Introduction to Networking

Exercise 1: Viewing Network Interfaces
Objective: Learn how to view network interfaces using nmcli.

1. Open your terminal.
   What is the contents of the file **/etc/hosts**

   Open the file with vi or nano and add the ip addresses of your colleagues.

   example:
   192.168.4.185 rocky-5

   save the file and ping some of the other machines using the hostname.

   ```
   ping -c1 rocky-5
   ```

2. List all available network interfaces:
   ```
   nmcli device status
   ```

3. Identify the network interface you want to configure (e.g., eth0, ens33, enp7s0, etc.).
   Please take the second interface that is NOT your ip address….

Exercise 2: Configuring a Static IP Address
Objective: Configure a static IP address using nmcli.

1. Identify your network interface (this example has enp1s0 as the interface).

2. Set the DNS server (replace with your preferred DNS server):
   ```
   sudo nmcli con mod enp7s0 ipv4.dns "8.8.8.8"
   sudo nmcli con show enp7s0 | grep ipv4.dns
   ```

3. Activate the connection:
   ```
   sudo nmcli con up enp7s0
   ```

Exercise 3: Configuring DHCP
Objective: Configure a network interface to use DHCP for IP addressing.

1. If you want to switch to DHCP, modify your second interface connection:
   ```
   sudo nmcli con modify enp7s0 ipv4.method auto
   ```

2. Bring the connection down and then back up to apply the changes:
   ```
   sudo nmcli con down enp7s0
   sudo nmcli con up enp7s0
   ```

3. Verify that the interface has received an IP address:
   nmcli device show `enp7s0`

If you like, inspect the graphical tool for NetworkManager.

 nmtui

Exercise 4: Viewing Current Network Configuration
Objective: Use various commands to view the current network configuration.

1. View the current IP address and routing information:
   ```
   ip addr show
   ip route show
   ```

2. Check the DNS servers being used:
   ```
   cat /etc/resolv.conf
   ```

Exercise 5: Testing Connectivity
Objective: Test network connectivity to other devices in the network.

1. Ping the default gateway to check connectivity:
   ```
   ping -c 4 192.168.4.1
   ```

2. Ping another device in the subnet (replace with an actual device IP):
   ```
   ping -c 4 192.168.4.1
   ```

Exercise 6: Managing Network Connections
Objective: Learn how to manage network connections using nmcli.

1. List all configured network connections:
   ```
   nmcli con show
   ```

2. Delete the connection you created earlier:
   ```
   sudo nmcli con delete enp1s0
   ```

3. List the remaining connections to confirm deletion:
   ```
   nmcli con show
   ```

   Check out the following directory:

   /etc/NetworkManager/system-connections

What do you see in there. Inspect the content of the file..

Can you restore the enp7s0 connection again?
Take this command as an example:
nmcli con add connection.interface-name <name> type ethernet

Exercise 7: Getting Network Statistics
Objective: Use commands to view network statistics and interface information.

1. Use the ip command to display interface statistics:
   ```
   ip -s link show
   ```

2. Use the ss command to view active connections:
   ```
   ss -tuln
   ```

Exercise 8: Checking Network Manager State
Objective: Learn how to check the status of NetworkManager.

1. Check the status of the NetworkManager service:
   ```
   systemctl status NetworkManager
   ```

2. Restart the NetworkManager service (if necessary):
   ```
   sudo systemctl restart NetworkManager
   ```

Exercise 9: Using traceroute
Objective: Trace the route packets take to a remote host.

1. Install traceroute if it's not already installed:
   ```
   sudo dnf install traceroute
   ```

   Or if using yum:
   ```
   sudo yum install traceroute
   ```

2. Use traceroute to trace the path to the default gateway:
   ```
   traceroute 192.168.4.1
   ```

Exercise 10: Cleaning Up
Objective: Remove any unnecessary configurations and ensure a clean state.