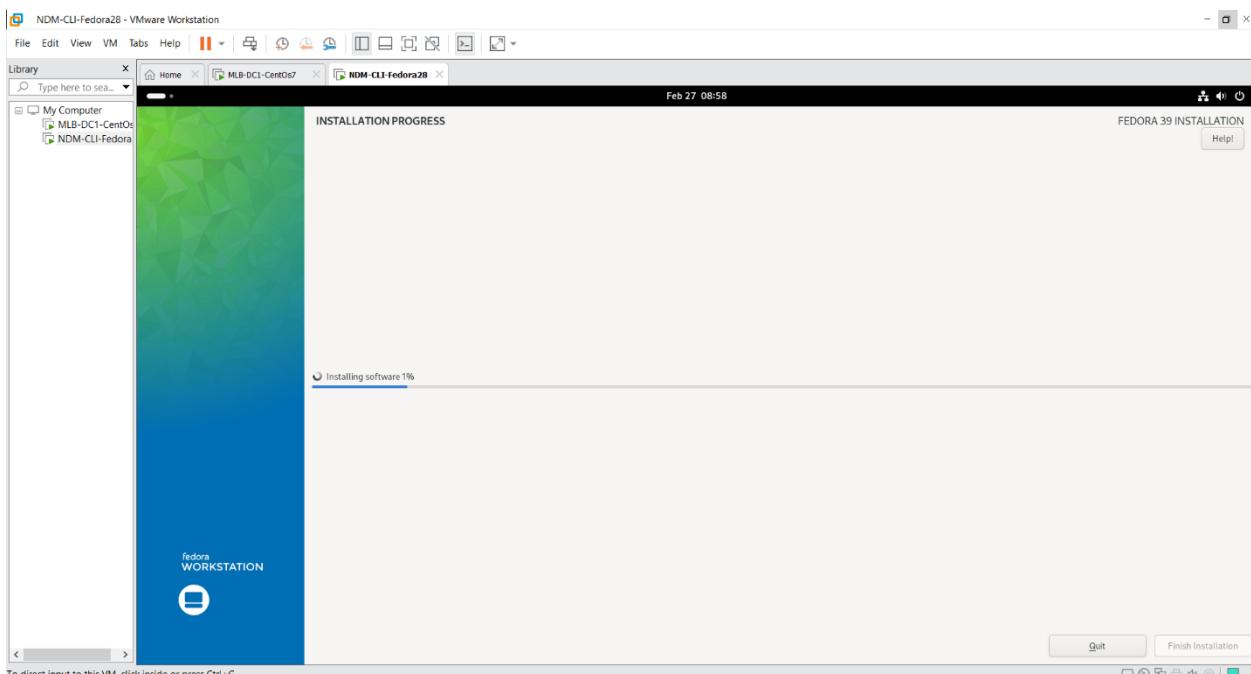
Go to installation destination to select the hard drive

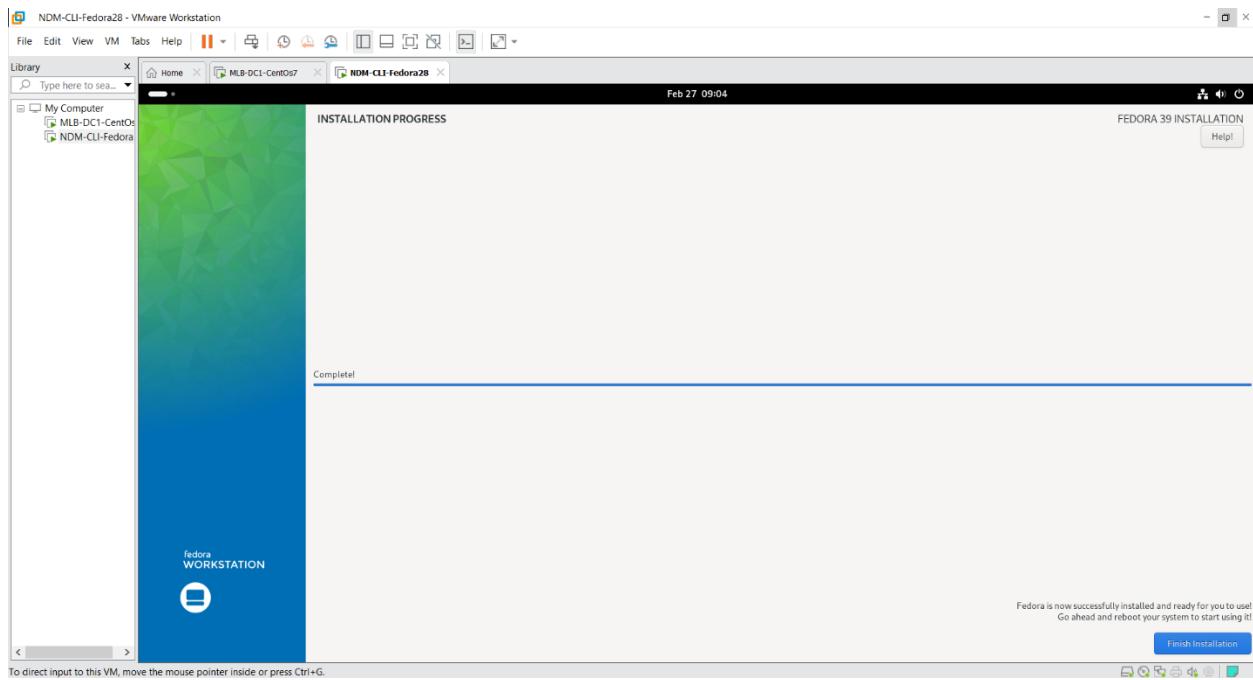


Select the hard disk which have created for the VM before and click on done.

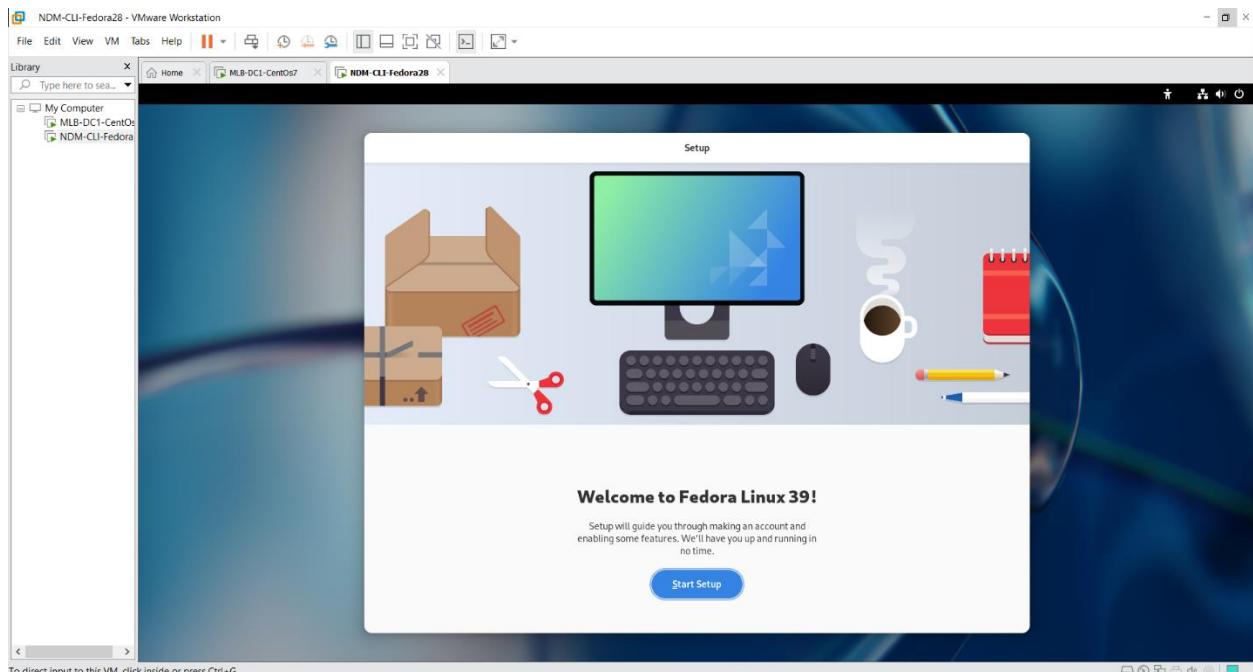


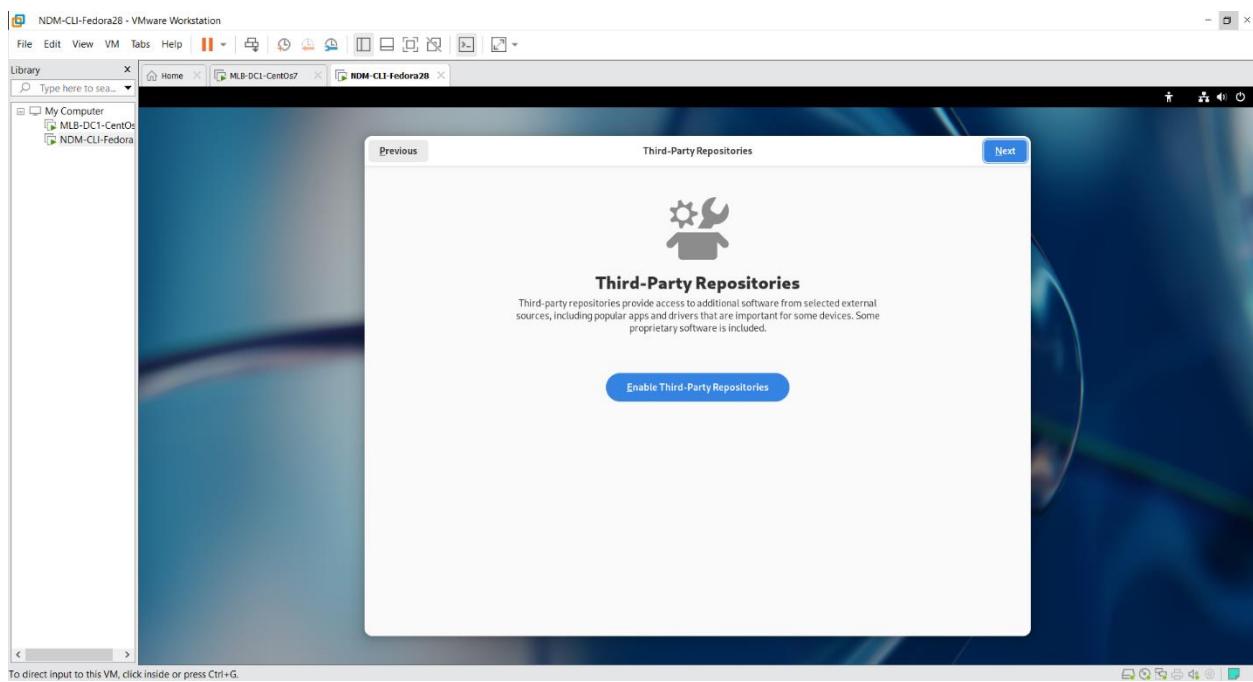
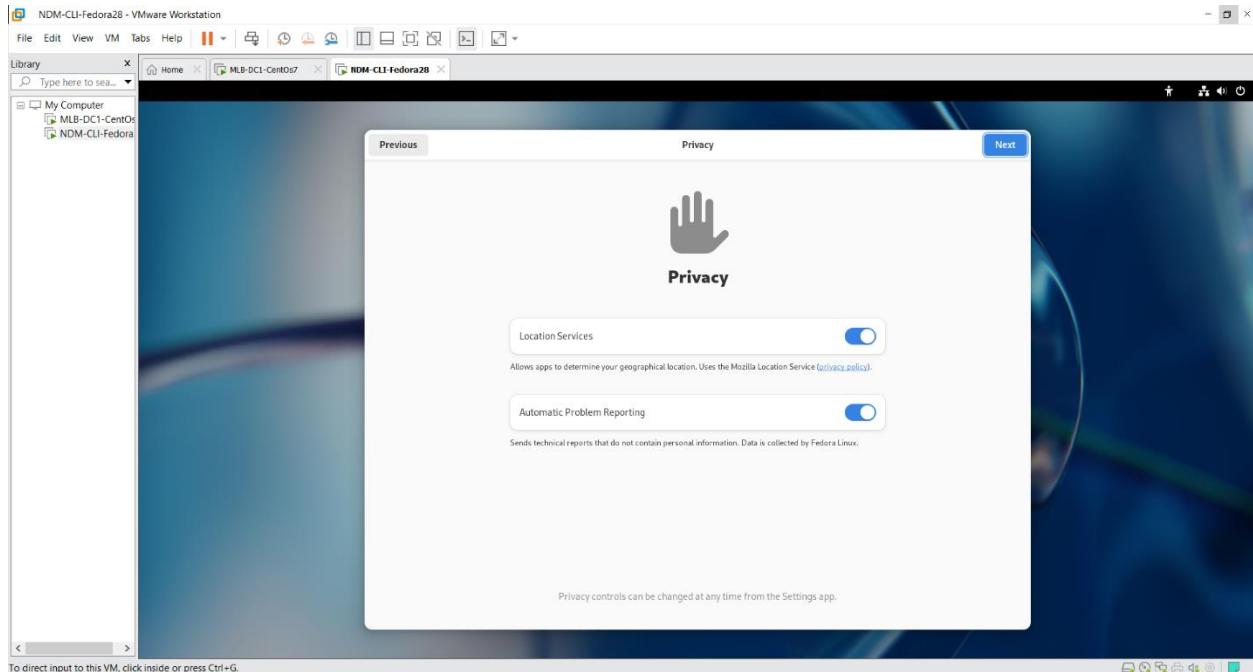
Installation destination will change as Automatic partitioning selected and press begin installation.

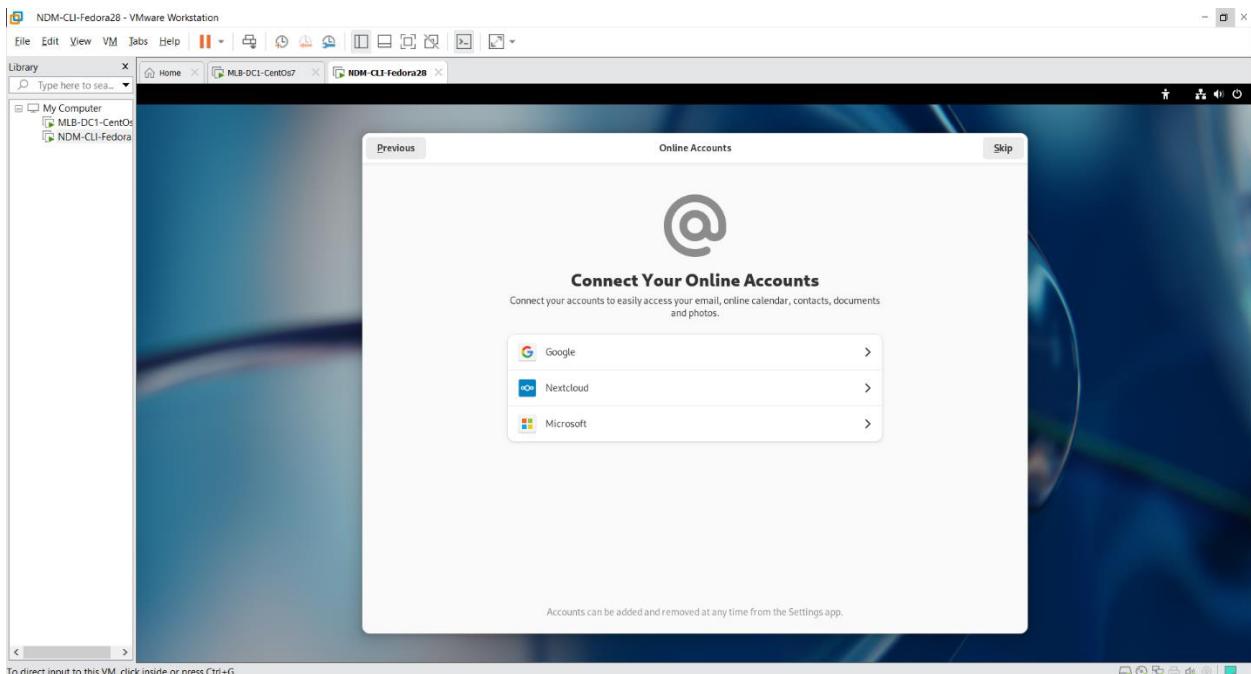




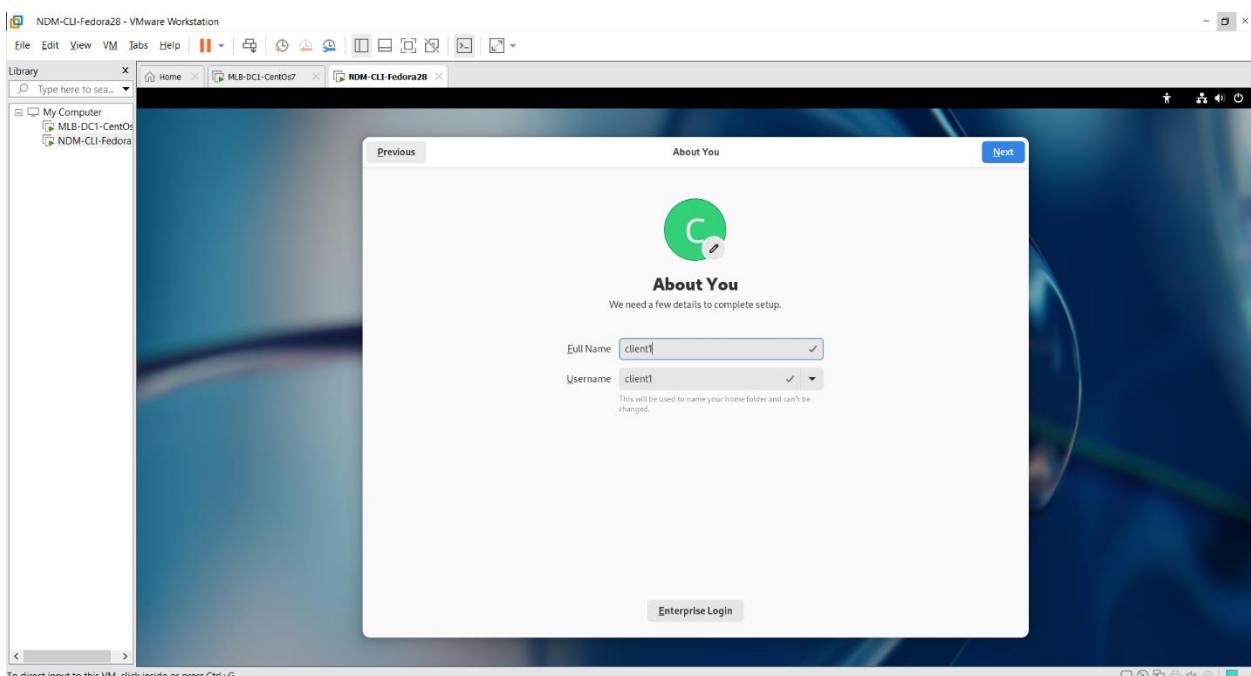
Click on Finish installation and reboot the system.



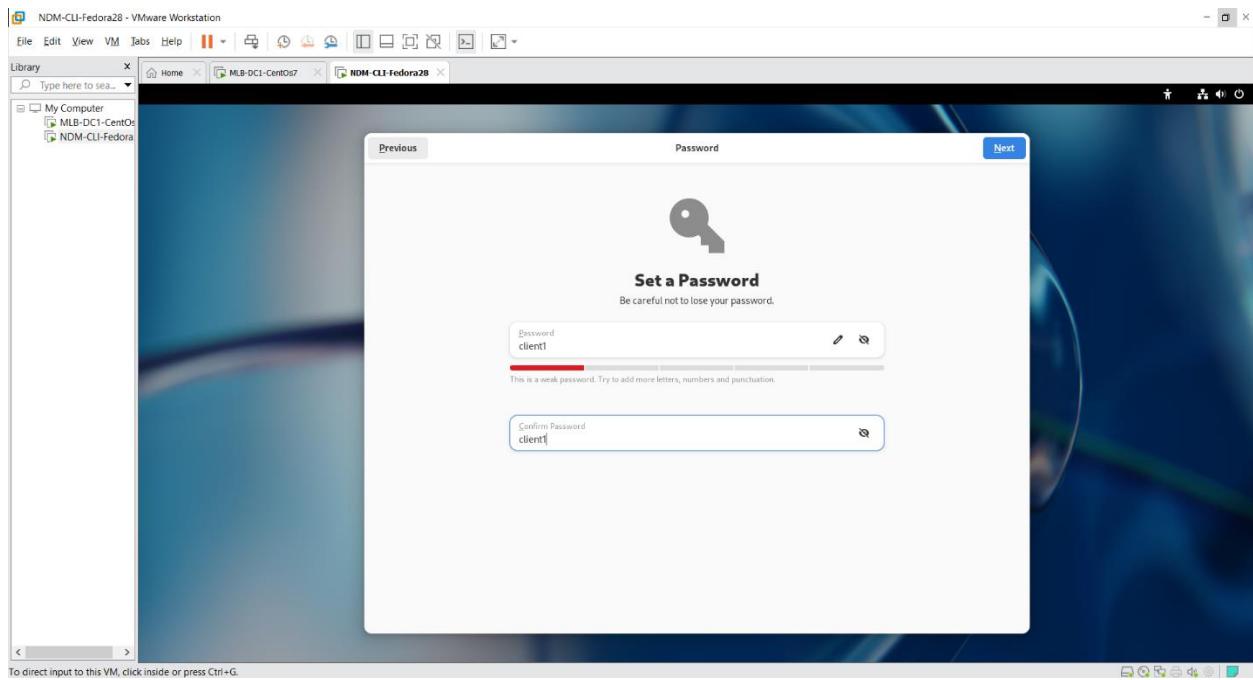




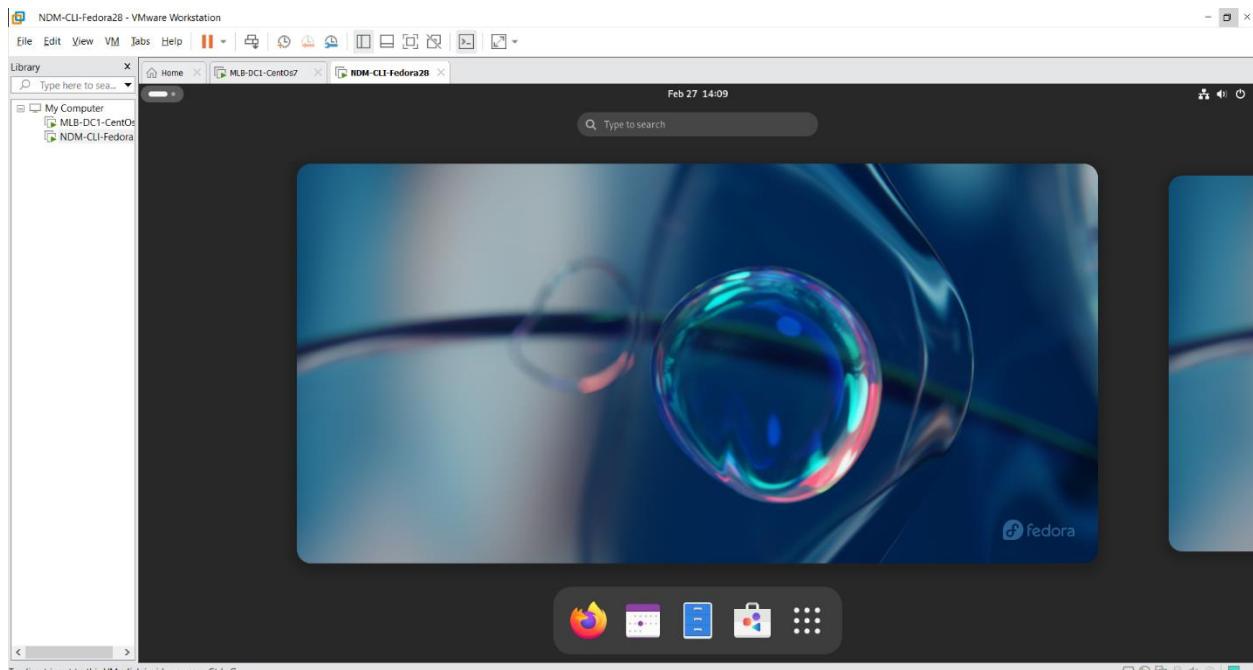
Skip the online access.



Set the username as client1

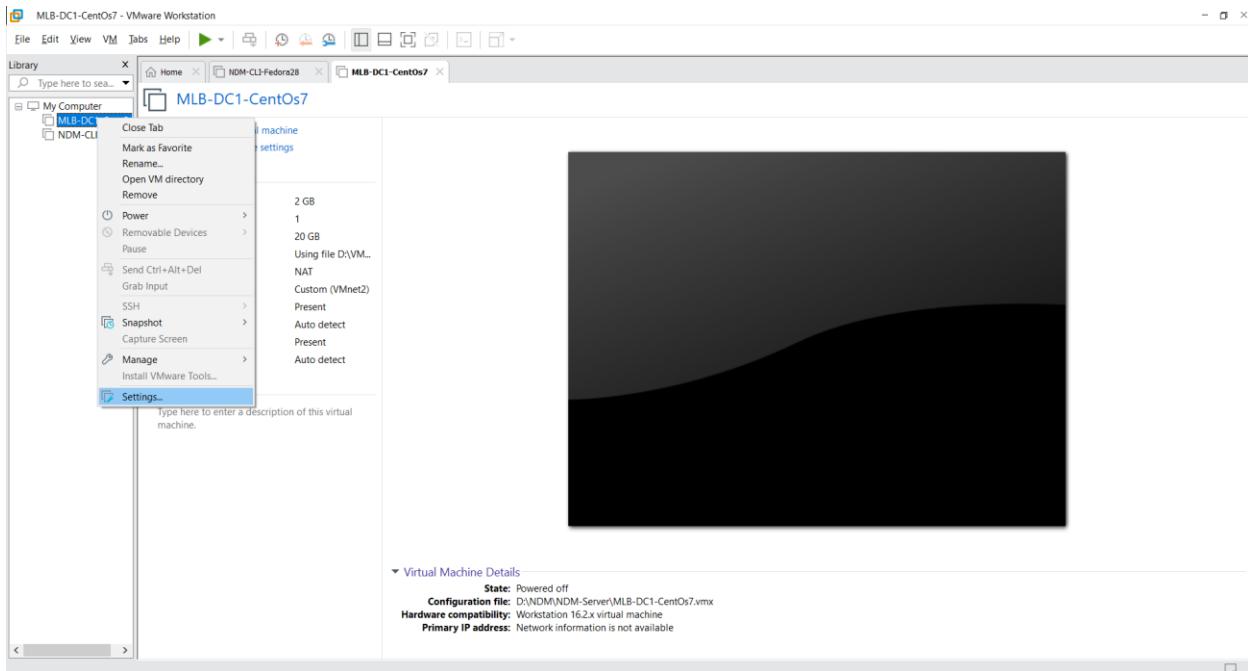


Set the password as client1

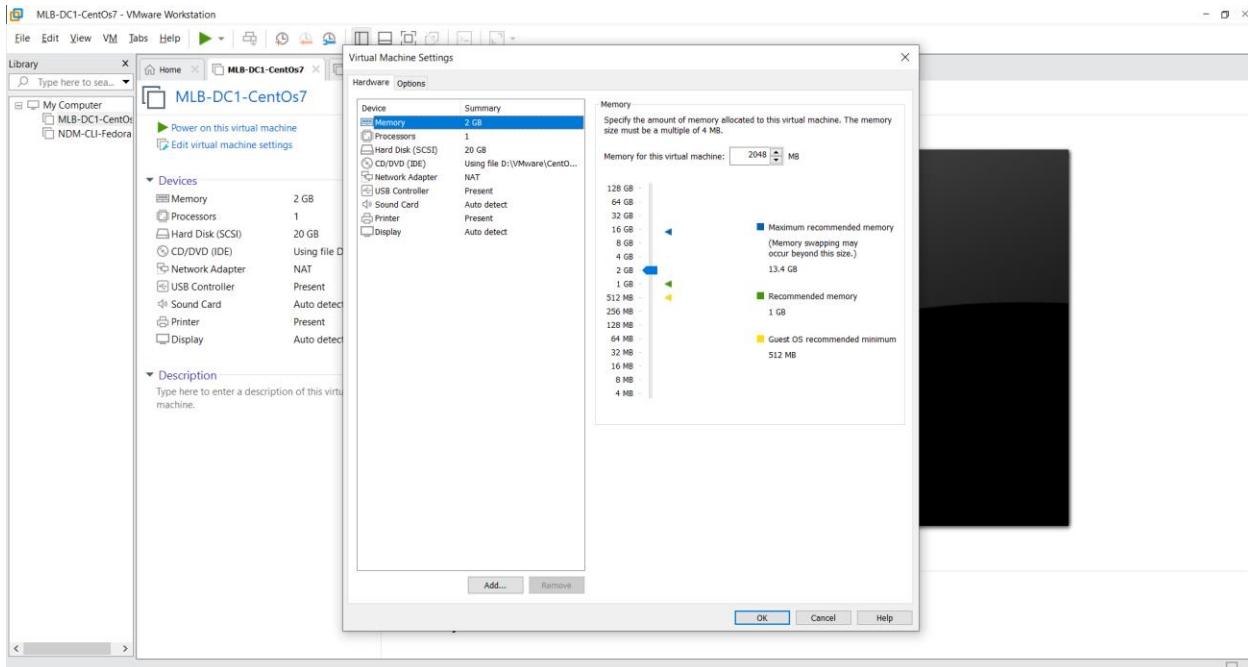


02. Setting up the Network Adaptors.

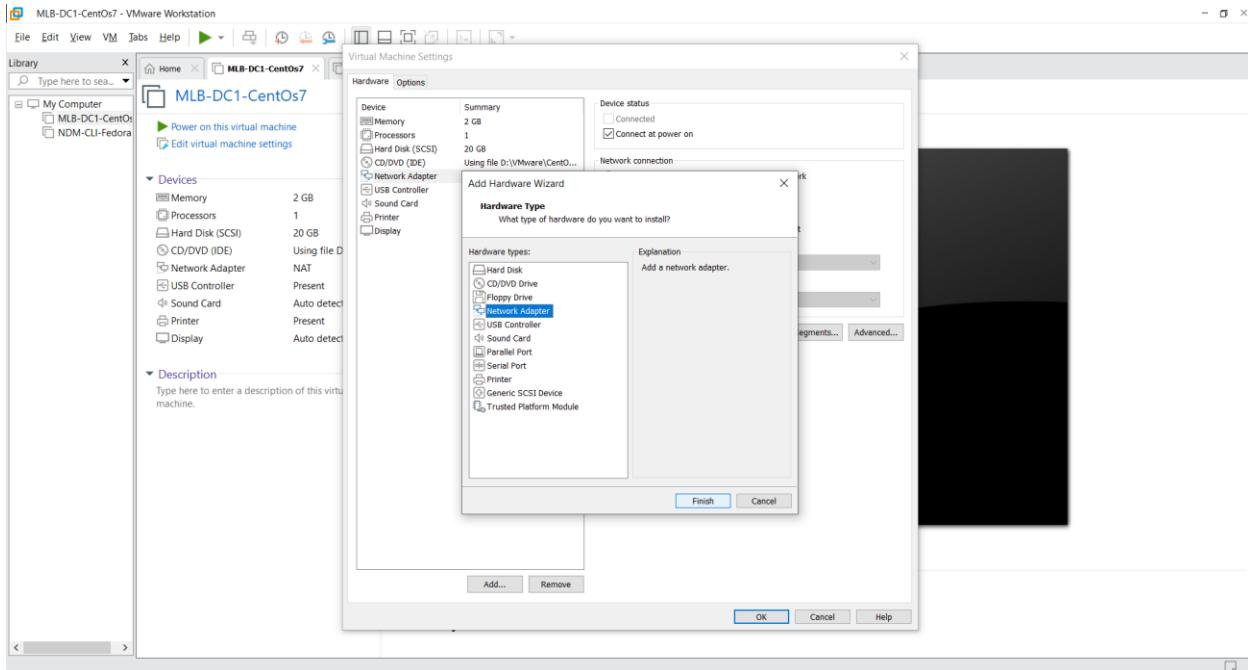
02.01. Setting up the network adaptor for the server.



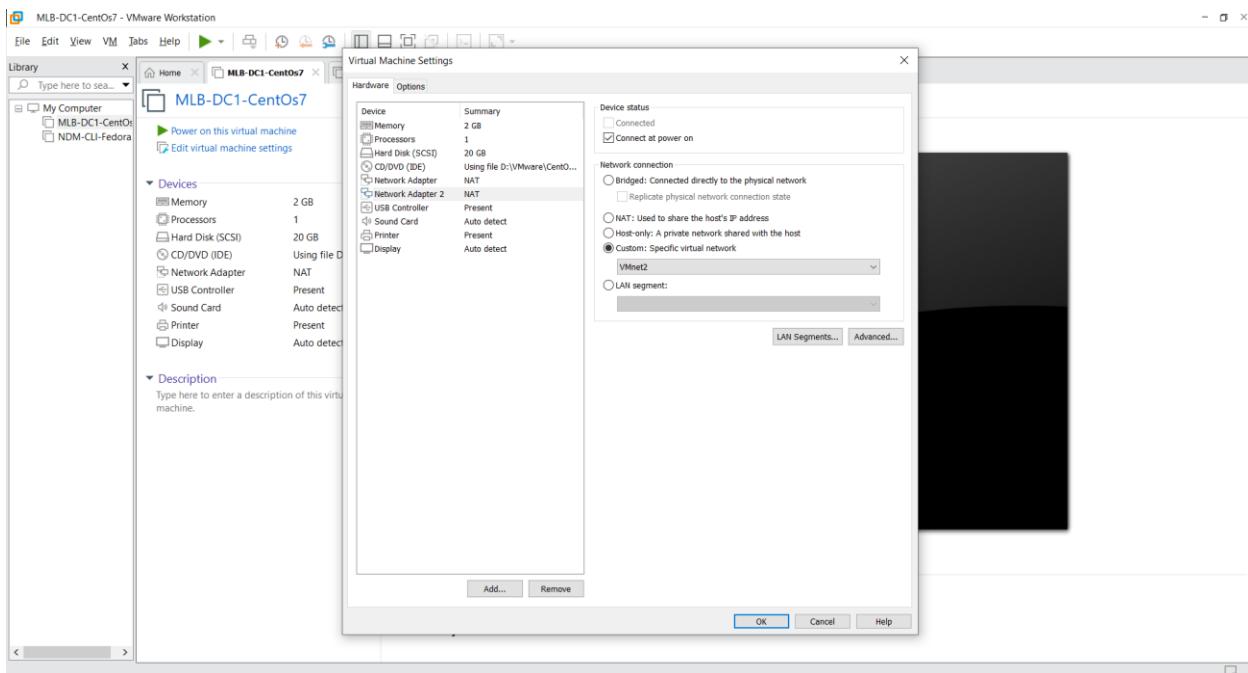
Right click on the server VM and go to settings.



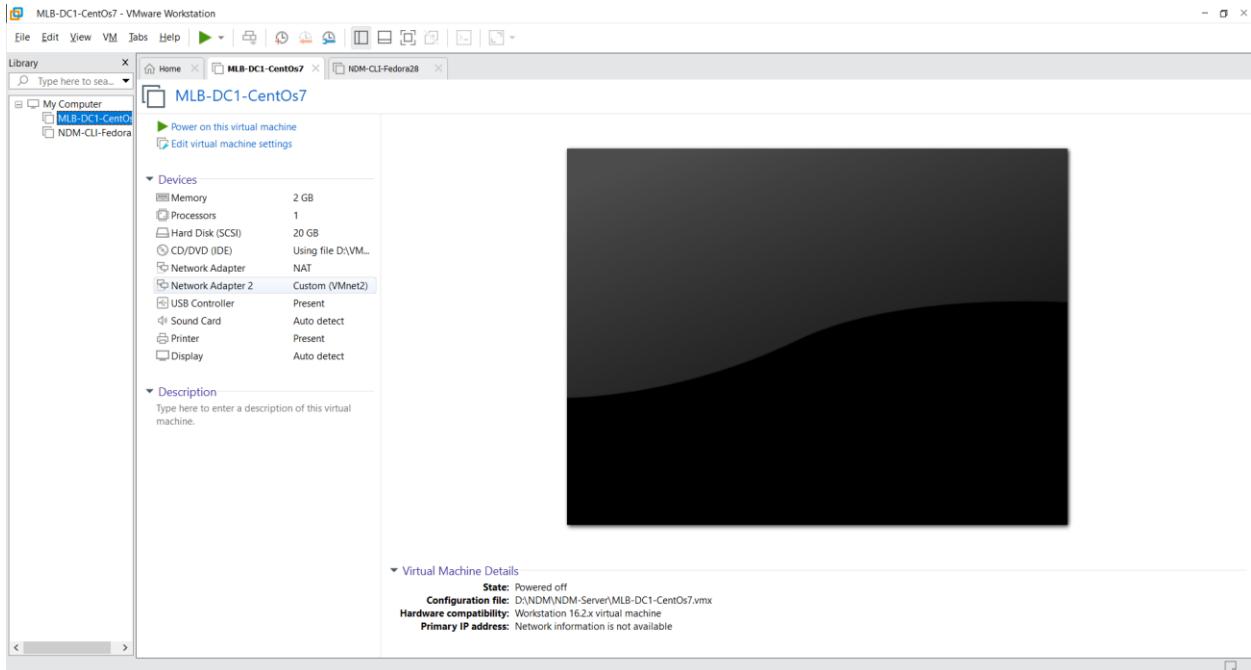
Click on add button.



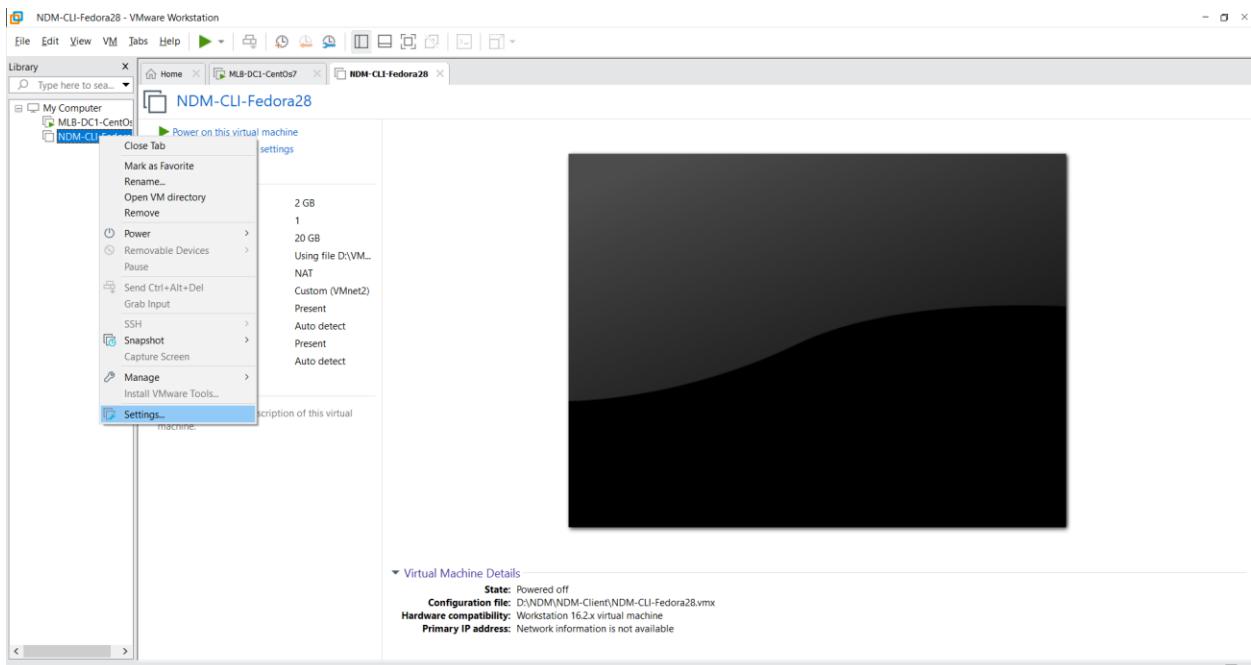
Select network adaptor and finish.



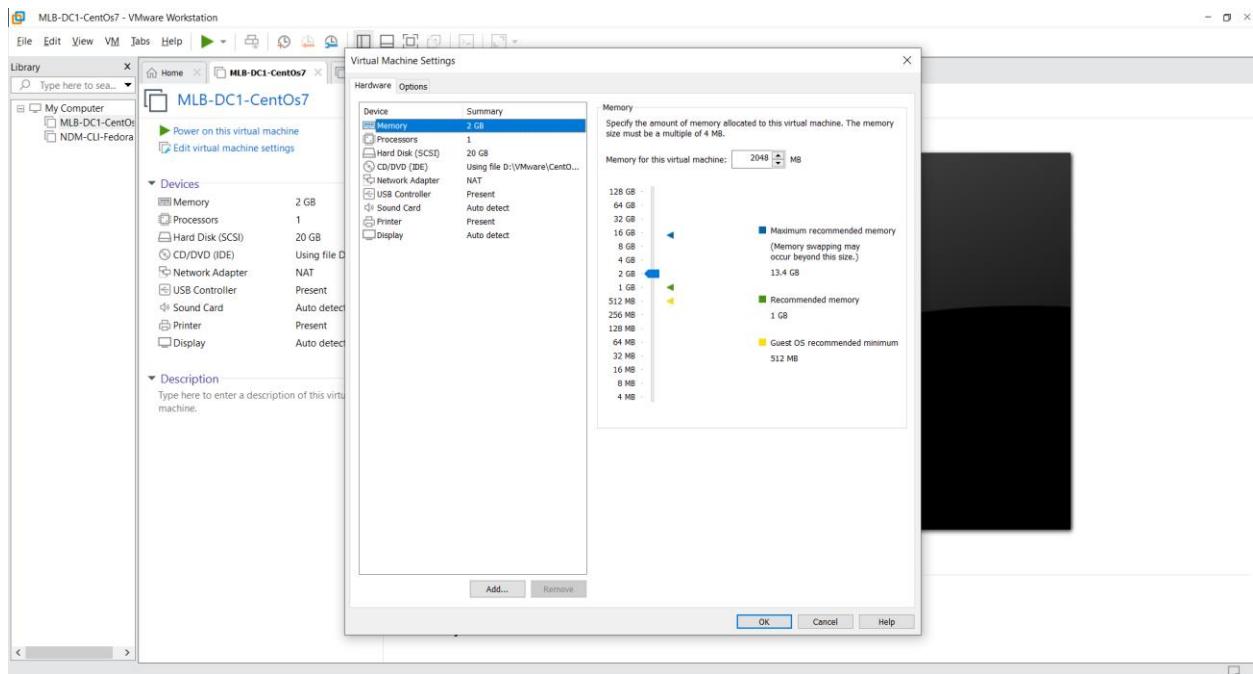
New network adaptor has added and select the new network adaptor and choose custom as the network connection and set the network as VMnet2.



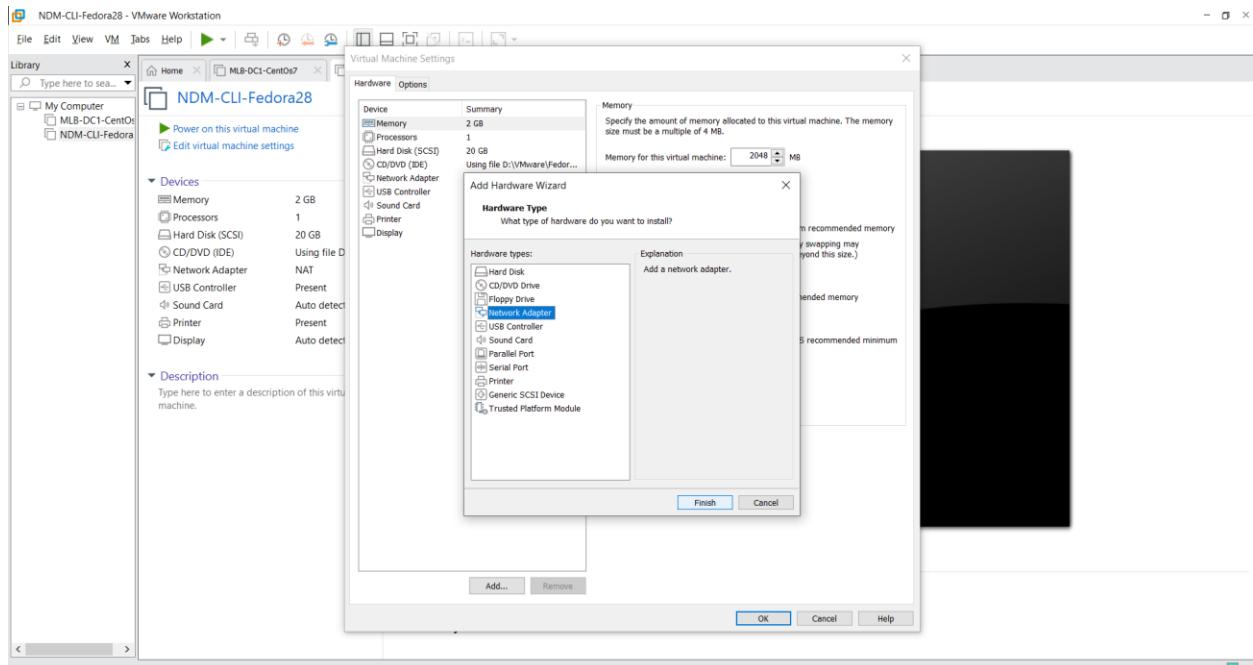
02.02. Setting up the network adaptor for the client.



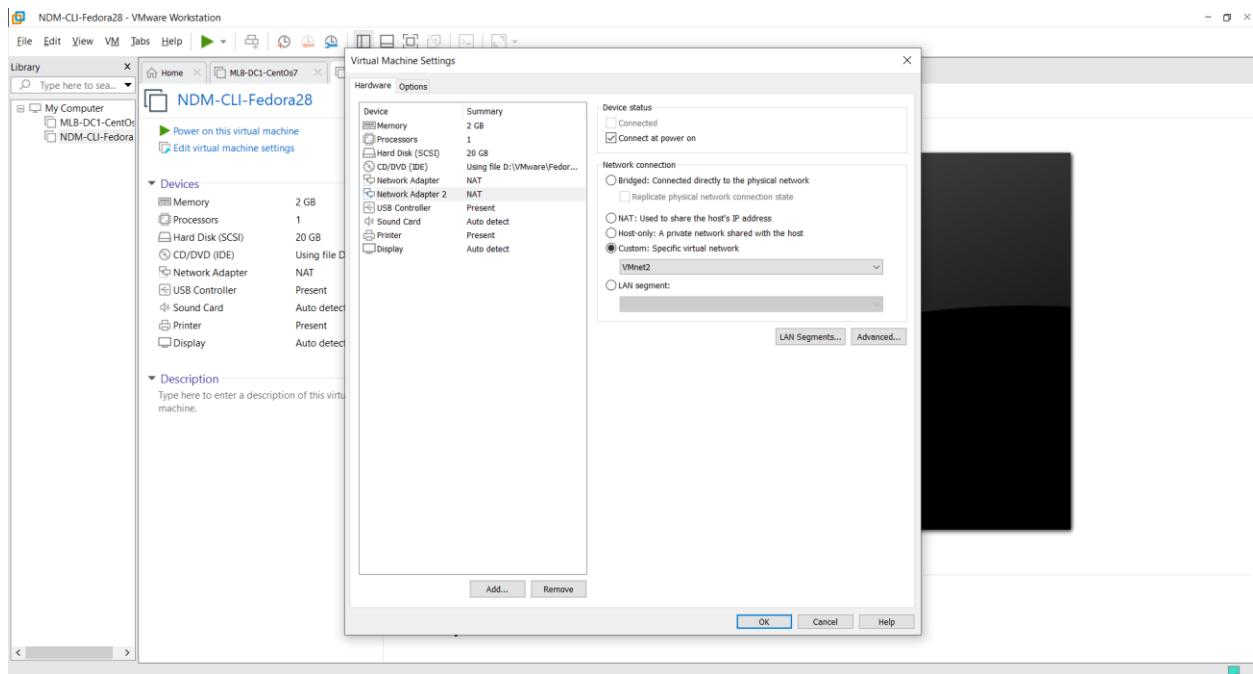
Right click on the client VM and go to settings.



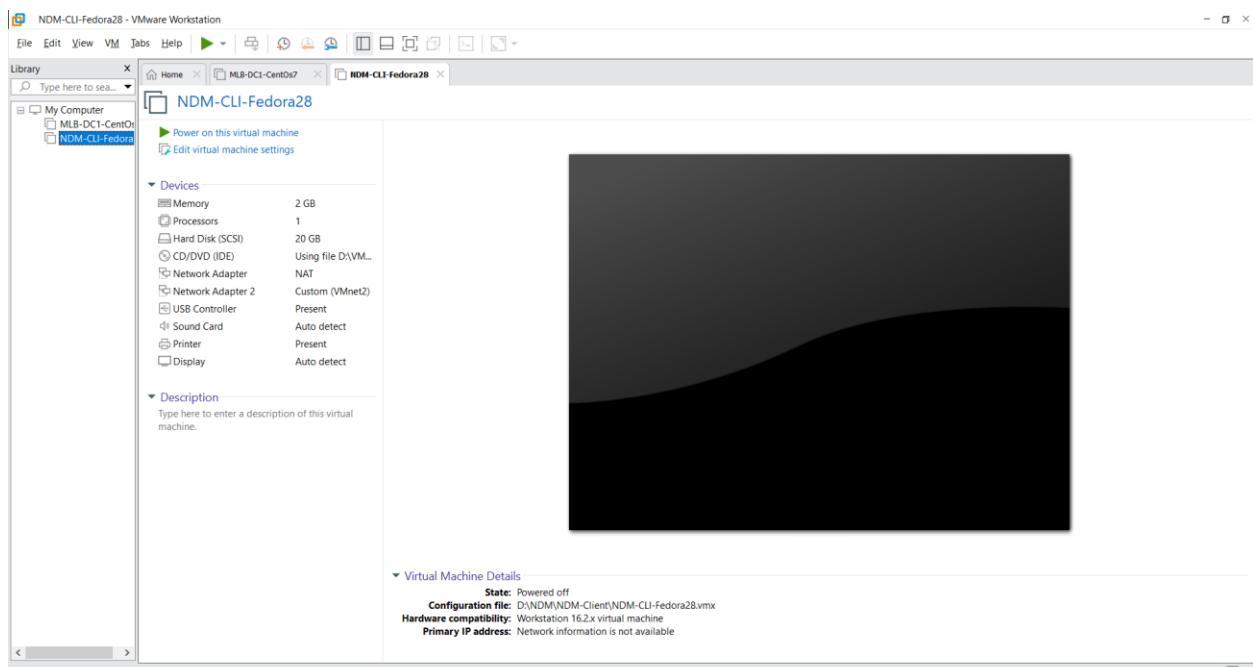
Click on add button.



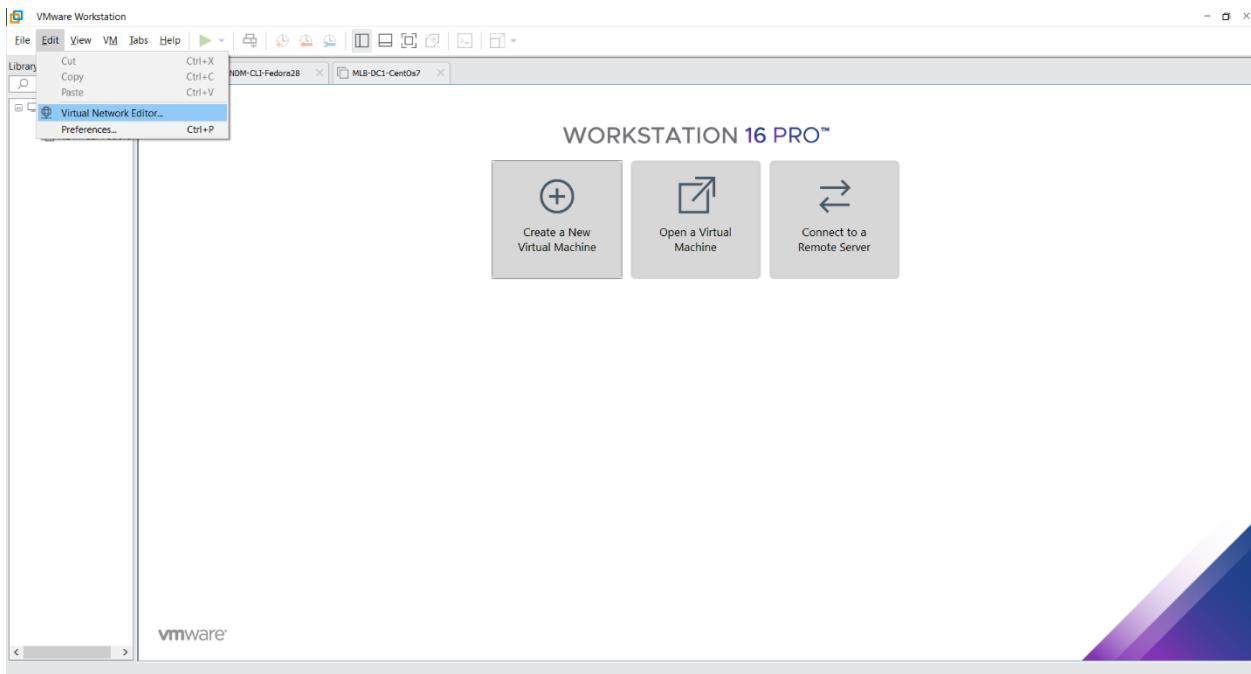
Select network adaptor and finish.



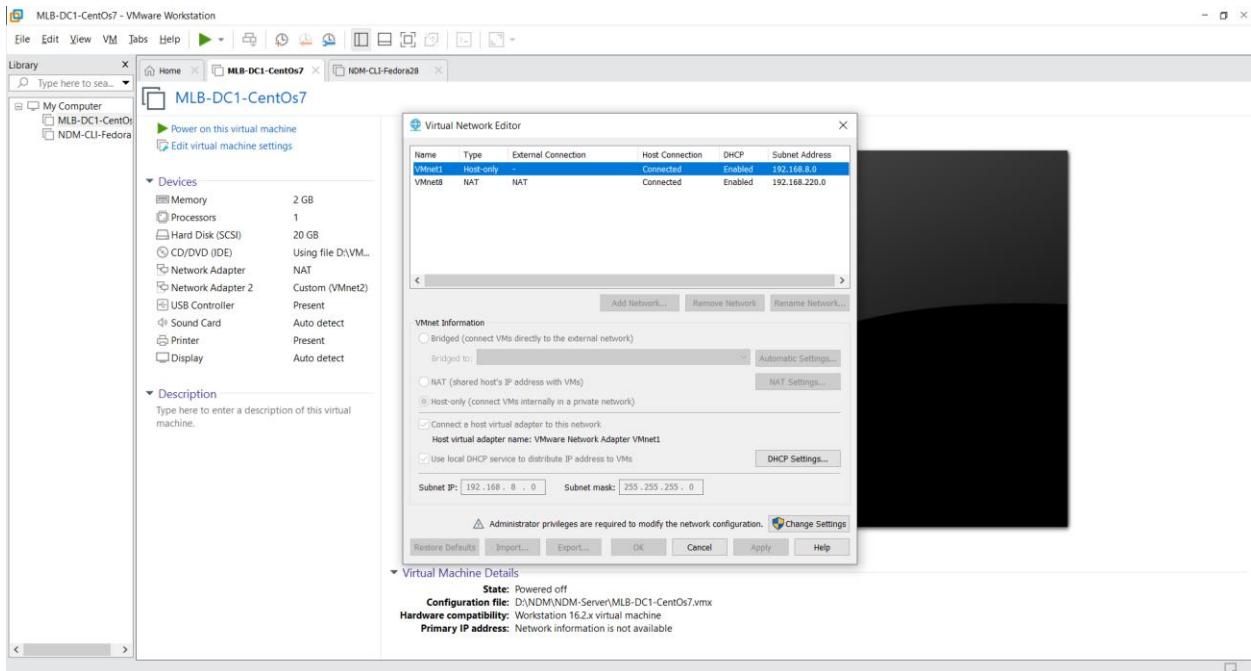
New network adaptor has added and select the new network adaptor and choose custom as the network connection and set the network as VMnet2.



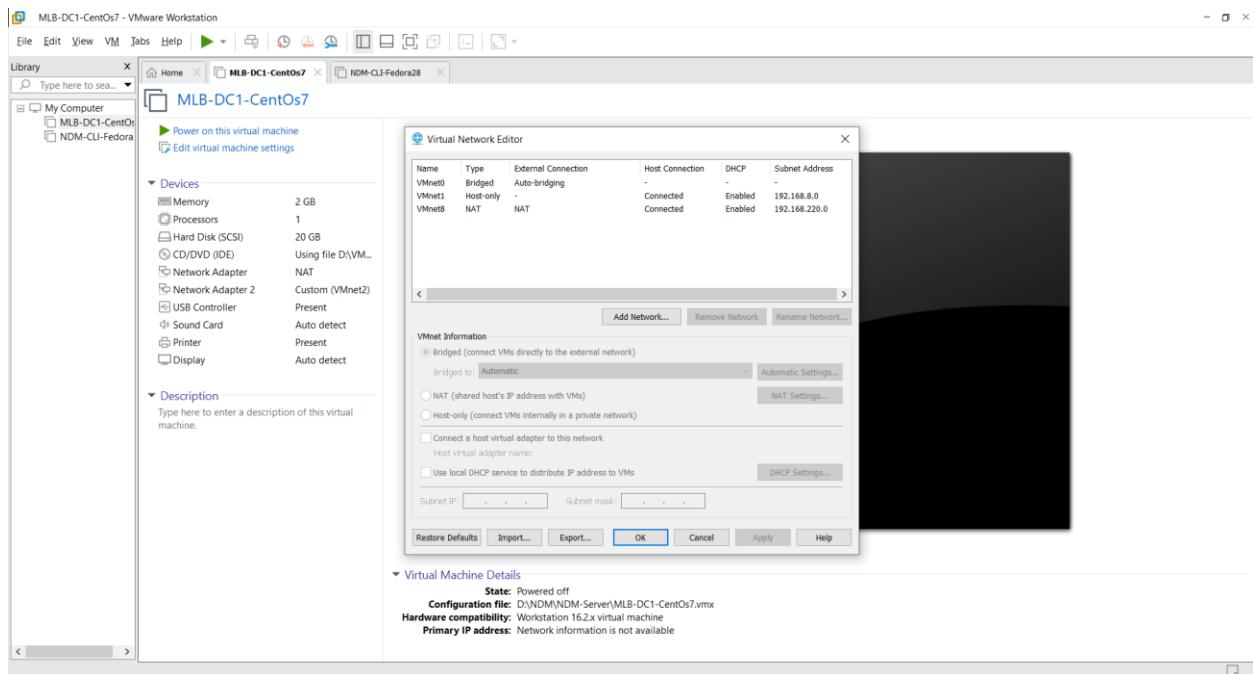
03.Creating virtual switch.



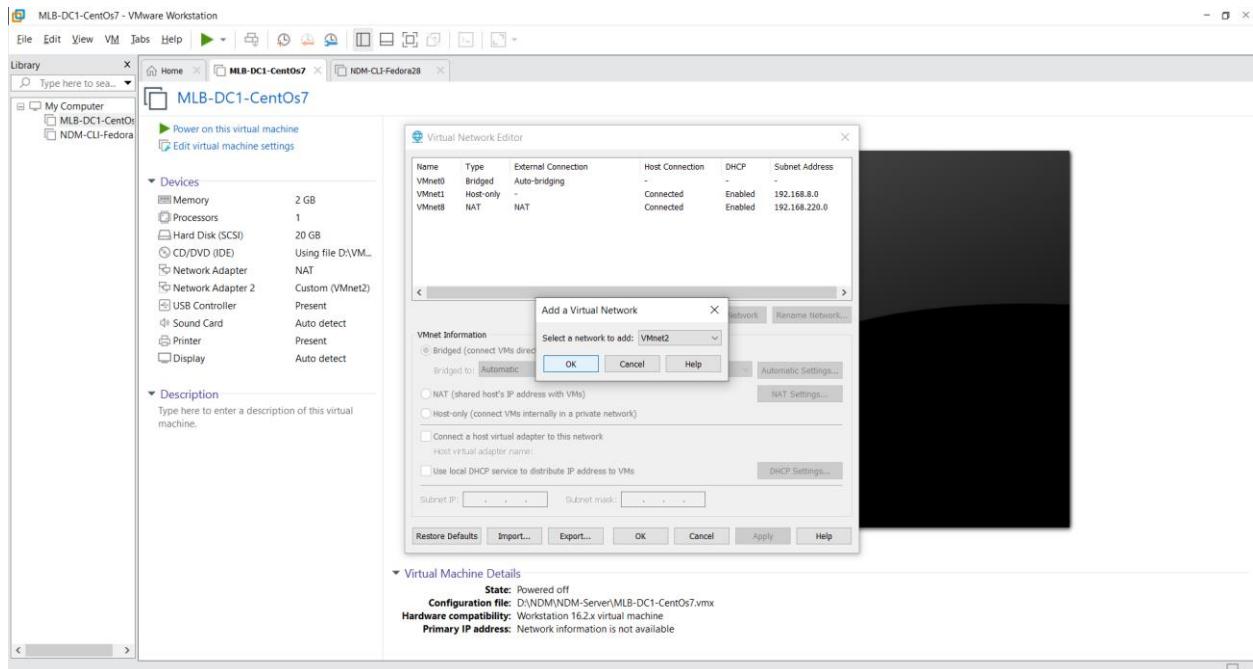
Click on edit tab and go to virtual network editor.



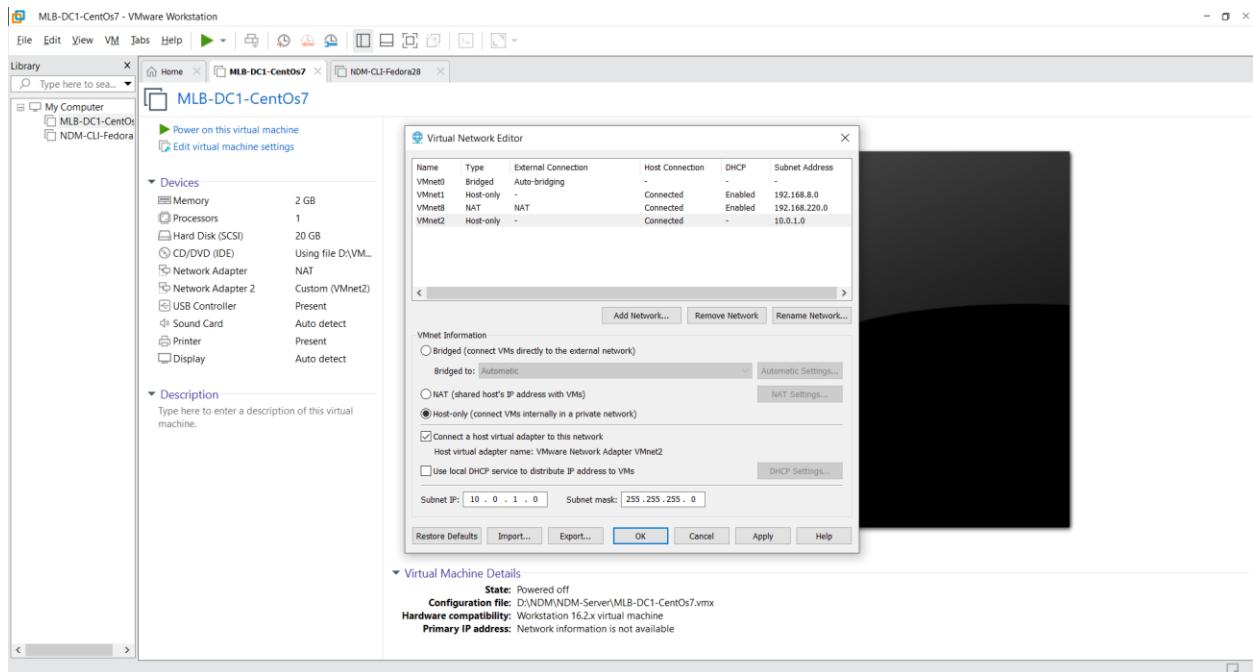
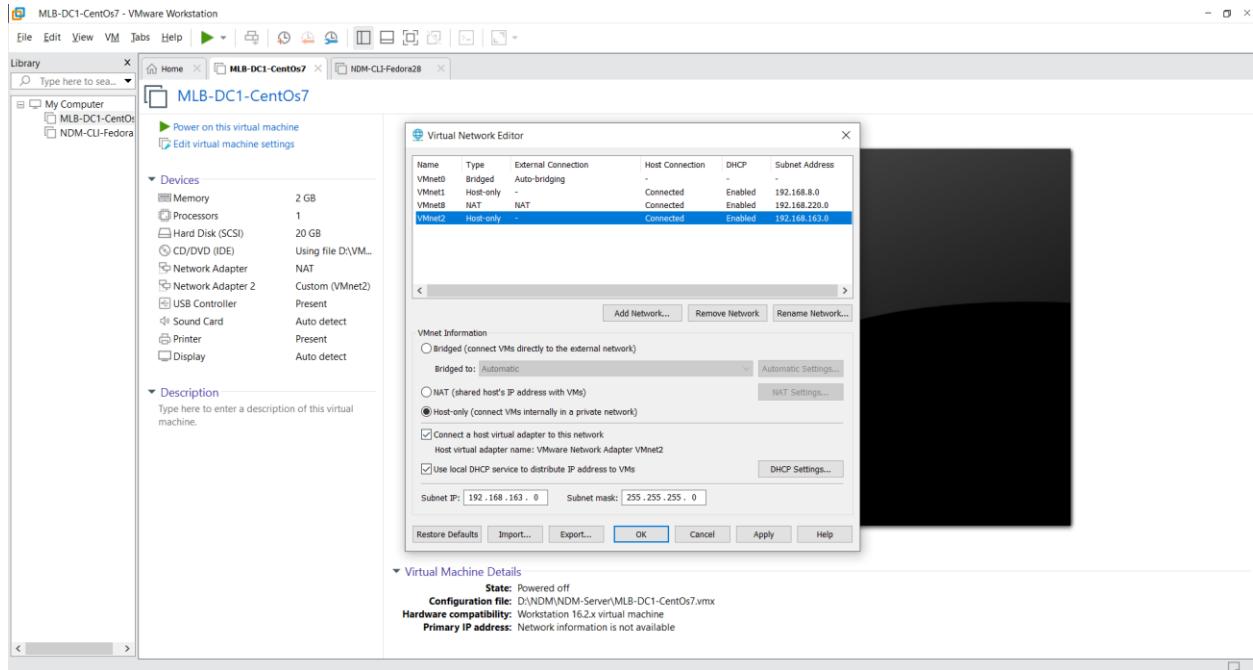
Click on change settings to accept administrator settings.



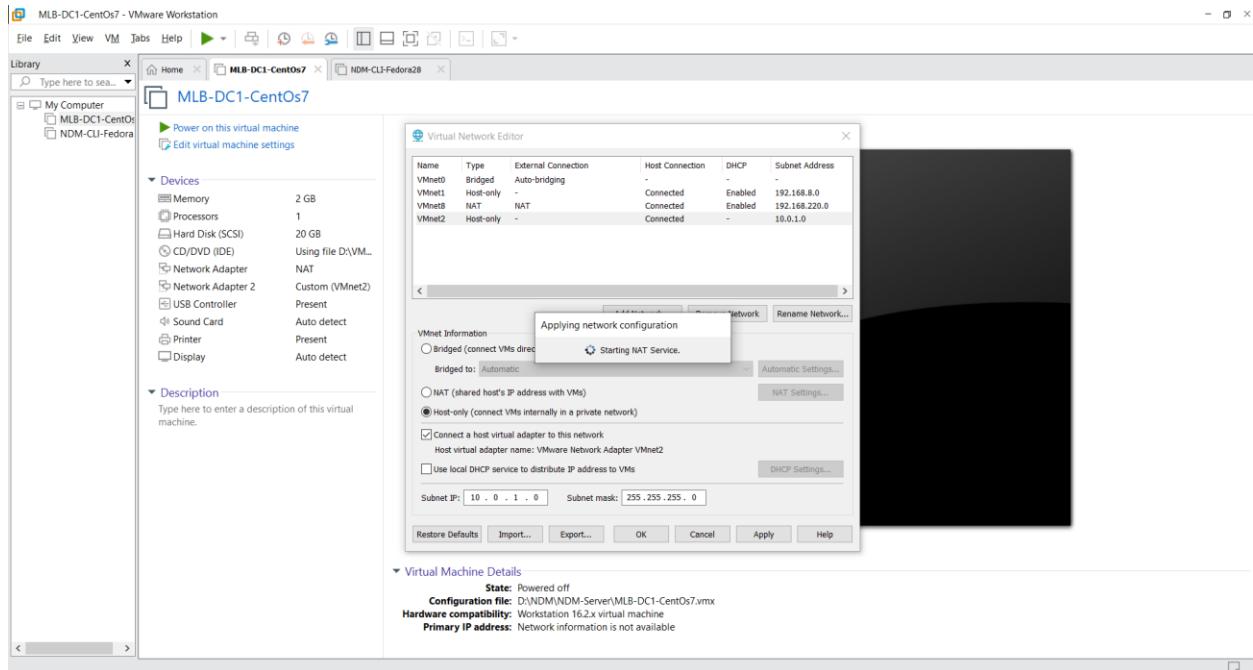
Click on add network to add a new network.



Select VMnet2 and press ok.

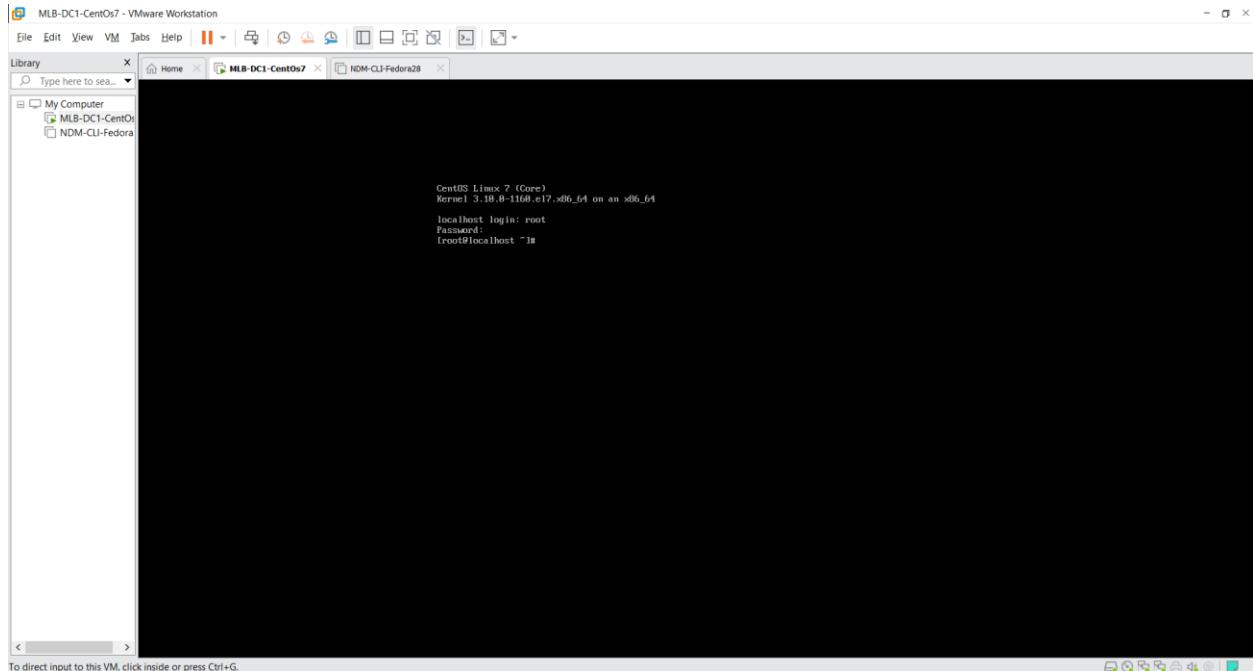


Remove the tick on the use local DHCP and set Subnet IP as 10.0.1.0 and Subnet Mask as 255.255.255.0 and press ok.

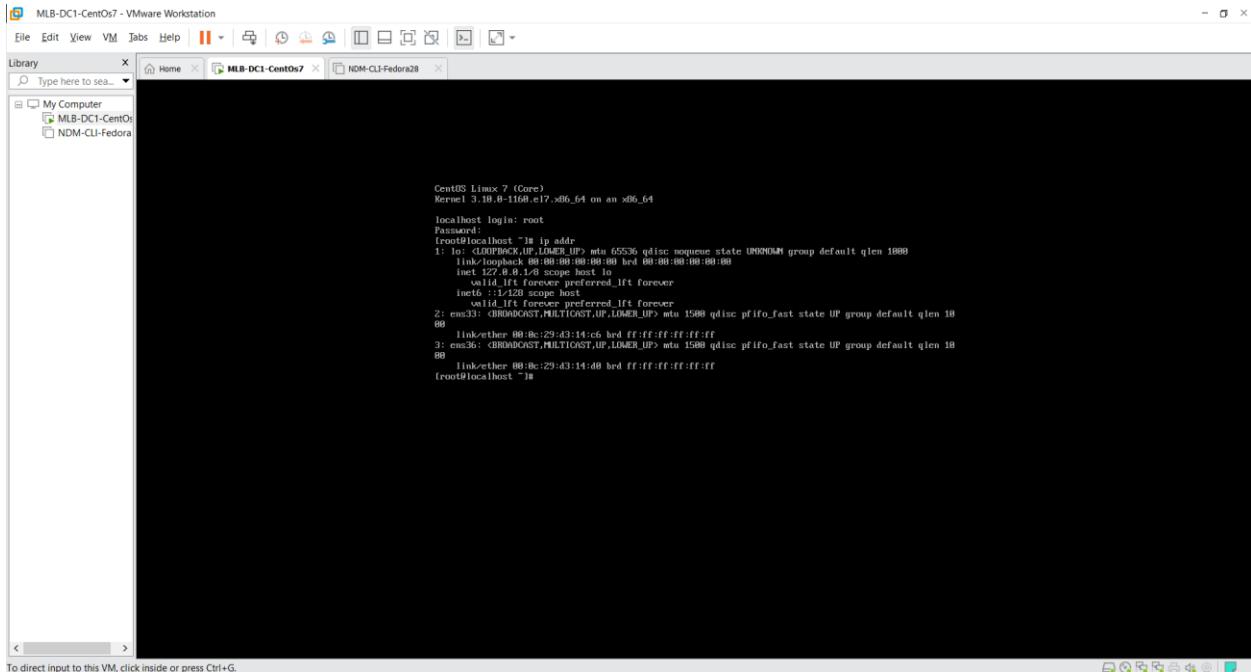


04. IP Configuration for the VMS.

04.01. IP configuration for the Server.

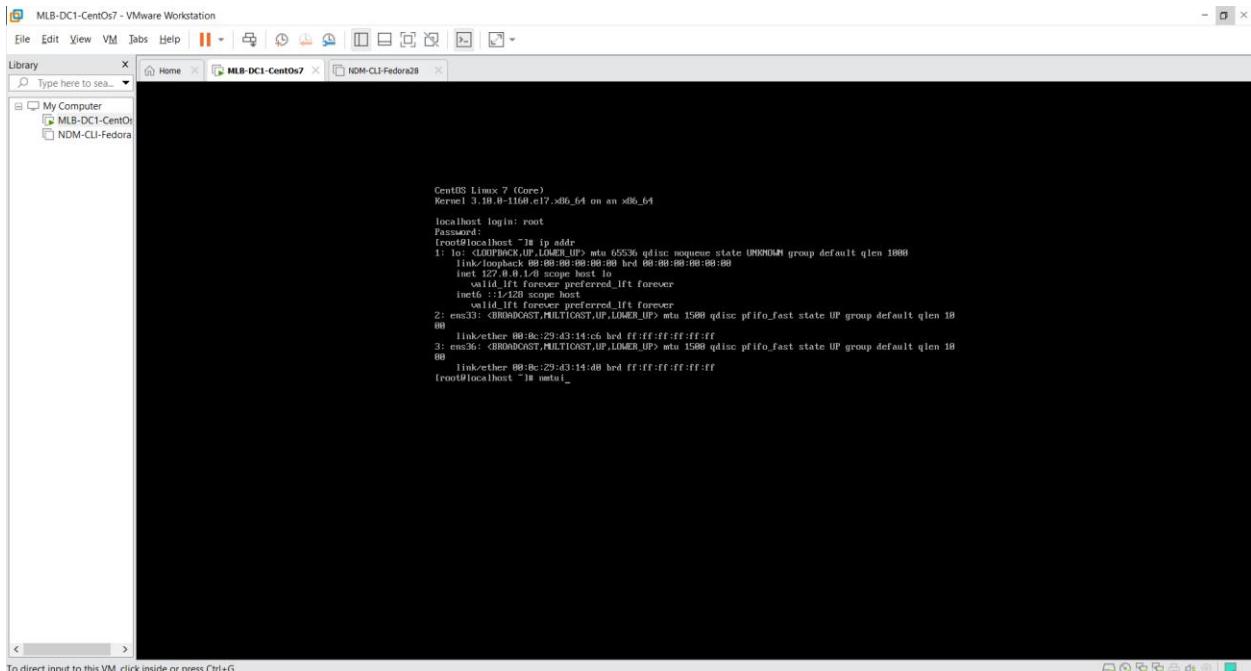


Login as root user.



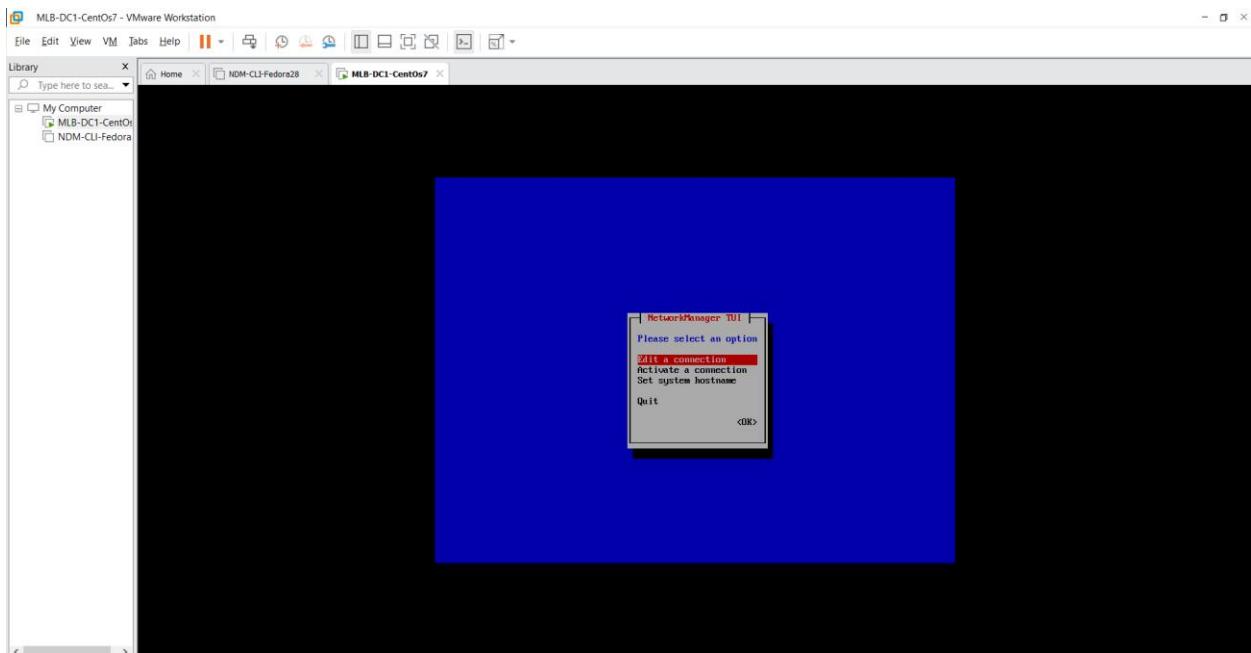
```
CentOS Linux 7 (Core)
Kernel 3.10.0-1160.el7.x86_64 on an x86_64
localhost login: root
Password:
[root@localhost ~]# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback brd 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 brd 00:00:00:00:00:00 scope host lo
        valid_lft forever preferred_lft forever
inet6 ::1/128 brd :: scope host lo
    valid_lft forever preferred_lft forever
2: ens33: <NOBROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:43:14:c6 brd ff:ff:ff:ff:ff:ff
3: ens36: <NOBROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:43:14:d8 brd ff:ff:ff:ff:ff:ff
[root@localhost ~]#
```

Run the command “ip addr” to get the connected networks.

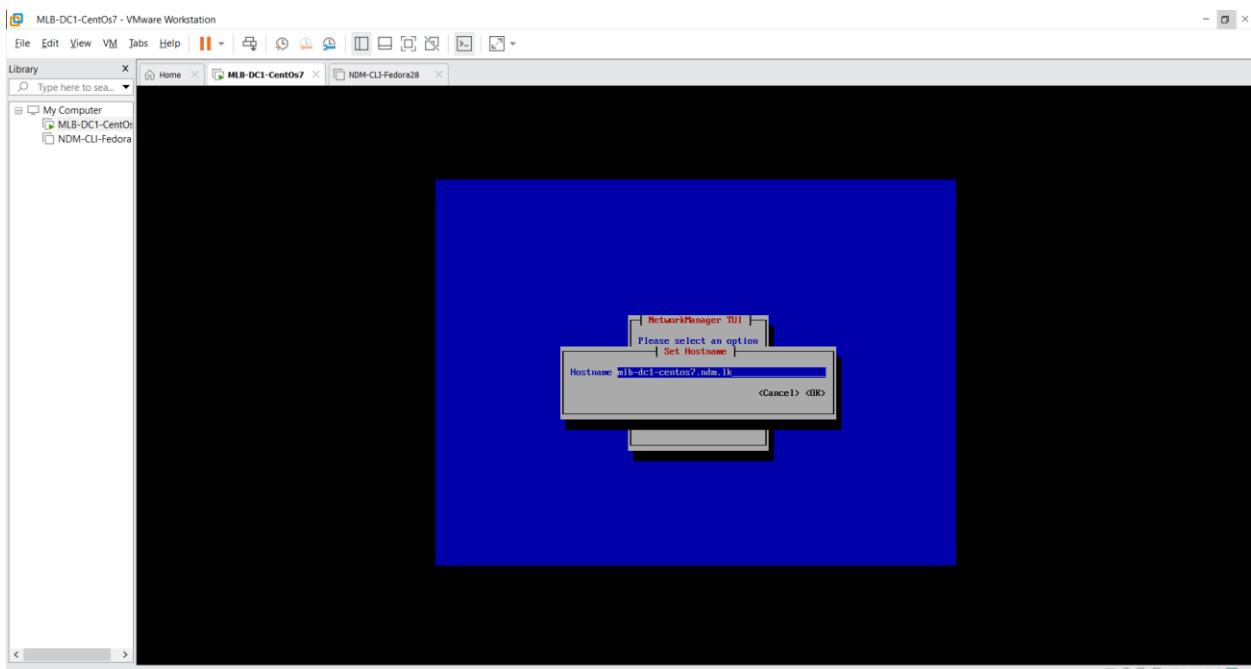


```
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Kernel 3.10.0-1160.el7.x86_64 on an x86_64
localhost login: root
Password:
[root@localhost ~]# ip addr
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    link/loopback brd 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 brd 00:00:00:00:00:00 scope host lo
        valid_lft forever preferred_lft forever
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    link/ether 00:0c:29:43:14:d8 brd ff:ff:ff:ff:ff:ff
[root@localhost ~]# nmtui
```

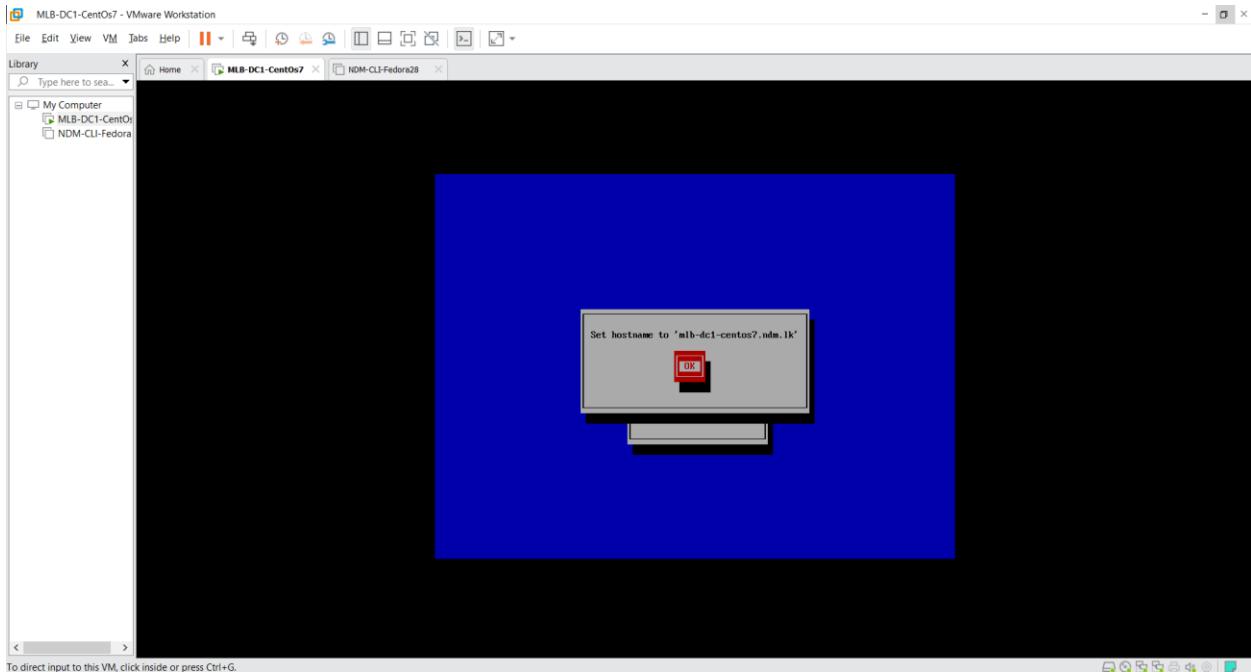
Run the command “nmtui” to go to NetworkManager TUI



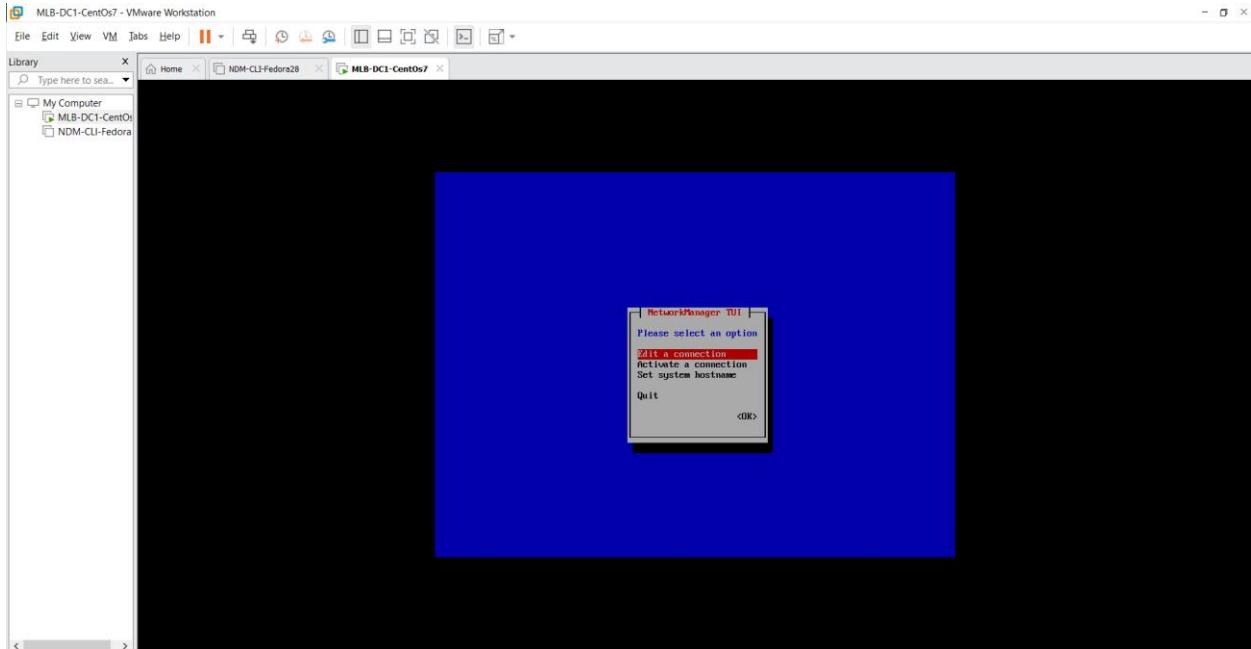
Select system hostname



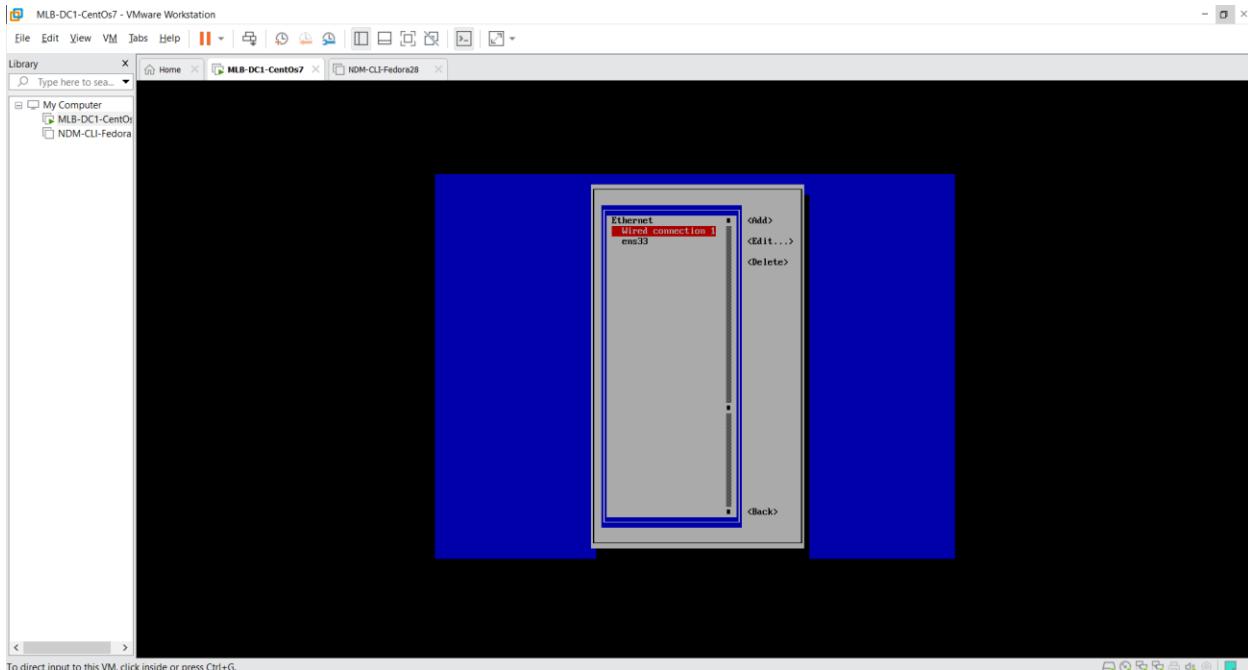
Change the host name as mlb-dc1-centos7.ndm.lk



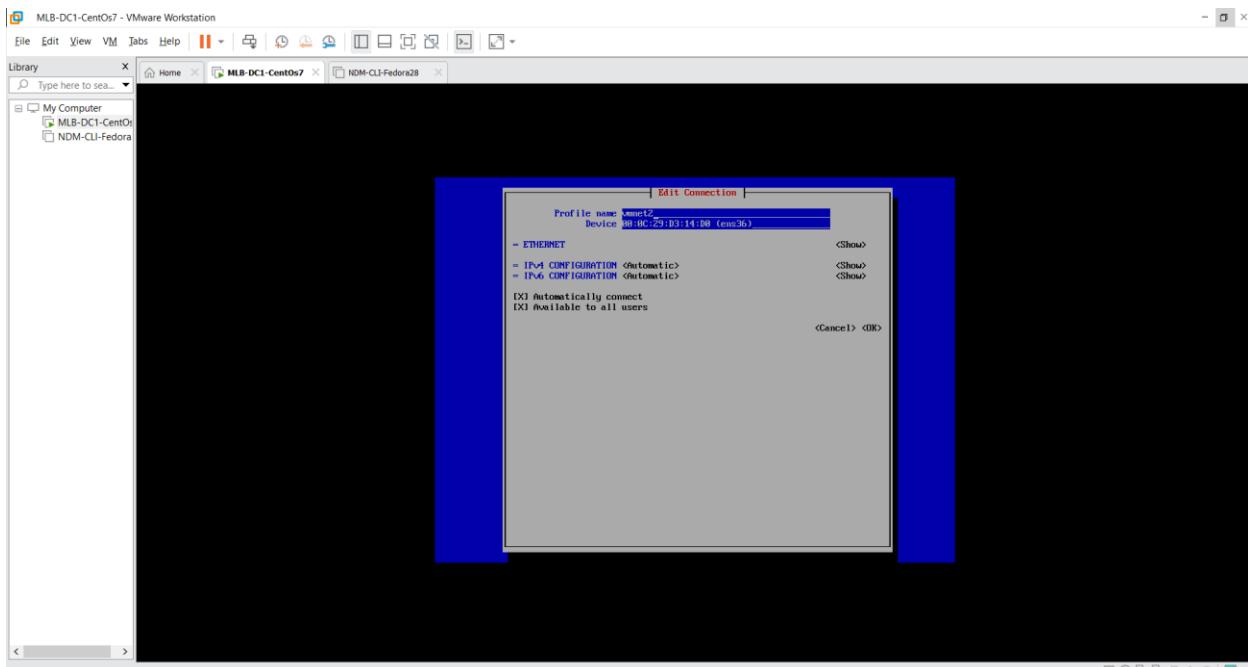
To direct input to this VM, click inside or press Ctrl+G.



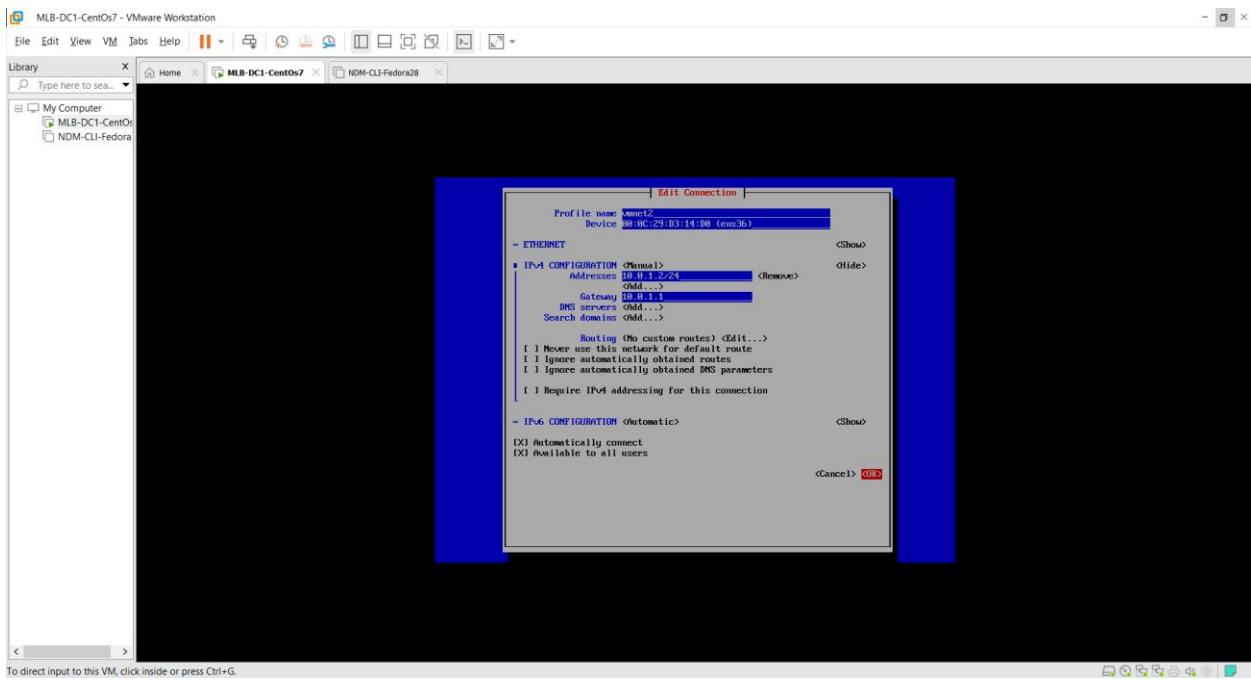
Go to edit a connection.



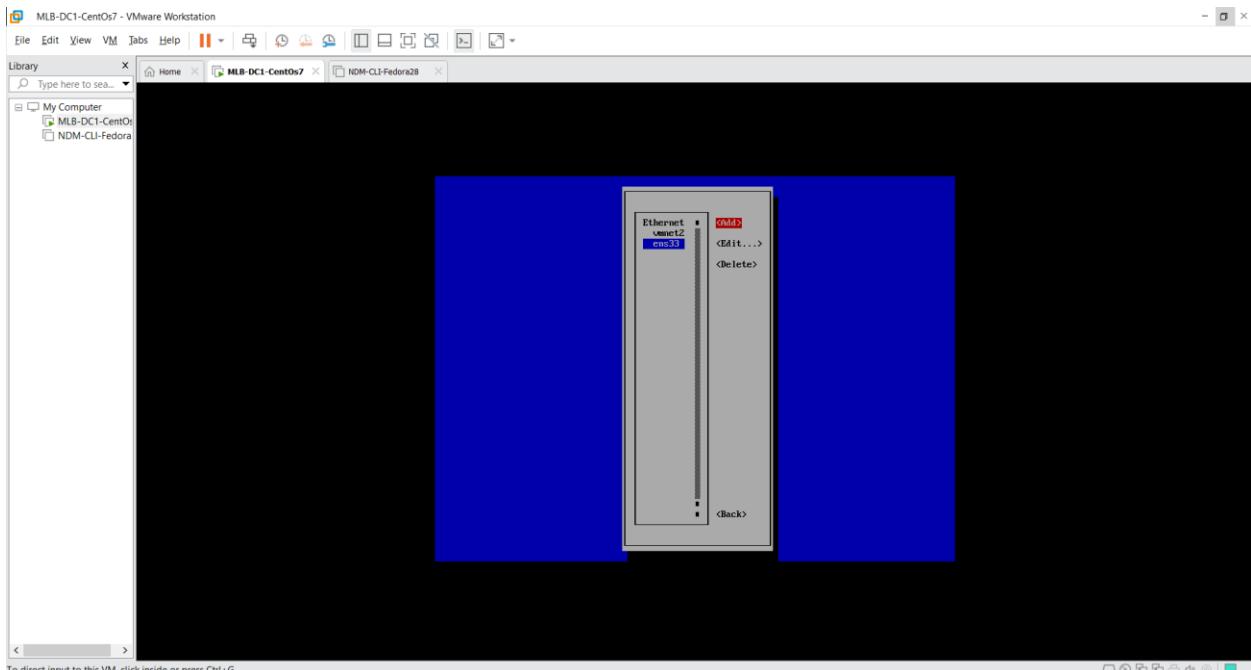
Select wired connection1 and go to edit

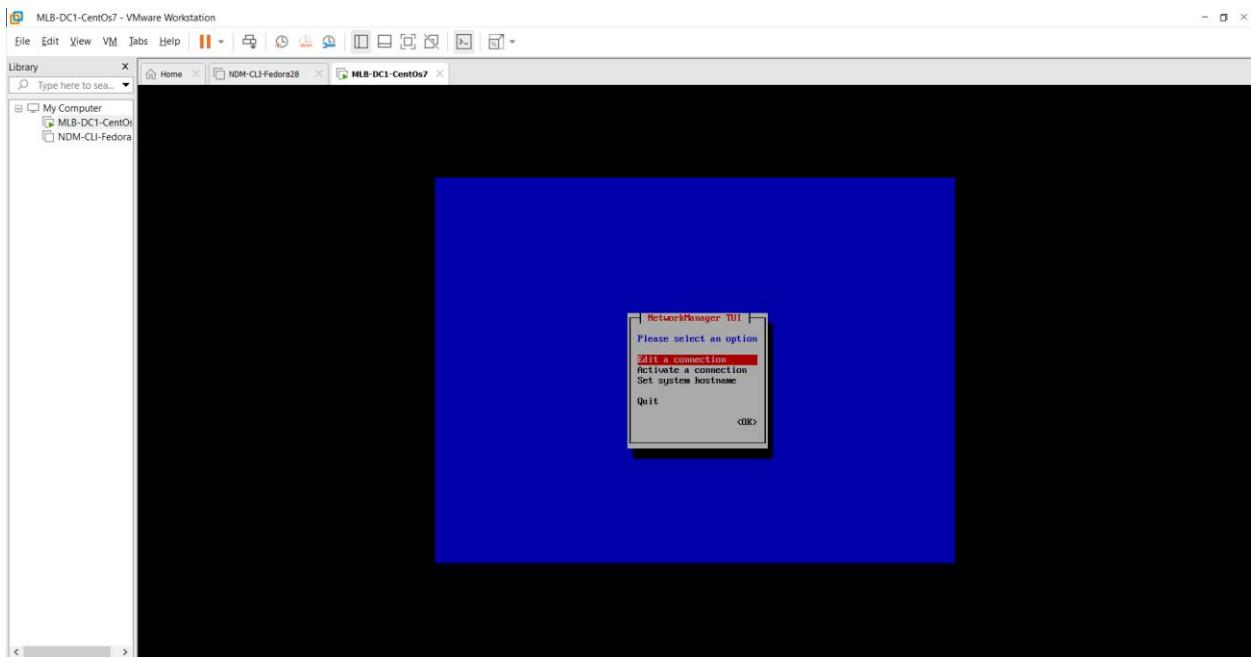


Change the profile name as vmnet2

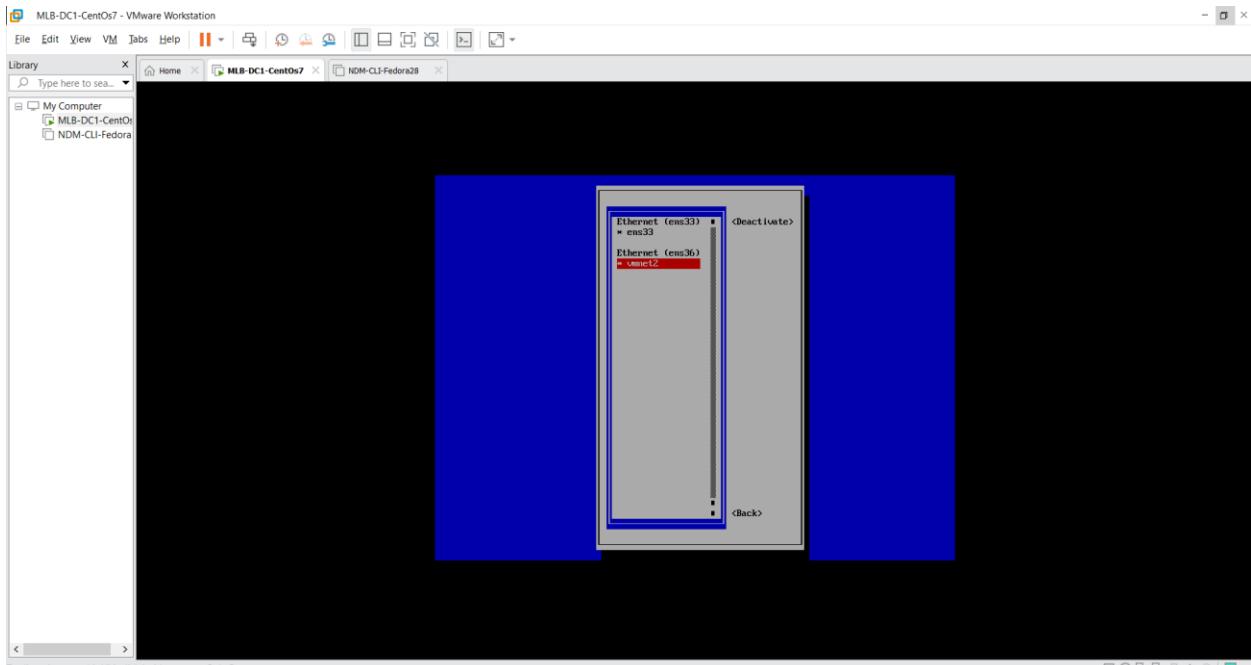


Click on IPv4 configuration show and select as manual. Edit the address as 10.0.1.2/24 and gateway as 10.0.1.1 and click on ok.

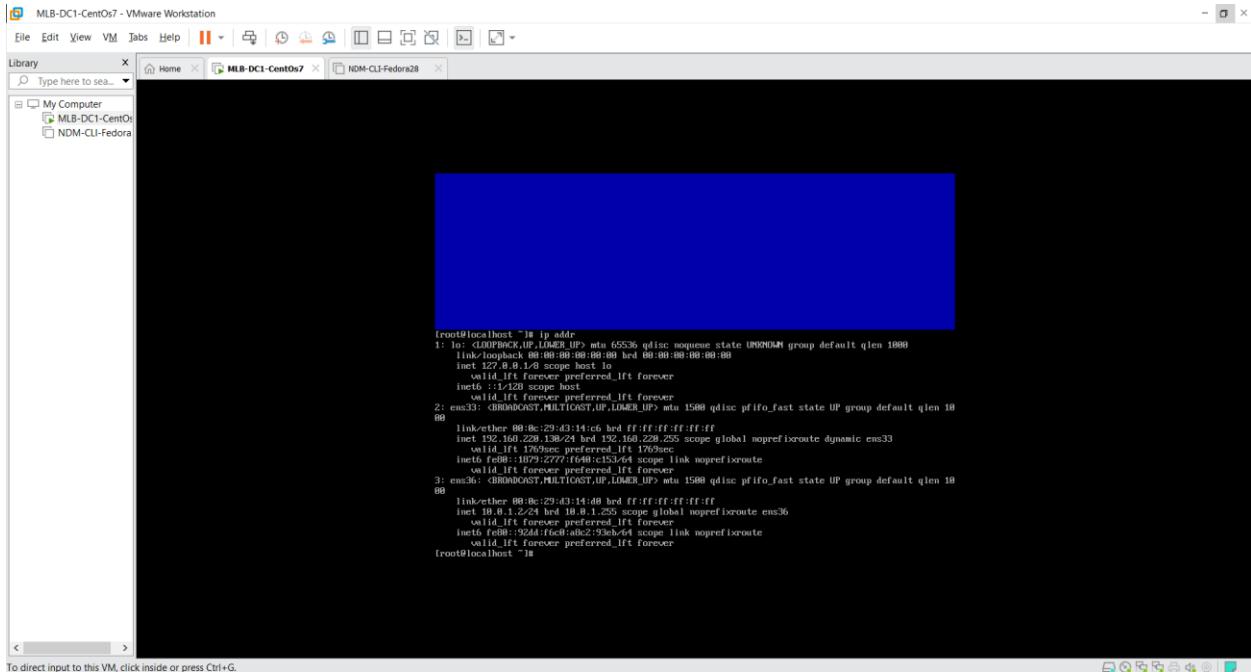




Go to activate a connection.

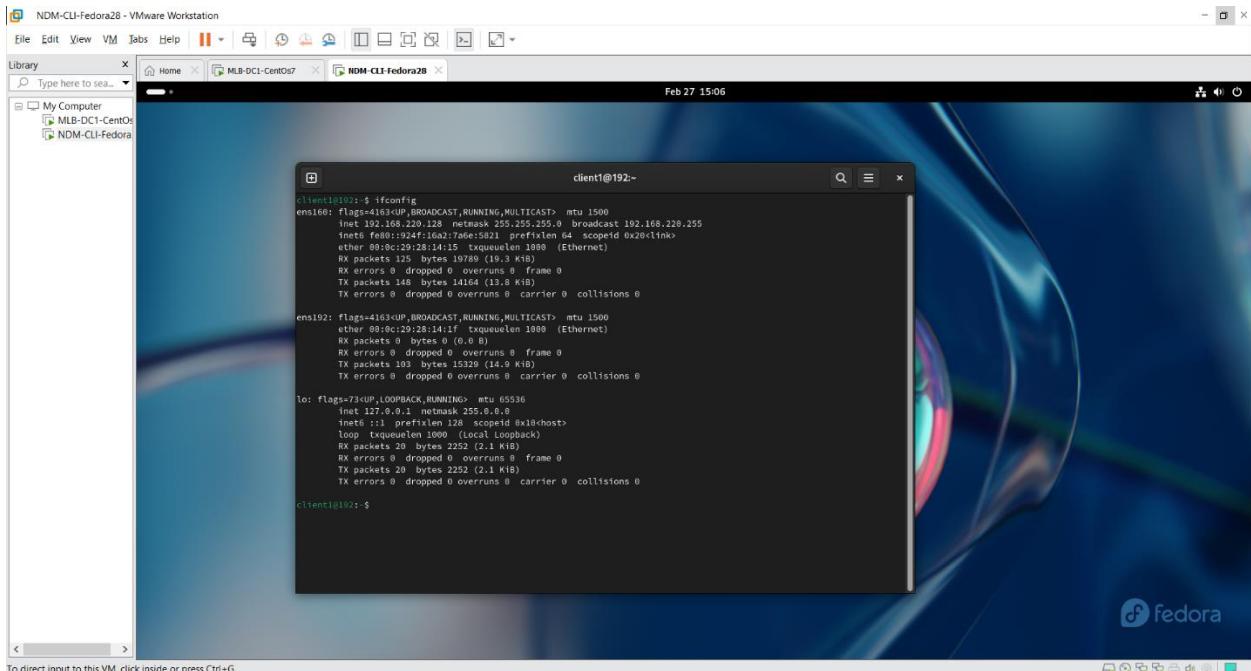


Activate both two connections and go back and exit the NetworkManager TUI.

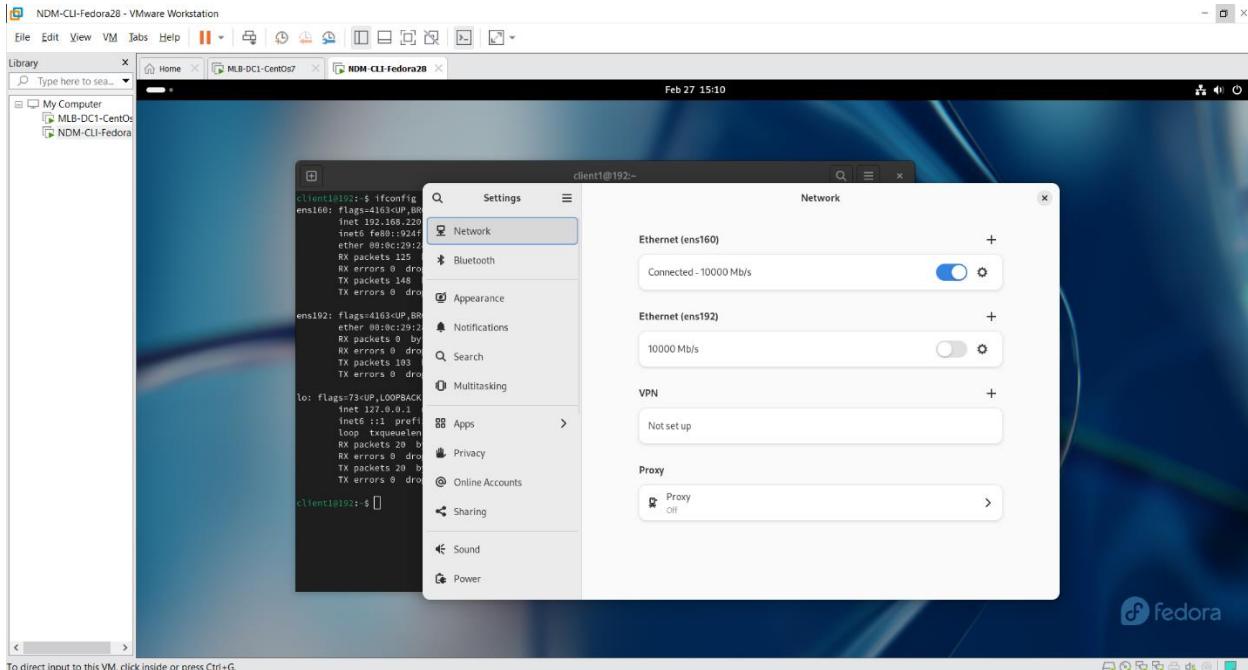


Run the command “ip addr” to clarify the changes of the networks.

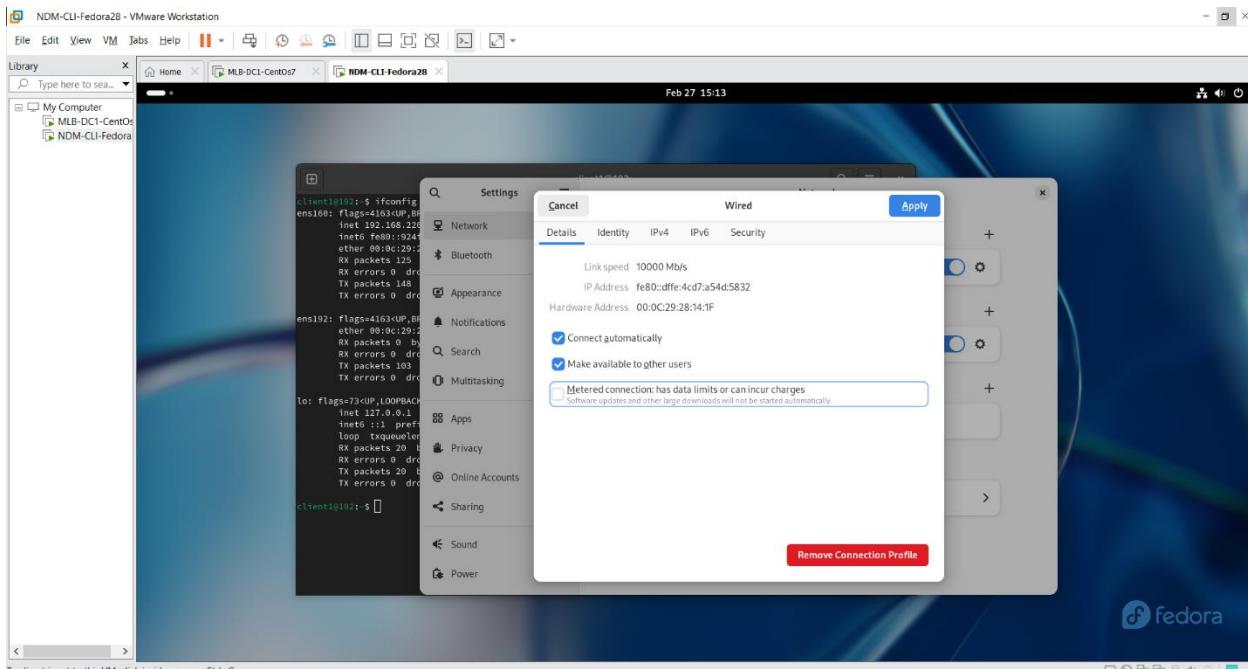
04.02. IP configuration for the Client.



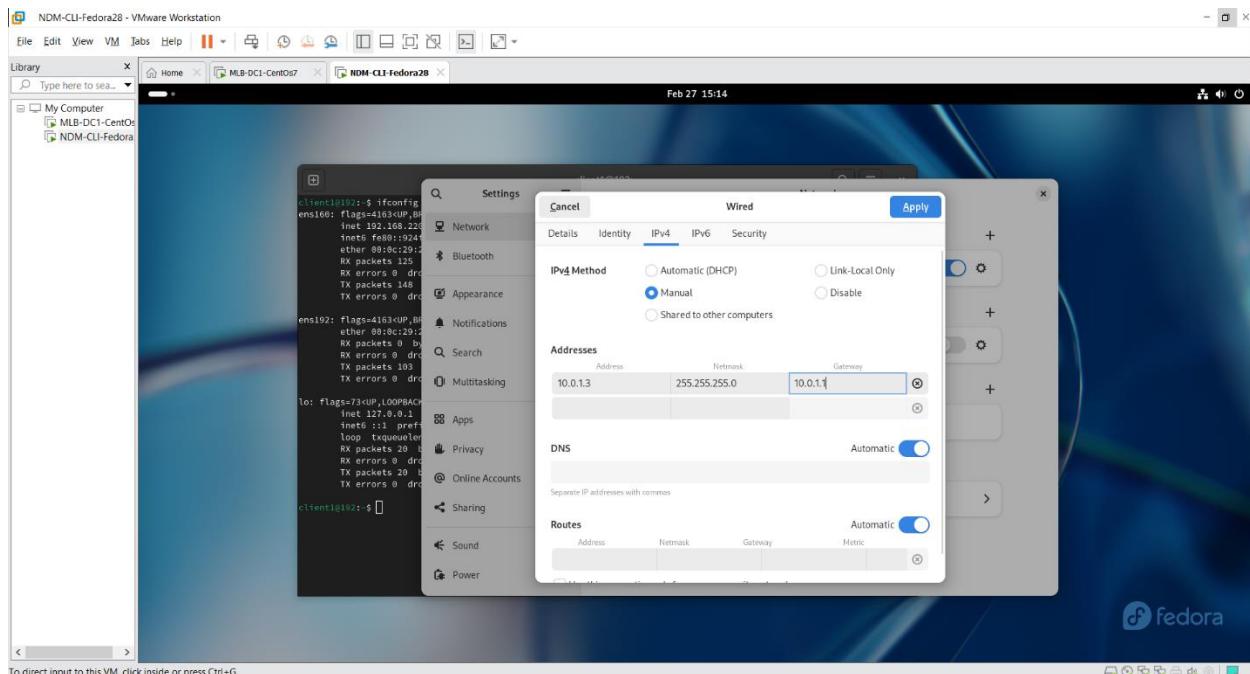
Run the terminal of the fedoraOS and run the command “ifconfig” to get the connected networks from CLI.



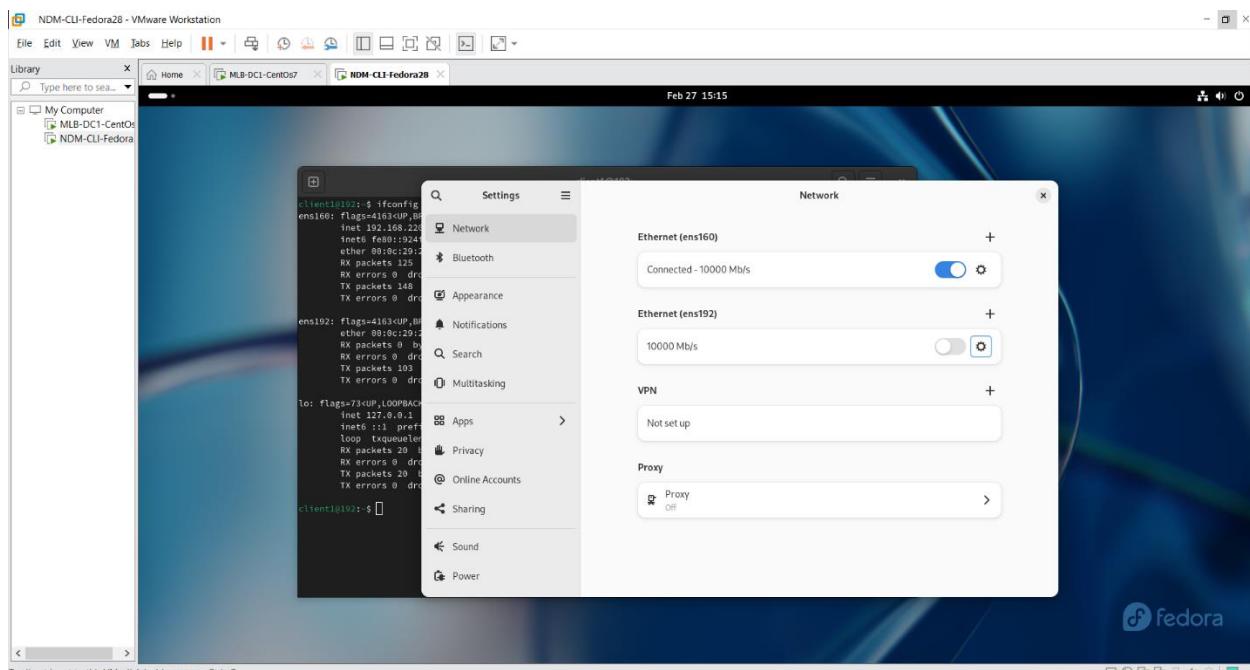
Go to settings and select the network tab to get the connected network connections from the GUI.



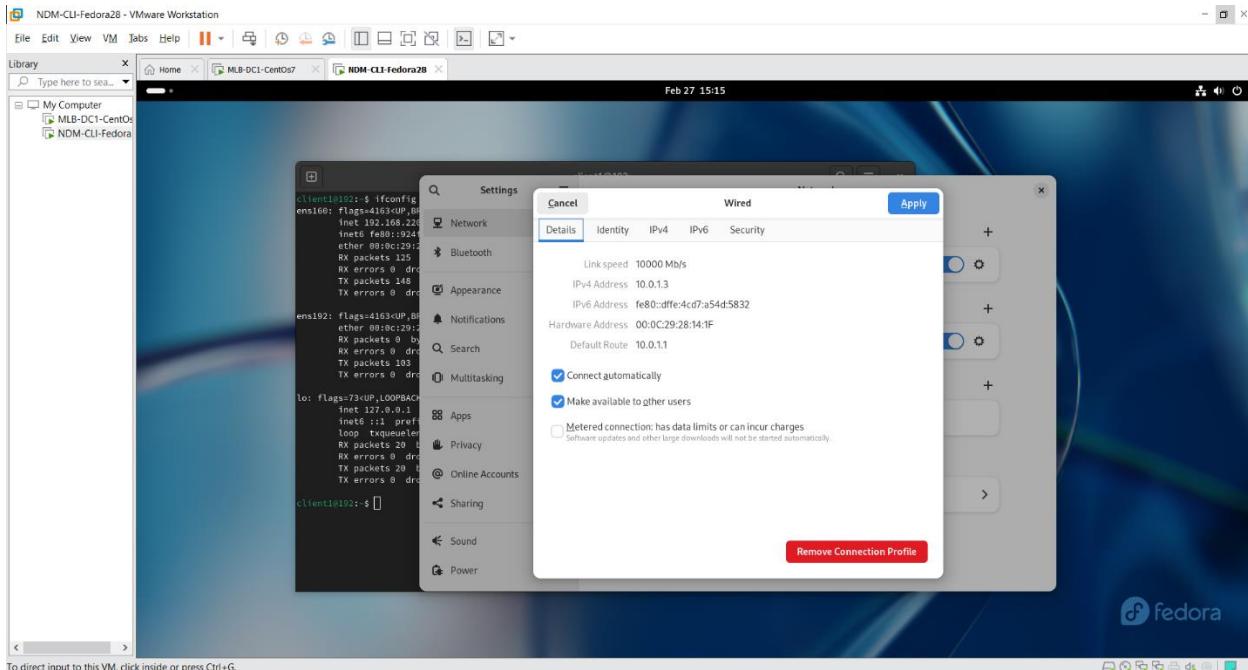
Select the network ens192 which is not showed an IP address for the network in the CLI and go to settings.



Select the IPv4 tab and set the IPv4 method as manual and setup the addresses , address as 10.0.1.3, Netmask as 255.255.255.0 and Gateway as 10.0.1.1.

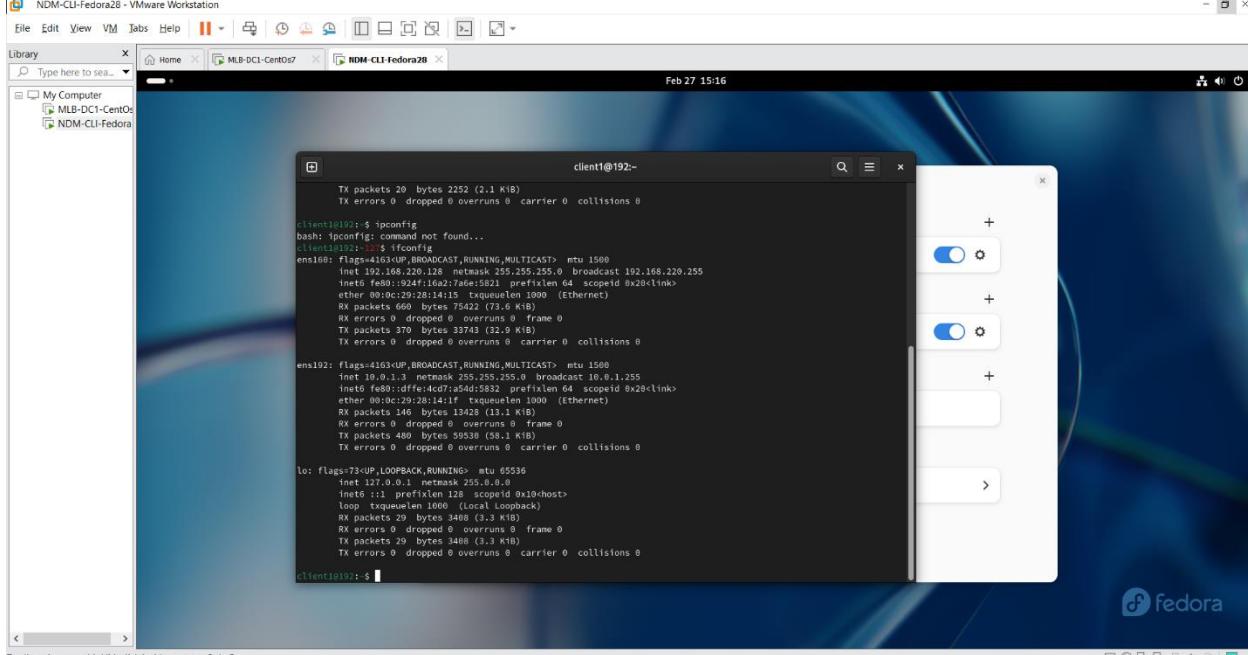


After applying the network changes disable the network and re enable.



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

After re-enabled the network, IPv4 address will display successfully.



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

Network ens192 will show an IP Address in the CLI after the changes.

```
client1@192:~$ ipconfig
bash: ipconfig: command not found...
client1@192:~$ ifconfig
ens160: flags=4163 mtu 1500
        inet 102.168.220.128 netmask 255.255.255.0 broadcast 102.168.228.255
                inetb fe80::924f:16a2:7a6e:5821 brd 102.168.220.128 scopeid 0x20<link>
                ether 00:0c:29:28:14:15 txqueuelen 1000 (Ethernet)
                Rx packets 600 bytes 75422 (73.6 kB)
                Rx errors 0 dropped 0 overruns 0 frame 0
                Tx packets 370 bytes 33743 (32.9 kB)
                Tx errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ens192: flags=4163 mtu 1500
        inet 102.168.1.13 netmask 255.255.255.0 broadcast 102.168.1.255
                inetb fe80::924f:16a2:7a6e:5823 brd 102.168.1.255 scopeid 0x20<link>
                ether 00:0c:29:28:14:1f txqueuelen 1000 (Ethernet)
                Rx packets 144 bytes 13428 (13.1 kB)
                Rx errors 0 dropped 0 overruns 0 frame 0
                Tx packets 480 bytes 59530 (58.1 kB)
                Tx errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73 mtu 5536
        inet 127.0.0.1 netmask 255.0.0.0
                inetb ::1 brd ::1 scopeid 0x10<host>
                loop txqueuelen 1000 (Local Loopback)
                Rx packets 0 bytes 0
                Rx errors 0 dropped 0 overruns 0 frame 0
                Tx packets 29 bytes 3408 (3.3 kB)
                Tx errors 0 dropped 0 overruns 0 carrier 0 collisions 0

client1@192:~$ sudo su
[sudo] password for client1:
root@192:~$ hostname ndm-cli-fedora28.ndm.lk
root@192:~$
```

To use root options run the command “sudo su” and set hostname as ndm-cli-fedora28.ndm.lk.

```
client1@192:~$ ping 10.0.1.2
PING 10.0.1.2 (10.0.1.2) 56(84) bytes of data.
64 bytes from 10.0.1.2: icmp_seq=1 ttl=64 time=0.414 ms
64 bytes from 10.0.1.2: icmp_seq=2 ttl=64 time=0.471 ms
64 bytes from 10.0.1.2: icmp_seq=3 ttl=64 time=0.291 ms
64 bytes from 10.0.1.2: icmp_seq=4 ttl=64 time=0.315 ms
64 bytes from 10.0.1.2: icmp_seq=5 ttl=64 time=0.283 ms
64 bytes from 10.0.1.2: icmp_seq=6 ttl=64 time=0.276 ms
```

Run the command “ping 10.0.1.2” to clarify that network has setup successfully.

```
root@localhost ~# ip link
1: ens3: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state UNKNOWN group default qlen 1000
    link/ether 00:0c:29:43:14:00 brd ff:ff:ff:ff:ff:ff
        inet 192.168.229.130/24 brd 192.168.229.255 scope global noprefixroute dynamic ens3
            valid_lft forever preferred_lft forever
        inet6 fe80::20c:29ff:fe43:1400/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
2: ems33: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:43:14:00 brd ff:ff:ff:ff:ff:ff
        inet 192.168.229.130/24 brd 192.168.229.255 scope global noprefixroute dynamic ems33
            valid_lft 1769sec preferred_lft 1769sec
        inet6 fe80::20c:29ff:fe43:1400/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
3: ems36: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:43:14:00 brd ff:ff:ff:ff:ff:ff
        inet 192.168.229.130/24 brd 192.168.229.255 scope global noprefixroute dynamic ems36
            valid_lft forever preferred_lft forever
        inet6 fe80::20c:29ff:fe43:1400/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@localhost ~# ping 10.0.1.3
PING 10.0.1.3 (10.0.1.3) 56(84) bytes of data.
64 bytes from 10.0.1.3: icmp_seq=1 ttl=64 time=0.245 ms
64 bytes from 10.0.1.3: icmp_seq=2 ttl=64 time=0.399 ms
64 bytes from 10.0.1.3: icmp_seq=3 ttl=64 time=0.267 ms
64 bytes from 10.0.1.3: icmp_seq=4 ttl=64 time=0.312 ms
64 bytes from 10.0.1.3: icmp_seq=5 ttl=64 time=0.312 ms
64 bytes from 10.0.1.3: icmp_seq=6 ttl=64 time=0.326 ms
64 bytes from 10.0.1.3: icmp_seq=7 ttl=64 time=0.298 ms
64 bytes from 10.0.1.3: icmp_seq=8 ttl=64 time=0.298 ms
64 bytes from 10.0.1.3: icmp_seq=9 ttl=64 time=0.330 ms
```

Run the command “ping 10.0.1.3” in the server terminal to clarify that network has setup successfully.