

**Sri Lanka Institute of Information Technology**  
**Network Designing & Management (IT3010)**  
**Year 3 Semester 1**

**Lab Sheet 02**



**IT22127778**

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# Installing and configuring DHCP

**Step 1:** Disable DHCP Settings in VMnet 2 (to avoid conflicts with the DHCP server being configured)

**Step 2:** Install DHCP Server on CentOS

Command `$ yum install -y dhcp`

```
root@localhost ~# sed -i 's/mirrorlist:*#mirrorlist:/' /etc/yum.repos.d/CentOS-Base.repo
root@localhost ~# sed -i 's#baseurl=http://mirror.centos.org#baseurl=http://vault.centos.org#' /etc/yum.repos.d/CentOS-Base.repo
root@localhost ~# yum clean all
Loaded plugins: fastestmirror
Cleaning repos: base extras updates
Cleaning up list of fastest mirrors
root@localhost ~# yum makecache
Loaded plugins: fastestmirror
Determining fastest mirrors
base                                13.6 kB 00:00:00
extras                              2.9 kB 00:00:00
updates                             2.9 kB 00:00:00
(1/10): base/7/x86_64/group.gz      153 kB 00:00:00
(2/10): base/7/x86_64/1filelists.db 7.2 MB 00:00:00
(3/10): base/7/x86_64/primary.db    6.1 MB 00:00:00
(4/10): extras/7/x86_64/1filelists.db 395 kB 00:00:04
(5/10): extras/7/x86_64/primary.db  233 kB 00:00:04
(6/10): extras/7/x86_64/other.db     154 kB 00:00:00
(7/10): base/7/x86_64/other.db       2.6 MB 00:00:05
(8/10): updates/7/x86_64/1filelists.db 15 MB 00:00:24
(9/10): updates/7/x86_64/primary.db  27 MB 00:00:25
(10/10): updates/7/x86_64/other.db   1.6 MB 00:00:01
Metadata Cache Created
root@localhost ~#
```

```
(4/4): dhcp-libs-4.2.5-83.el7.centos.2.x86_64.rpm | 133 kB 00:00:00
-----
Total | 661 kB/s | 1.1 MB 00:00:01
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 0x6f00825f:
Userid : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
Fingerprint: 6341 ab27 53d7 ba79 a2c2 7bb1 26c6 afa7 f4ab 0eb5
Package : centos-release-7-9-2009.0.el7.centos.x86_64 (Centos7)
From : /etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Updating : 12:dhcp-libs-4.2.5-83.el7.centos.2.x86_64 1/7
  Updating : 12:dhcp-common-4.2.5-83.el7.centos.2.x86_64 2/7
  Installing : 12:dhcp-4.2.5-83.el7.centos.2.x86_64 3/7
  Updating : 12:dhclient-4.2.5-83.el7.centos.2.x86_64 4/7
  Cleanup : 12:dhclient-4.2.5-82.el7.centos.x86_64 5/7
  Cleanup : 12:dhcp-common-4.2.5-82.el7.centos.x86_64 6/7
  Cleanup : 12:dhcp-libs-4.2.5-82.el7.centos.x86_64 7/7
  Verifying : 12:dhcp-4.2.5-83.el7.centos.2.x86_64 1/7
  Verifying : 12:dhclient-4.2.5-83.el7.centos.2.x86_64 2/7
  Verifying : 12:dhcp-libs-4.2.5-83.el7.centos.2.x86_64 3/7
  Verifying : 12:dhcp-common-4.2.5-83.el7.centos.2.x86_64 4/7
  Verifying : 12:dhcp-common-4.2.5-82.el7.centos.x86_64 5/7
  Verifying : 12:dhclient-4.2.5-82.el7.centos.x86_64 6/7
  Verifying : 12:dhcp-libs-4.2.5-82.el7.centos.x86_64 7/7

Installed:
  dhcp.x86_64 12:4.2.5-83.el7.centos.2

Dependency Updated:
  dhclient.x86_64 12:4.2.5-83.el7.centos.2      dhcp-common.x86_64 12:4.2.5-83.el7.centos.2
  dhcp-libs.x86_64 12:4.2.5-83.el7.centos.2

Complete!
root@localhost ~#
```



- Set the domain name and DNS servers.
- Uncomment the authoritative; line.
- Define the subnet, IP range, and other parameters:

A slightly different configuration for an internal subnet.

```
subnet 10.0.1.0 netmask 255.255.255.0 {
```

```
range 10.0.1.25 10.0.1.30;
```

```
# option domain-name-servers server.unixmen.local;
```

```
2 option domain-name "dsnm.sub"; option routers 10.0.1.1; option broadcast-address 10.0.1.255;
```

```
default-lease-time 600;
```

```
max-lease-time 7200;
```

```
}
```

[...]

```
CentOS 7 64-bit - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
NDM-CLI-Fedora
CentOS 7 64-bit
# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.
subnet 10.152.187.0 netmask 255.255.255.0 {
}
# This is a very basic subnet declaration.
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;
}
# This declaration allows BOOTP clients to get dynamic addresses,
# which we don't really recommend.
subnet 10.254.239.32 netmask 255.255.255.224 {
range dynamic-bootp 10.254.239.40 10.254.239.60;
option broadcast-address 10.254.239.31;
option routers rtr-239-32-1.example.org;
}
# A slightly different configuration for an internal subnet.
subnet 10.0.1.0 netmask 255.255.255.0 {
range 10.0.1.25 10.0.1.30;
option domain-name-servers server.unixmen.local;
option domain-name "dsnm.sub";
option routers 10.0.1.1;
option broadcast-address 10.0.1.255;
default-lease-time 600;
max-lease-time 7200;
}
# Hosts which require special configuration options can be listed in
# host statements. If no address is specified, the address will be
# allocated dynamically (if possible), but the host-specific information
To direct input to this VM, click inside or press Ctrl+G.
```

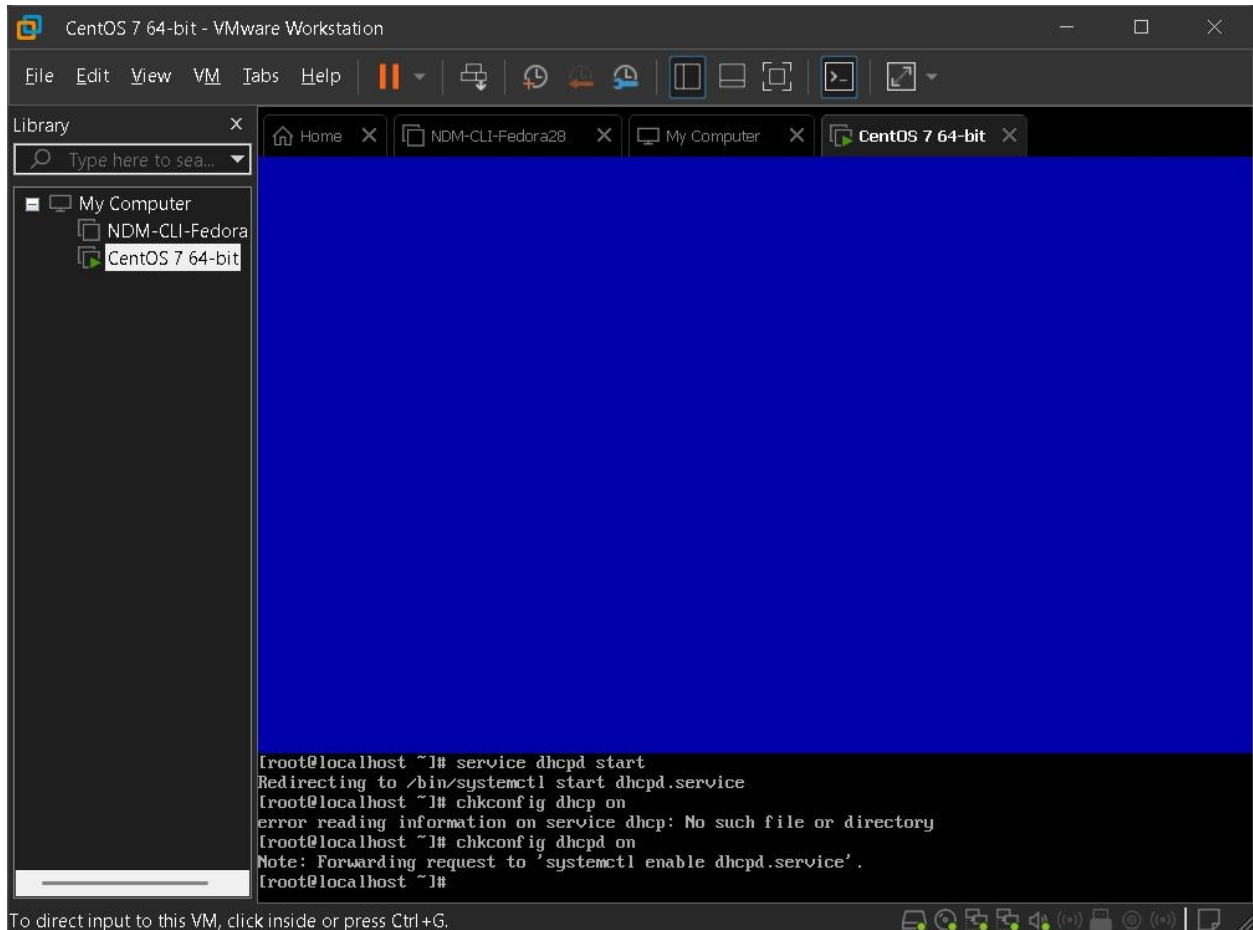
Save and close the file.

**Step 4** -start the dhcpd service and make it to start automatically on every reboot

**service dhcpd start**

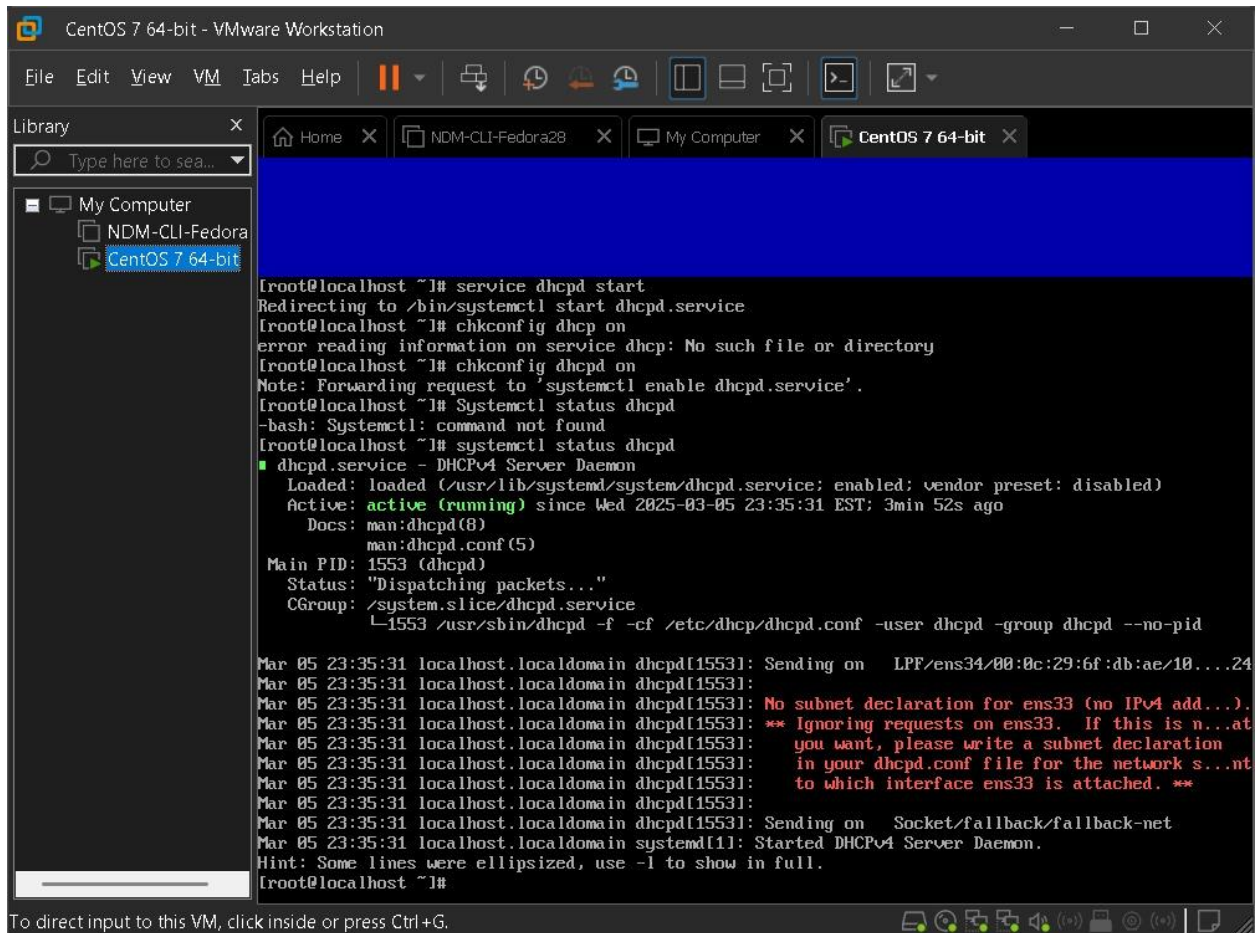
If you want to start up the DHCP server at logon to the server session use;

**chkconfig dhcpd on**



```
[root@localhost ~]# service dhcpd start
Redirecting to /bin/systemctl start dhcpd.service
[root@localhost ~]# chkconfig dhcp on
error reading information on service dhcp: No such file or directory
[root@localhost ~]# chkconfig dhcpd on
Note: Forwarding request to 'systemctl enable dhcpd.service'.
[root@localhost ~]#
```

DHCP must active and running now.



The screenshot shows a VMware Workstation window titled "CentOS 7 64-bit - VMware Workstation". The interface includes a menu bar (File, Edit, View, VM, Tabs, Help), a toolbar, and a library pane on the left. The main terminal window displays the following commands and output:

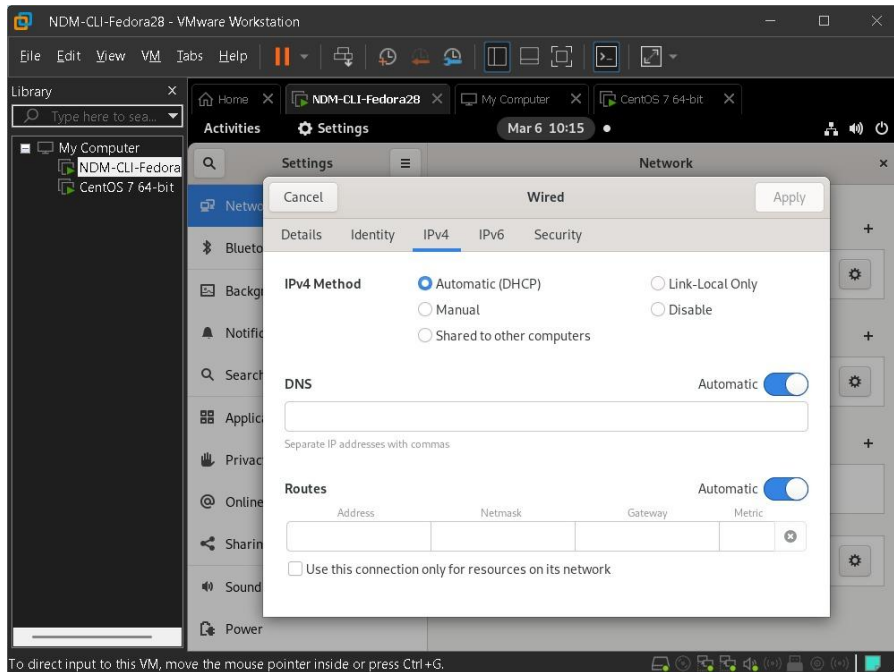
```
[root@localhost ~]# service dhcpd start
Redirecting to /bin/systemctl start dhcpd.service
[root@localhost ~]# chkconfig dhcpd on
error reading information on service dhcpd: No such file or directory
[root@localhost ~]# chkconfig dhcpd on
Note: Forwarding request to 'systemctl enable dhcpd.service'.
[root@localhost ~]# Systemctl status dhcpd
-bash: Systemctl: command not found
[root@localhost ~]# systemctl status dhcpd
● dhcpd.service - DHCPv4 Server Daemon
   Loaded: loaded (/usr/lib/systemd/system/dhcpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Wed 2025-03-05 23:35:31 EST; 3min 52s ago
     Docs: man:dhcpd(8)
           man:dhcpd.conf(5)
   Main PID: 1553 (dhcpd)
    Status: "Dispatching packets..."
   CGroup: /system.slice/dhcpd.service
           └─1553 /usr/sbin/dhcpd -f -cf /etc/dhcp/dhcpd.conf -user dhcpd -group dhcpd --no-pid

Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: Sending on   LPF/ens34/00:8c:29:6f:db:ae:10...24
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]:
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: No subnet declaration for ens33 (no IPv4 add...).
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: ** Ignoring requests on ens33.  If this is n...at
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: you want, please write a subnet declaration
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: in your dhcpd.conf file for the network s...nt
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: to which interface ens33 is attached. **
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]:
Mar 05 23:35:31 localhost.localdomain dhcpd[1553]: Sending on   Socket/fallback/fallback-net
Mar 05 23:35:31 localhost.localdomain systemd[1]: Started DHCPv4 Server Daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]#
```

At the bottom of the window, a status bar reads: "To direct input to this VM, click inside or press Ctrl+G."

## Step 5: Test the DHCP Server with Fedora Client

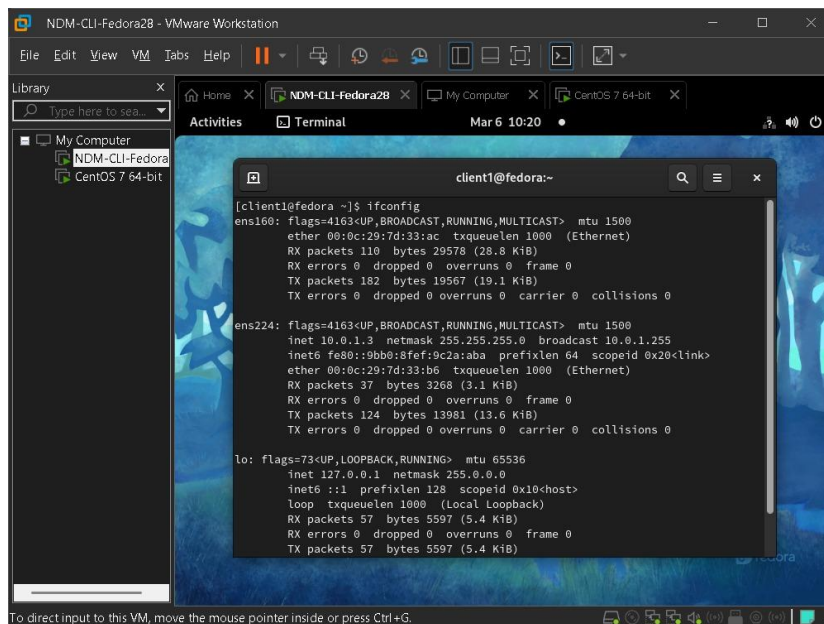
- Go to settings and Then selecting network setting change the IP settings on the Fedora client to Automatic (DHCP).



- Use the following command to check the IP address:  
**Ifconfig**

### Verify DHCP Functionality:

- Ensure the Fedora client receives an IP address within the defined range (e.g., 10.0.1.20 to 10.0.1.30).



# Self Study

## Changing IP Configurations in Linux

CLI Method Using Network Commands:

**Step 1:** Identify the available network interfaces using: **ip addr show**

```
[root@localhost ~]# ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 10
    00
    link/ether 00:0c:29:6f:db:a4 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.100/24 brd 192.168.1.255 scope global noprefixroute ens33
        valid_lft forever preferred_lft forever
    inet6 fe80::2bf8:cb0c:e712:8c24/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: ens34: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 10
    00
    link/ether 00:0c:29:6f:db:ae brd ff:ff:ff:ff:ff:ff
    inet 10.0.1.2/24 brd 10.0.1.255 scope global noprefixroute ens34
        valid_lft forever preferred_lft forever
    inet6 fe80::21fa:957f:6743:7ba1/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

[root@localhost ~]#
```

**Step 2:** Assign a temporary IP address to an interface

**sudo ip addr add 192.168.1.100/24 dev ens33**

```
[root@localhost ~]#
[root@localhost ~]# sudo ip addr add 192.168.1.100/24 dev ens33

RTNETLINK answers: File exists
[root@localhost ~]#
[root@localhost ~]# _
```

**Step 3:** Set the default gateway

**sudo ip route add default via 192.168.1.1 dev ens33**

```
[root@localhost ~]# sudo ip route add default via 192.168.1.1 dev ens33

[root@localhost ~]#
[root@localhost ~]# _
```

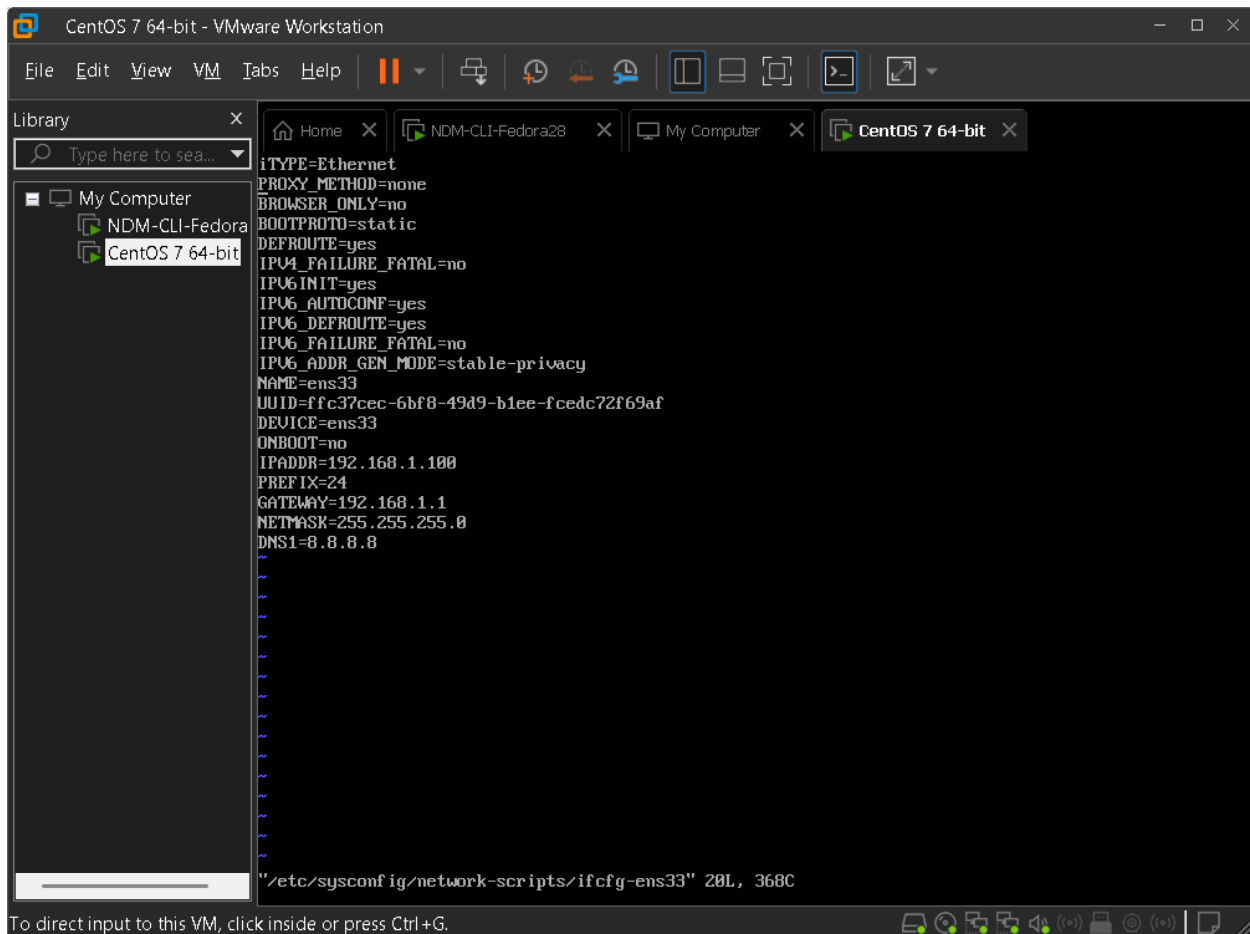


## Editing Network Interface Configuration File

**Step 1:** Navigate to the network scripts directory:

```
[root@localhost ~]# cd /etc/sysconfig/network-scripts/
[root@localhost network-scripts]#
[root@localhost network-scripts]#
```

**Step 2:** Locate and edit the configuration file for your interface, e.g., ifcfg-ens33:



### Step 3: Restart the network service:

## nmcli connection down ens33

## nmcli connection up ens33

