COMP3066 – Week 03 Assignment

- **This is an individual assignment.**
- **The completed work has to be uploaded to the drop box on D2L.**
  1. **Email submissions will not be accepted.**
- **Reminder:**
  1. **The screenshot taking guidelines must be followed (these can be found in our course on D2L under the "Course Content"**
  2. **User account: Your lastname and then the first letter of the first name. For example: my name is Nikolai (first) Ivanov (last), so my user name is ivanovn**
  3. **Host name of your Linux VM: Your full last name, the dash character, and the two letters of the first name. For example: my name is Nikolai (first) Ivanov (last), so my host name is ivanov-ni**
  4. **Screenshots that do not show the properly configured user account and host name will not be accepted**

Objective: To configure the network options manually on Open SUSE Linux.

Marks breakdown:

Total assignment marks: 10 marks
5 marks: Part III: Configure network manually
5 marks: Part V: Save the Network Connection to Interface and Hardware Configuration Files

Note: there are no partial marks: the configuration must be completed successfully to receive the marks

Lab Activity

Purpose: Configure the Network Connection Manually

Change the host name of your Linux machine

- Part I: Note the Current Network Configuration
- Part II: Delete the Current Network Setup with YaST
- Part III: Configure the Network Manually
- Part IV: Reconfigure the network card to use DHCP configuration
- Part V: Save the Network Connection to Interface Configuration Files

How to change the host name of the Linux PC (review as this was completed in week 1):

1. Open terminal and switch to root.
2. Use the hostname command to change the hostname:

   hostname NEWHOSTNAME

where NEWHOSTNAME is the new host name you want to assign to your Linux machine.

3. Use a text editor to modify the **/etc/hostname** file to make the change to the machine's host name permanent. NOTE: Your new hostname is the content of the **/etc/hostname** file.
4. Modify the **/etc/hosts** file so that your new host name would resolve to the local IP address.

   Open the /etc/hosts file with nano editor and add the following line just below the 127.0.0.1 localhost line (do not remove any existing lines from the /etc/hosts file).

   127.0.0.1 NEWHOSTNAME
5. Test if you have properly completed the above steps by issuing the following commands:

   exec /bin/bash

   and then:

   ping NEWHOSTNAME

   You should see the output stating number of bytes received from localhost and in what timeframe. NOTE: press CTRL+C to stop the execution of the ping command.
6. The above steps could be completed by using the YaST system manager. Open YaST -> Network Services -> Hostnames. You should see the new hostname in the list of the current hosts. You could use this application to:
   a. Add to add a new host
   b. Edit to edit the existing host
   c. Delete to remove an existing host

INSERT SCREENSHOTS OF:

1. Successful execution of the commands that you see in the attached screenshot. The commands must be executed in the order listed in the screenshot and all commands must succeed.

These re are the commands that you need to run:

(a) cat /etc/HOSTNAME, (b) grep '^127.0.0.1' /etc/hosts, and (c) ping -c 3 YOURHOSTNAME.

```
loore@loor-ed:~> cat /etc/hostname
loor-ed
loore@loor-ed:~> grep '^127.0.0.1' /etc/hosts
127.0.0.1       localhost
127.0.0.1       loor-ed
loore@loor-ed:~> ping -c 3 loor-ed
PING loor-ed (127.0.0.1) 56(84) bytes of data.
64 bytes from localhost (127.0.0.1): icmp_seq=1 ttl=64 time=0.082 ms
64 bytes from localhost (127.0.0.1): icmp_seq=2 ttl=64 time=0.185 ms
64 bytes from localhost (127.0.0.1): icmp_seq=3 ttl=64 time=0.116 ms

--- loor-ed ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2048ms
rtt min/avg/max/mdev = 0.082/0.127/0.185/0.042 ms
loore@loor-ed:~>
```

Part I: Note the Current Network Configuration

1. Make sure you are logged in to the KDE Desktop as a regular user (not root).

2. Open a terminal window and use the su command (switch user) to switch to **root** using your root password.

3. Enter **ip add show eth0**

Note : if the system does not have the eth0 network device, then run YaST->System->Network Settings and select the available network device. Click the Edit button. Switch to the Hardware tab and click the Change button next to the Device Name textbox. Replace the existing value in the Device name with eth0 and click the OK button. You would need to confirm the change: click the Next button (found in the bottom right corner of the network settings screen) and then click the OK button. Wait for the network to reload and close YaST. Run the **ip add show eth0** command, this time you should see the output.

4. Run the **ip address show eth0** command. Find the line starting with **inet**, and record the **host *IP address, Broadcast address*** displayed in that line:

- **Host IP address:** 192.168.132.128/24 (replace my IP address with your IP address)(DONE)
- **Broadcast address:** 192.168.132.255 (replace my IP address with your IP address)(DONE)

5. Run the **ip route show** command

6. Find the line starting with **default via** and record the ***gateway IP address*** of the gateway:

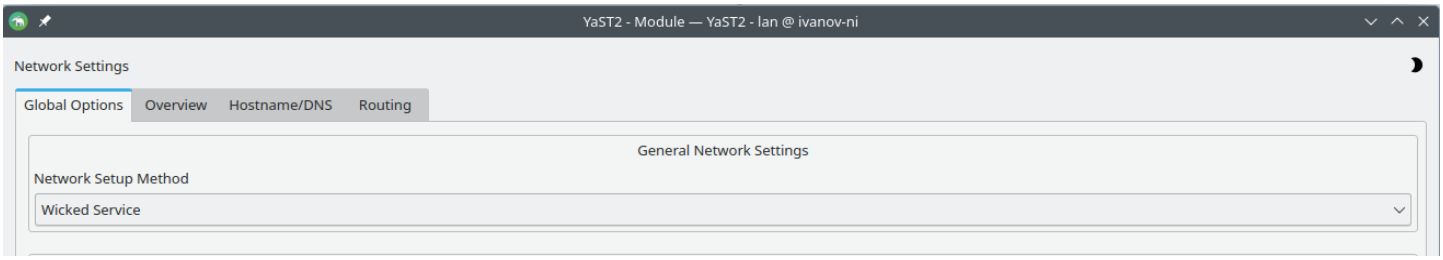
- **Gateway IP address:** 192.168.132.2 (replace my IP address with your IP address)(DONE)

6. Find the line containing **dev eth0 scope link** and record the ***local network IP address***:

- **Local Network IP address:** 192.168.132.0/24 (replace my IP address with your IP address) (DONE)

7. Enter **ip link show eth0**.
8. Find the line starting with **link/ether** and record the ***MAC address*** of the network card:
    - **MAC address: 00:0c:29:a6:68:b5 (replace my MAC address with your MAC address) (DONE)**
9. Run the **nslookup** command. The command line prompt will change as a result.
10. Type www.google.ca and then hit enter. Record the shown ***DNS server address***: (first address after the www.google.ca line):
    - **DNS server address: 192.168.132.2 (replace my IP address with your IP address)(DONE)**
11. Type exit and then hit the Enter key to terminate the nslookup utility.

IMPORTANT: your network is currently being managed by the NetworkManager service that does not allow to change the network settings manually. You have to switch from NetworkManager to Wicked service to be able to make changes to the network configuration. For that, open Network Settings in YaST and under Global Options, change the Network Setup Method from NetworkManager service to Wicked service. Confirm the change by clicking the OK button.



Open the YaST Network Settings again and switch to the “Overview” tab, select the eth0 network card and click the “Edit” button.

Enter your recorded IP address in the “IP Address” box.
Enter /24 in the “Subnet Mask” box.
Enter your host name in the “Hostname” box”
Click the “Next” button and then click the “OK” button to apply the change.

Once you made the above change, open the /etc/resolv.conf file in nano and add the following line at the end of the file:

nameserver DNSSERVERIP

Check if the network configuration was successful by pinging the www.georegebrown.ca host:

ping -c 3 www.georgebrown.ca

Part II: Delete the Current Network Setup with YaST

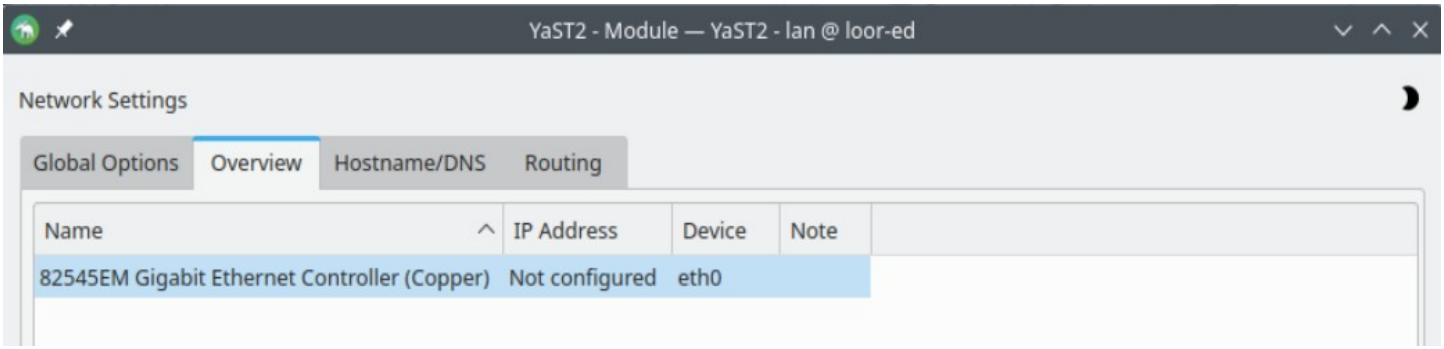
1. Start **YaST** and select **Network Devices > Network Settings**.
2. Select the ***network card eth0***; then select **Delete**.
3. Select **OK**.

4. From the terminal window (as root), enter **rm /etc/sysconfig/network/routes** command. Note: this file might not exist.

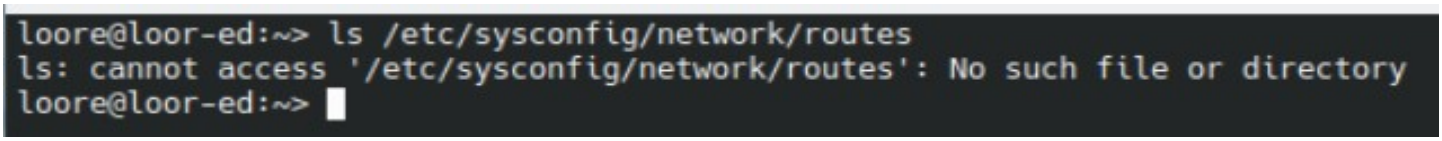
5. Verify that the network connection is not working any more by entering **ping -c 3 georgebrown.ca**

INSERT SCREENSHOTS OF:

1. YaST Network Settings showing the not configured eth0 network card:



2. Terminal window showing that the *etc/sysconfig/network/routes file has been removed*



Part III: Configure the Network Manually

1. In the terminal window enter the following command as root:

ip address add *your_IP_address*/24 brd + dev eth0

sudo ip address add 192.168.132.128/24 brd + dev eth0

2. To activate the network device, enter **ip link set eth0 up**.

sudo ip link set eth0 up

3. To set a route to the local network enter the following:

ip route add LocalNetworkIPAddress dev eth0

sudo ip route add 192.168.132.0 dev eth0

Note: most likely you will get the “file exists” message as step 1 already configured the local network route.

4. To set the default route enter the following:

ip route add default via *gateway_IP_address*

sudo ip route add default via 192.168.132.2

5. Add the following line to the end of the /etc/resolv.conf file:

nameserver *gateway_IP_address*

nameserver 192.168.132.2

6. Prevent the /etc/resolv.conf file from being overwritten by the default network configuration script. For this

6.a Remove the existing /etc/resolv.conf symbolic link

6.b Create a new /etc/resolv.conf file.

6.c Once you recreate the /etc/resolv.conf file, add the nameserver entry to it.

6.d Once the above is done, the /etc/resolv.conf will not be erased when the computer restarts.

7. Verify that the network connection is working again by entering:

ping -c 3 georgebrown.ca

If you are having problems with the network interface, you might need to delete the network card configuration with YaST, save the change, and then re-configure the network card with YaST.

INSERT SCREENSHOT OF:

1. the successful execution of steps 3.1 through 3.7

```
loore@loor-ed:~> sudo ip address add 192.168.132.128/24 brd + dev eth0
loore@loor-ed:~> sudo ip link set eth0 up
loore@loor-ed:~> sudo ip route add 192.168.132.0 dev eth0
loore@loor-ed:~> sudo ip route add default via 192.168.132.2
loore@loor-ed:~> ll /etc/resolv.conf
-rw-r--r-- 1 root root 25 Sep 16 16:32 /etc/resolv.conf
loore@loor-ed:~> ping -c 3 www.georgebrown.ca
PING a1206.b.akamai.net (23.223.17.172) 56(84) bytes of data.
64 bytes from a23-223-17-172.deploy.static.akamaitechnologies.com (23.223.17.172): icmp_seq=1 ttl=128 time=1.5
4 ms
64 bytes from a23-223-17-172.deploy.static.akamaitechnologies.com (23.223.17.172): icmp_seq=2 ttl=128 time=2.8
0 ms
64 bytes from a23-223-17-172.deploy.static.akamaitechnologies.com (23.223.17.172): icmp_seq=3 ttl=128 time=2.3
8 ms

--- a1206.b.akamai.net ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.535/2.236/2.795/0.524 ms
loore@loor-ed:~>
```

Part IV – Reset eth0 card:

NOTE: ONLY COMPLETE THIS STEP IF YOU NEED TO RESET THE NETWORK TO THE DEFAULT STATE IN CASE YOU MADE AN ERROR WHILE WORKING ON THE MANUAL NETWORK CONFIGURATION

Reconfigure the network card to use DHCP configuration

1. Start **YaST** and select **System > Network Settings**.

2. Select the ***network card***; then select **Edit**; then select the “Dynamic Address” option button. Make sure that DHCP and DHCP both version 4 and 6 are selected in the drop down boxes.

3. Select **Next** and then **OK**

4. Verify that the network connection is working properly by entering the following command at the console:

ping -c georgebrown.ca

Note: verify that your /etc/resolv.conf file still have the nameserver entry.

Part V: Save the Network Connection to Interface and Hardware Configuration Files

1. From the terminal window, change to the directory**/etc/sysconfig/network**.

2. Create a new text file and name it **ifcfg-eth0** Open this file with the **nano** editor.

3. Add the following options and enter the indicated values:

BOOTPROTO='static'
IPADDR='YOUR_HOST_IP_ADDRESS/24'
NETWORK='YOUR_NETWORK_ADDRESS/24'
STARTMODE='auto'

BOOTPROTO='static'
IPADDR='192.168.132.128/24'
NETWORK='192.168.132.0/24'
STARTMODE='auto'

4. Save the file and exit nano

5. Change to the directory **/etc/sysconfig/network**.

6. Create a new file with nano called **routes**.

7. Add the following line to the file:

default *default_gateway_IP_address*

default 192.168.132.2

8. Save the file and exit nano.

9. Open the /etc/resolv.conf file with nano and make sure the following lines exist in the file:

nameserver *default_gateway_IP_address*

nameserver 192.168.132.2

10. Reboot your system (issue the **sudo reboot now** command at the console). Note: you could also reload network for the settings to be applied using the following command: **systemctl restart network** or **service network restart**

11. From a terminal window (as root), verify that the network configuration is loaded correctly by entering the following commands:

ip address show eth0

ip route show

12. Verify that the network connection is working properly by entering the following command:

ping georgebrown.ca

INSERT SCREENSHOTS OF:

1. successful execution of the commands that you see in the attached screenshot. The commands must be executed in the order listed in the screenshot and all commands must succeed.

These are the commands that you need to run. NOTE: these command must be run one after another and you must take a single screenshot that includes the output of all commands. Also, the ping command must be successful:

(a) cat /etc/sysconfig/network/ifcfg-eth0, (b) cat /etc/sysconfig/network/routes, (c) cat /etc/resolv.conf, (d) sudo systemctl restart network, and (e) ping -c 3 www.georgebrown.ca.

```
loore@loor-ed:~> cat /etc/sysconfig/network/ifcfg-eth0
BOOTPROTO='static'
IPADDR='192.168.132.128/24'
NETWORK='192.168.132.0/24'
STARTMODE='auto'
loore@loor-ed:~> cat /etc/sysconfig/network/routes
default 192.168.132.2
loore@loor-ed:~> sudo systemctl restart network
[sudo] password for root:
loore@loor-ed:~> ping -c 3 www.georgebrown.ca
PING a1206.b.akamai.net (23.223.17.172) 56(84) bytes of data.
64 bytes from a23-223-17-172.deploy.static.akamaitechnologies.com (23.223.17.172): icmp_seq=1 ttl=128 time=1.3
3 ms
64 bytes from a23-223-17-172.deploy.static.akamaitechnologies.com (23.223.17.172): icmp_seq=2 ttl=128 time=2.5
9 ms
64 bytes from a23-223-17-172.deploy.static.akamaitechnologies.com (23.223.17.172): icmp_seq=3 ttl=128 time=2.6
6 ms

--- a1206.b.akamai.net ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 1.329/2.193/2.661/0.611 ms
loore@loor-ed:~>
```