

Configuring the NIC Card in Linux

Upon completion of this lab the student will be able to:

- Determine the IP address of the NIC card
- Configure an IP address on a NIC card
- Activate and Shut Down your NIC Card

Overview:

In this lab, the student will work with the most commonly used networking concepts. Some of these activities are automatically covered during a Linux installation, but you will often find yourself having to know how to modify these initial settings whenever you need to move your server to another network, add a new network interface card or use an alternative means of connecting to the Internet.

Determining & Configuring Your Network Settings

1. Logon to the Linux operating system.
2. Open a terminal shell (Click on Applications, System Tools, and Terminal).
3. Login in as superuser.
4. Type the following command to show all interfaces – **ifconfig** or **ifconfig -a**

Manual Page description: `ifconfig` is used to configure the kernel-resident network interfaces. It is used at boot time to set up interfaces as necessary. After that, it is usually only needed when debugging or when system tuning is needed. This command is being replaced with newer commands discussed later.

Type the following command to view one interface only: **example - ifconfig eth0**

```
[root@localhost ~]# ifconfig
eno16777736: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.211 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::20c:29ff:febf:ef4 prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:cf:e1:f4 txqueuelen 1000 (Ethernet)
    RX packets 363385 bytes 526789073 (502.3 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 155571 bytes 10758955 (10.2 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Item in Results	Meaning of the Item in Results
inet	IPv4 address
inet6	IPv6 address
ether	Ethernet networking
00:0c:29:cf:e1:f4	MAC address

RX	Received packets
TX	Transmitted packets

5. Type the following command: **ifconfig eth0 down** (releases the ip address like ipconfig /release in Windows)
6. Type the following command **ifconfig eth0** to renew your address (like ipconfig /renew in Windows)
7. **ifconfig** can be used to configure the IP address & subnet mask on the network interface:
ifconfig eth0 192.168.2.1 netmask 255.255.255.0
8. Change your current directory in the terminal by typing the following:
cd /etc/sysconfig/network-scripts
9. Type the following: **ls** (to view the contents of the directory)

```
[root@localhost network-scripts]# ls
ifcfg-eno16777736  ifdown-post      ifup-bnep        ifup-routes
ifcfg-lo           ifdown-ppp       ifup-eth         ifup-sit
ifcfg-virbr0-nic  ifdown-routes    ifup-ippp        ifup-Team
ifdown            ifdown-sit       ifup-ipv6        ifup-TeamPort
ifdown-bnep       ifdown-Team      ifup-isdn        ifup-tunnel
ifdown-eth        ifdown-TeamPort  ifup-plip        ifup-wireless
ifdown-ippp       ifdown-tunnel    ifup-plusb       init.ipv6-global
ifdown-ipv6       ifup             ifup-post        network-functions
ifdown-isdn       ifup-aliases     ifup-ppp         network-functions-ipv6
```

10. Make a backup file of the ifcfg-eth0 file by typing the following:
cp ifcfg-eth0 ifcfg-back

Type the following to view the contents of ifcfg.eth1: **cat ifcfg-eth1**

(Make sure you are in the /etc/sysconfig/network-scripts directory by using pwd)

```
HWADDR=00:0C:29:CF:E1:F4
TYPE=Ethernet
BOOTPROTO=dhcp
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
NAME=eth0
UUID=5c9fcb41-6e0a-46ed-a1d6-078c183db07a
ONBOOT=yes
PEERDNS=yes
PEERROUTES=yes
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
IPV6_PRIVACY=no
```

11. See table to interpret the results:

	Meaning of the item
HWADDR=	MAC Address
TYPE=	Ethernet
NAME=	Interface name
ONBOOT=	Interface initialized on boot

12. The following would be an example of the settings for a static configuration of the NIC card.

Example

```
DEVICE=eth0
IPADDR=208.164.186.1
NETMASK=255.255.255.0
NETWORK=208.164.186.0
BROADCAST=208.164.186.255
ONBOOT=yes
BOOTPROTO=yes
USERCTL=no
```

13. New networking tools/commands

Application or tool	What it does
Network Manager	Default networking daemon
nmtui	Simple text based user interface for Network Manager
nmcli	Command-line tool for working with Network Manager
nm-connection-editor	A editor tool for networking
Control Center	Graphical interface used in GNOME

14. Type the following: **dnf install Network manager** (must be login as root) The following message means it was installed at OS installation. Nothing more to do.

```
[root@localhost network-scripts]# dnf install NetworkManager
Last metadata expiration check performed 3:37:26 ago on Mon Dec 28 11:16:57 2015
.
Package NetworkManager-1:1.0.6-8.fc23.x86_64 is already installed, skipping.
Dependencies resolved.
Nothing to do.
Complete!
[root@localhost network-scripts]# █
```

15. Type the following: **systemctl status NetworkManager** or the older **service NetworkManager status** (Look at the line with Active: active (running) shows service is running.

```
[root@localhost network-scripts]# systemctl status NetworkManager
● NetworkManager.service - Network Manager
   Loaded: loaded (/usr/lib/systemd/system/NetworkManager.service; enabled; ver
   or preset: enabled)
   Active: active (running) since Mon 2015-12-28 10:41:48 EST; 4h 16min ago
   Main PID: 1035 (NetworkManager)
   CGroup: /system.slice/NetworkManager.service
           └─ 1035 /usr/sbin/NetworkManager --no-daemon
              51900 /sbin/dhclient -d -q -sf /usr/libexec/nm-dhcp-helper -pf /..

Dec 28 14:31:17 localhost.localdomain NetworkManager[1035]: <info> (eno16777..
Dec 28 14:31:18 localhost.localdomain NetworkManager[1035]: <info> NetworkMa..
Dec 28 14:41:58 localhost.localdomain NetworkManager[1035]: <info> connectiv..
Dec 28 14:41:58 localhost.localdomain NetworkManager[1035]: <info> NetworkMa..
Dec 28 14:42:38 localhost.localdomain NetworkManager[1035]: <info> connectiv..
Dec 28 14:42:38 localhost.localdomain NetworkManager[1035]: <info> connectiv..
Dec 28 14:43:18 localhost.localdomain NetworkManager[1035]: <info> connectiv..
Dec 28 14:46:58 localhost.localdomain NetworkManager[1035]: <info> connectiv..
Dec 28 14:51:58 localhost.localdomain NetworkManager[1035]: <info> connectiv..
Dec 28 14:56:18 localhost.localdomain NetworkManager[1035]: <info> NetworkMa..
Hint: Some lines were ellipsized, use -l to show in full.
```

16. If the service is not running, then type the following:
systemctl start NetworkManager and rerun the command in step 17.

17. Type the following command: **nmcli con show** (connection show) shows all configured interfaces on the server.

```
[root@localhost network-scripts]# nmcli con show
NAME                UUID                                  TYPE      DEVICE
virbr0              417f7fcb-6a0e-4f08-adaf-18cf5fe2cee3 bridge    virbr0
virbr0-nic          db8458bf-a871-4907-a999-1119acaa6698 802-3-ethernet --
eno16777736         5c9fcb41-6e0a-46ed-a1d6-078c183db07a 802-3-ethernet eno16777736
virbr0-nic          58e4bd3b-7132-4c4c-89f1-131f5128bcef generic   virbr0-nic
[root@localhost network-scripts]# █
```

18. Type the following in the terminal: **nmcli dev status** (device status) shows all available interfaces.

```
[root@localhost network-scripts]# nmcli dev status
DEVICE          TYPE        STATE        CONNECTION
virbr0          bridge     connected    virbr0
eno16777736     ethernet   connected    eno16777736
virbr0-nic      tap        connected    virbr0-nic
lo              loopback   unmanaged    --
[root@localhost network-scripts]#
```

19. Type the following in the terminal: **ip addr**

```
[root@localhost network-scripts]# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    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: eno16777736: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:cf:e1:f4 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.101/24 brd 192.168.1.255 scope global dynamic eno16777736
        valid_lft 83867sec preferred_lft 83867sec
    inet6 fe80::20c:29ff:fecf:e1f4/64 scope link
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 52:54:00:5c:91:e7 brd ff:ff:ff:ff:ff:ff
    inet 192.168.124.1/24 brd 192.168.124.255 scope global virbr0
        valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel master virbr0 state DOWN group default qlen 500
    link/ether 52:54:00:5c:91:e7 brd ff:ff:ff:ff:ff:ff
```

20. The **ip addr** command can be used to assign addresses to interfaces:

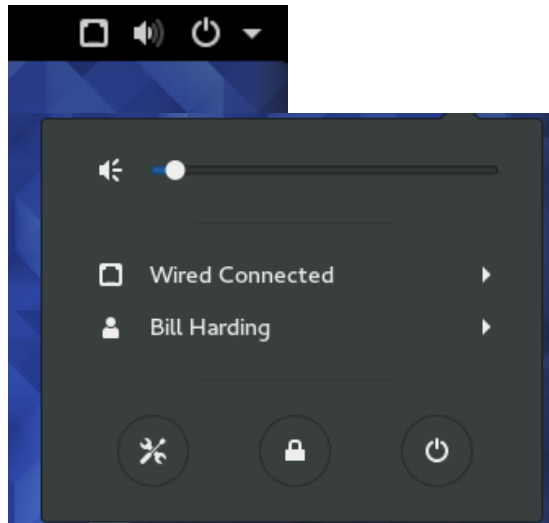
example – **ip addr add 192.168.1.100/24 dev eth0**

21. Use the **ip addr** to view the new settings: **ip addr show dev eth0**

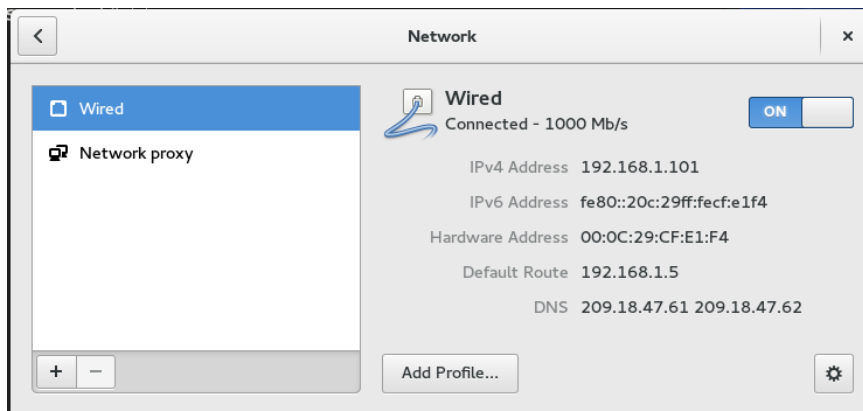
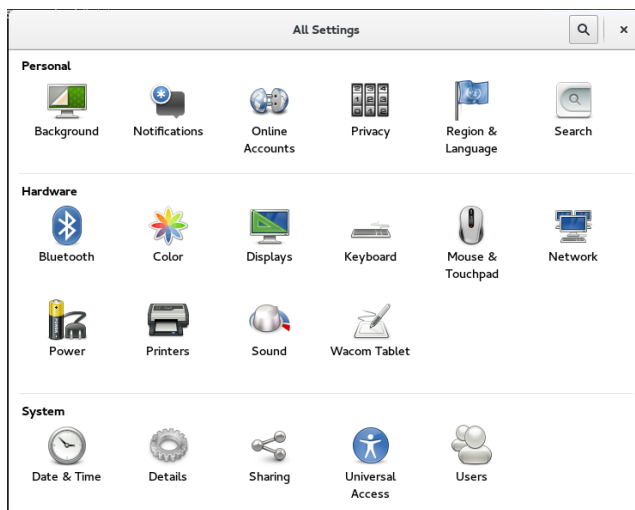
22. Deactivate or activate a device by typing: **nmcli con down id eth0** or **nmcli con up id eth0** (does the same thing as ifup or ifdown)

23. Any changes to any of the Network configurations you must reinitialize the Network service by typing: **systemctl restart network** (the older **/etc/init.d/servicename start/restart** should not be used going forward in Red Hat)

24. The Control Center can be started by clicking at the top right circle icon and clicking on Wired Connections or



By clicking on Applications/Settings/Network icon: or by pressing the Super key on keyboard (windows key) and type in “control network” and click then on network icon.

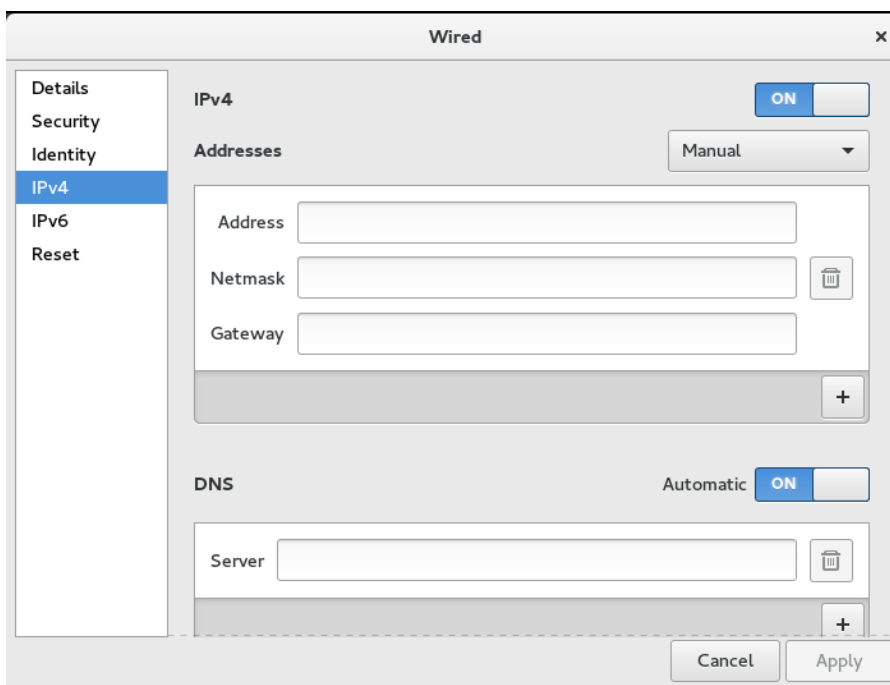


25. Click on the gear at the bottom right allows one to set other options for the Network.

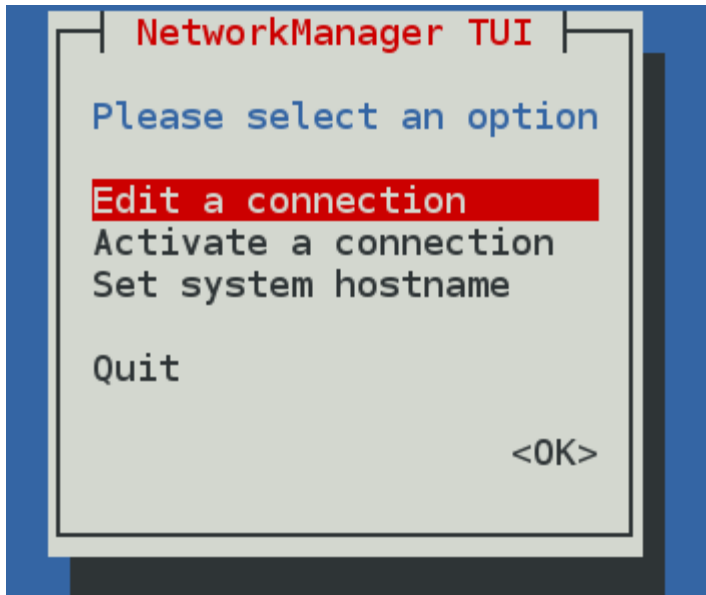


26. Click on the IPv4 icon and change the button for DHCP to Manual for static addressing. Enter a IP address, subnet mask and a gateway address.

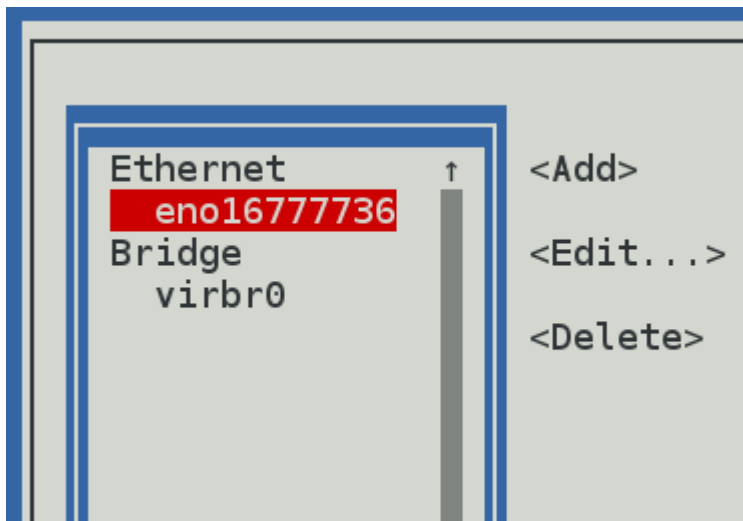
Whenever you make any changes using any GUI tool, the tool will make configuration changes to the manual files that control the network card and the system will need to be reinitialized. (systemctl restart network)



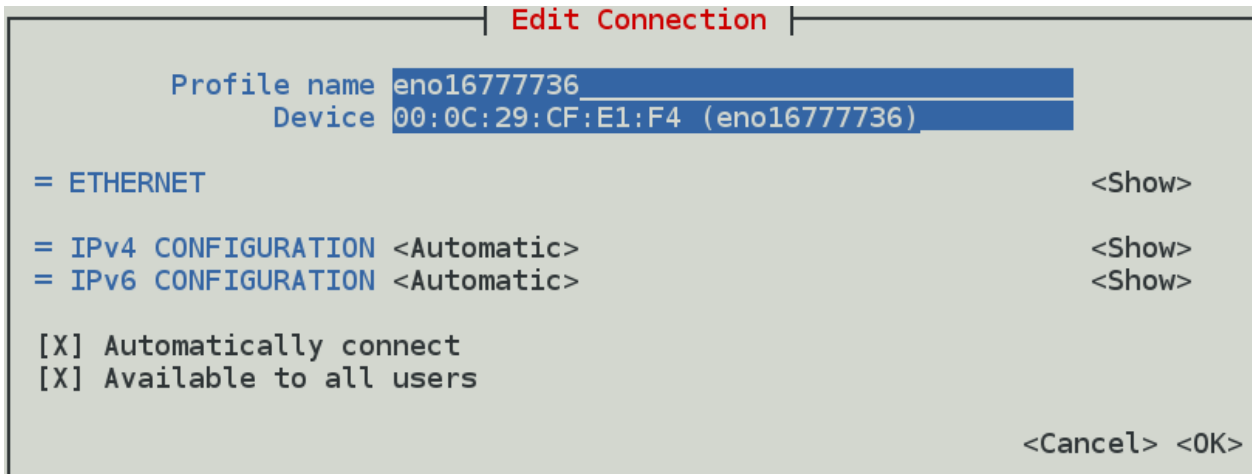
27. The NetworkManger tui is another tool that also can be used to configure the network settings. Type `nmtui` in the terminal.



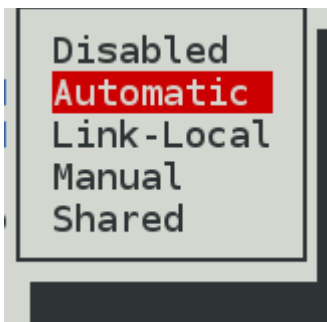
28. Click **Edit a connection**.



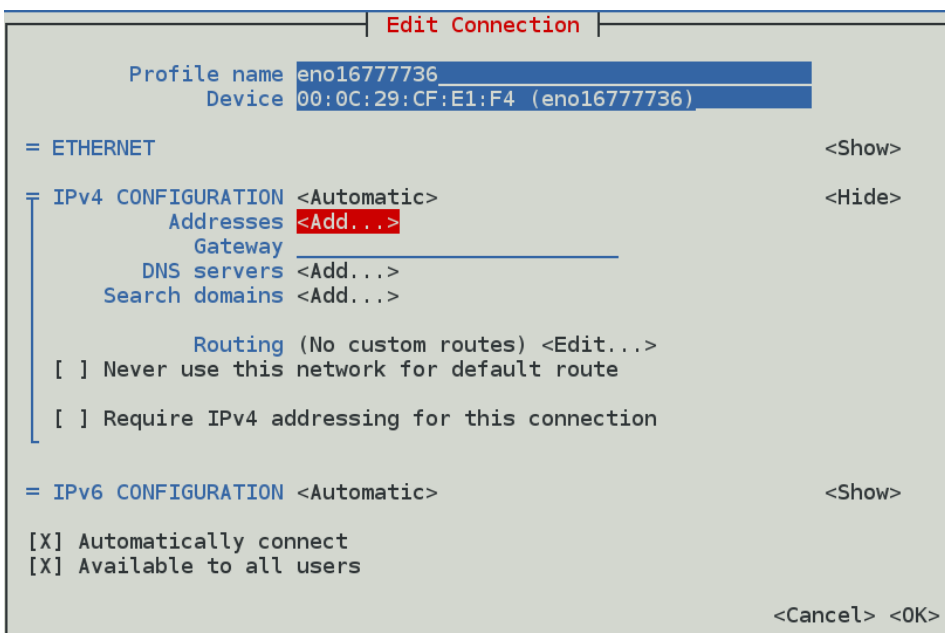
29. Choose a connection and click Enter. Use your Tab key to move around.



30. Tab over until you get to IPv4 where it says <Automatic> and hit Enter key.



31. Tab over to <Show> and hit the Enter key. Now enter your manual/static addresses for Ip, Subnet Mask and Gateway.



32. Tab down to Ok to complete the screen.
33. Tab to Exit to Quit.
34. Type the following in the terminal: **hostnamectl status**

```
[root@localhost network-scripts]# hostnamectl status
bash: hostnamectl: command not found...
Similar command is: 'hostnamectl'
[root@localhost network-scripts]# hostnamectl status
  Static hostname: localhost.localdomain
        Icon name: computer-vm
        Chassis: vm
        Machine ID: fcb6b831603e49789bb01300f2122087
        Boot ID: 26555f9914bc417fb1571ec9ca26af45
  Virtualization: vmware
  Operating System: Fedora 23 (Workstation Edition)
        CPE OS Name: cpe:/o:fedoraproject:fedora:23
        Kernel: Linux 4.2.5-300.fc23.x86_64
  Architecture: x86-64
```

35. Type this command to set the hostname for your server:
`hostnamectl set-hostname name (example – hostnamectl set-hostname server5)`
36. Type this in the terminal: **hostname** (to see the hostname of the server)