Module 1 and 2 Assignments solutions

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1. Consider a Case,a folder contains multiple files and how would copy it to the destination machine path?

Solution:

```
C:\Users\Priya>scp -r E:\Files\ saravan@192.168.29.104:/home/saravan
saravan@192.168.29.104's password:
89.pdf
DocScanner 05-Mar-2023 4-37 pm.pdf
sapm1.pdf
```

Here from Windows machine,I used scp (Secure Copy) to transfer folder that contains multiple files to copy to the Linux VM.It used Port 22 (SSH Port) for connection and transferred the file successfully.

```
drwxr-xr-x 2 saravan saravan 4096 Feb  3 09:25 Downloads
drwxr-xr-x 5 saravan saravan 4096 Feb 19 16:16 Desktop
drwx------ 5 saravan saravan 4096 Feb 28 17:06 snap
drwx---rwx 2 saravan saravan 4096 Mar 13 21:12 Files
saravan@saravan-VirtualBox:~$ cd Files/
saravan@saravan-VirtualBox:~/Files$ ls -ltr
total 77292
-rw-rw-r-- 1 saravan saravan  2217160 Mar 13 21:12  89.pdf
-rw-rw-r-- 1 saravan saravan 66811741 Mar 13 21:12 'DocScanner 05-Mar-2023 4-37
pm.pdf'
-rw-rw-r-- 1 saravan saravan 10112724 Mar 13 21:12  sapm1.pdf
saravan@saravan-VirtualBox:~/Files$
```

Here you can see that Same files are transferred to the Linux VM.

So the scp uses ssh(Secure Shell connection) Port to transfer the files.

2. Host a FTP and SFTP Server and try PUT and GET Operations?

   Solution:

```
C:\Users\Priya>ftp 192.168.29.104
Connected to 192.168.29.104.
220 Welcome to blah FTP service.
200 Always in UTF8 mode.
User (192.168.29.104:(none)): saravan
331 Please specify the password.
Password:

230 Login successful.
ftp>
ftp>
ftp> put test.txt
200 PORT command successful. Consider using PASV.
150 Ok to send data.
226 Transfer complete.
ftp: 18 bytes sent in 0.00Seconds 18.00Kbytes/sec.
ftp>
```

```
ftp> get test.txt
200 PORT command successful. Consider using PASV.
150 Opening ASCII mode data connection for test.txt (17 bytes).
226 Transfer complete.
ftp: 18 bytes received in 0.03Seconds 0.53Kbytes/sec.
ftp>
```

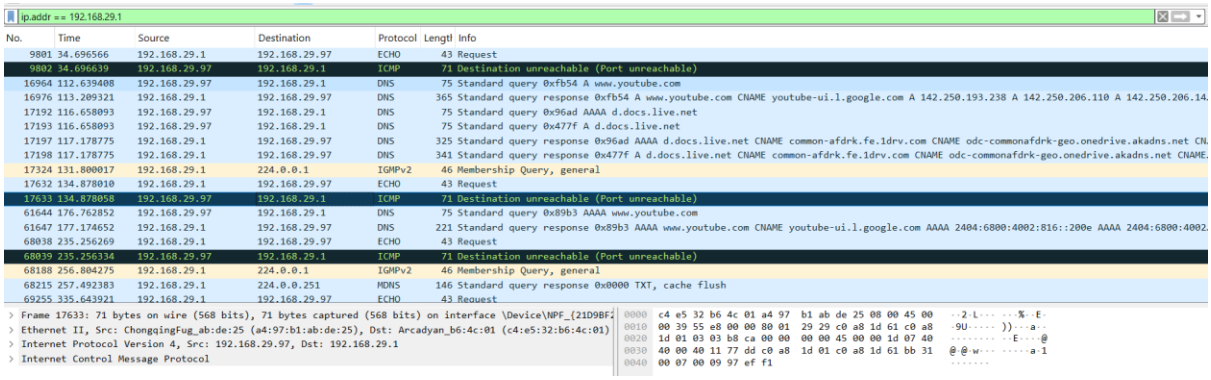
```
-rwxr-xr-x 1 saravan saravan     0 Jan 24 17:18 hello.c
drwxr-xr-x 3 saravan saravan  4096 Jan 24 17:31 Pictures
-r-xr-xrwx 1 saravan saravan     0 Jan 24 17:34 saravan.c
drwxrwxr-x 3 saravan saravan  4096 Jan 24 17:51 dir1
drwxrwxr-x 2 saravan saravan  4096 Jan 31 14:19 jackie
-rw-rw-r-- 1 saravan saravan     0 Jan 31 19:04 jackie_characters
drwxr-xr-x 2 saravan saravan  4096 Feb  3 09:25 Downloads
drwxr-xr-x 5 saravan saravan  4096 Feb 19 16:16 Desktop
drwx------ 5 saravan saravan  4096 Feb 28 17:06 snap
drwx---rwx 2 saravan saravan  4096 Mar 13 21:12 Files
-rw------- 1 saravan saravan    17 Mar 13 22:59 test.txt
saravan@saravan-VirtualBox:~$
```

Here you can see using FTP (File transfer Protocol) we have transferred the file from the client to server.Basically FTP Uses Port 21 for its connection.

3. Explore with Wire shark/tcpdump/cisco packet tracer tools and learn about packet filters?

Solution:

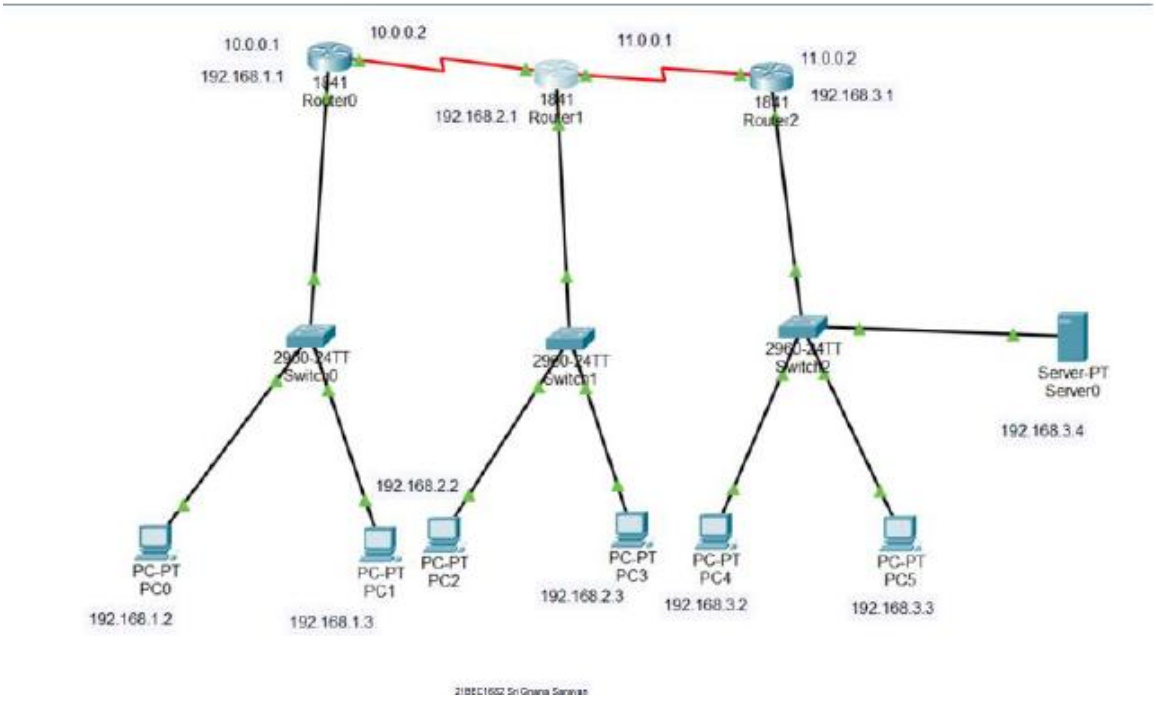
Wireshark:

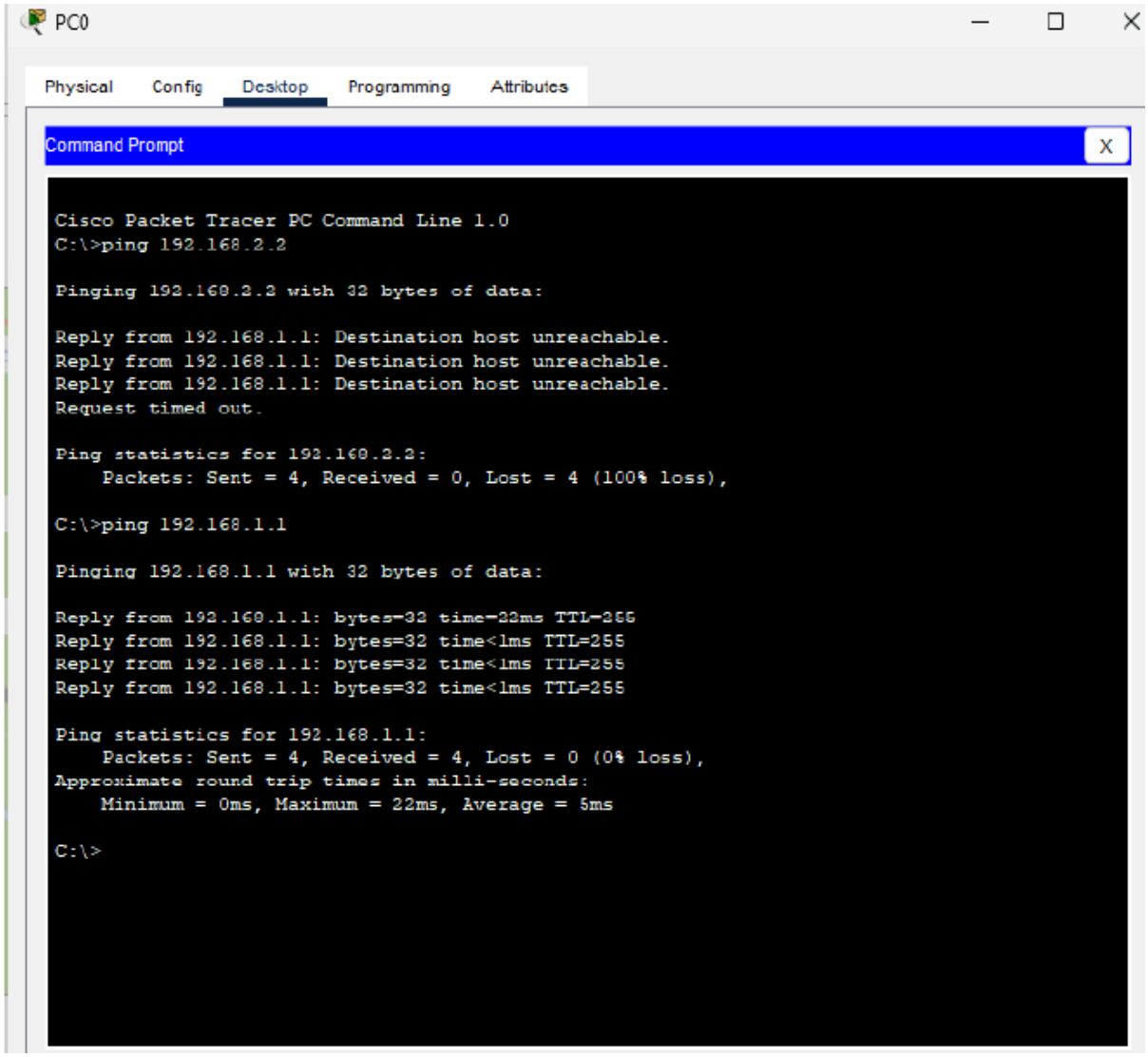


Used a Display Filter like ip.addr = to segregate the the packets arrived from the specific address and uses keyword and and applied the icmp or any other protocol to segregate the packets arrived from that protocol.

```
> 000. .... = Flags: 0x0
  ...0 0000 0000 0000 = Fragment Offset: 0
  Time to Live: 128
  Protocol: ICMP (1)
  Header Checksum: 0x292d [validation disabled]
  [Header checksum status: Unverified]
  Source Address: 192.168.29.97
  Destination Address: 192.168.29.1
  [Stream index: 10]
v Internet Control Message Protocol
    Type: 3 (Destination unreachable)
    Code: 3 (Port unreachable)
    Checksum: 0xb8ca [correct]
    [Checksum Status: Good]
    Unused: 00000000
  > Internet Protocol Version 4, Src: 192.168.29.1, Dst: 192.168.29.97
  > User Datagram Protocol, Src Port: 47921, Dst Port: 7
  > Echo
```

We can check the source and destination IP Addresses and lots of information from the Packet.





Here Used Cisco packet tracer for establishing LAN Network and understands the basic setup of the network connection and different topologies.

```
root@saravan-VirtualBox:/home/saravan/Desktop# tcpdump -i enp0s3
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
01:26:06.425316 IP del11s08-in-f10.1e100.net.https > saravan-VirtualBox.39842: F
lags [P.], seq 2261022849:2261022934, ack 1004816185, win 1012, options [nop,nop
,TS val 4096235520 ecr 34601402], length 85
01:26:06.430452 IP saravan-VirtualBox.55928 > reliance.reliance.domain: 51000+ P
TR? 104.29.168.192.in-addr.arpa. (45)
01:26:06.440192 IP reliance.reliance.domain > saravan-VirtualBox.55928: 51000 NX
Domain 0/0/0 (45)
01:26:06.441293 IP saravan-VirtualBox.58668 > reliance.reliance.domain: 12579+ P
TR? 202.77.250.142.in-addr.arpa. (45)
```

```
root@saravan-VirtualBox:/home/saravan/Desktop# tcpdump src host 192.168.29.1
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
01:27:51.333666 ARP, Request who-has 192.168.29.130 (Broadcast) tell reliance.re
liance, length 46
01:27:51.453392 IP reliance.reliance.domain > saravan-VirtualBox.40600: 21513 NX
Domain 0/0/0 (45)
01:27:51.460603 IP reliance.reliance.domain > saravan-VirtualBox.36293: 29222* 1
/0/0 PTR reliance.reliance. (74)
```

As you can see using tcpdump we have capture various packets and also using filters like tcpdump port --> Used to capture the packets from specific ports

tcpdump src host ---->Used to capture the packets from specific source ipaddres

tcpdump dest host --->Capture the packets to the specific ip address.

4. Understand ping,arp linux utility commands.

Solution:

Ping is used to check whether the PC or server is reachable or not.

```
saravan@saravan-VirtualBox:~/Desktop$ ping www.google.com
PING www.google.com (216.58.200.196) 56(84) bytes of data.
64 bytes from del11s07-in-f4.1e100.net (216.58.200.196): icmp_seq=1 ttl=53 time=
52.1 ms
64 bytes from nrt12s12-in-f196.1e100.net (216.58.200.196): icmp_seq=2 ttl=53 tim
e=49.9 ms
64 bytes from del11s07-in-f4.1e100.net (216.58.200.196): icmp_seq=3 ttl=53 time=
47.1 ms
64 bytes from nrt12s12-in-f196.1e100.net (216.58.200.196): icmp_seq=4 ttl=53 tim
e=47.7 ms
S64 bytes from nrt12s12-in-f196.1e100.net (216.58.200.196): icmp_seq=5 ttl=53 ti
me=48.7 ms
```

So in ping command it will send some packets to the server and receives the reply,It also measures total trip length.So if its successful the pc or server is reachable.

```
saravan@saravan-VirtualBox:~/Desktop$ arp
Address                  HWtype  HWaddress           Flags Mask            Iface
reliance.reliance        ether   c4:e5:32:b6:4c:01   C                     enp0s
3
192.168.29.130           ether   5e:a6:e6:04:ab:42   C                     enp0s
3
saravan@saravan-VirtualBox:~/Desktop$ S
```

Basically ARP stands for Address Resolution Protocol,It maintains the MAC Address table.So while receiving packets it can verify whether the packets are sent for its device or not.

5.Understand what happens when the duplicate IP's configured in the Network?

Solution:

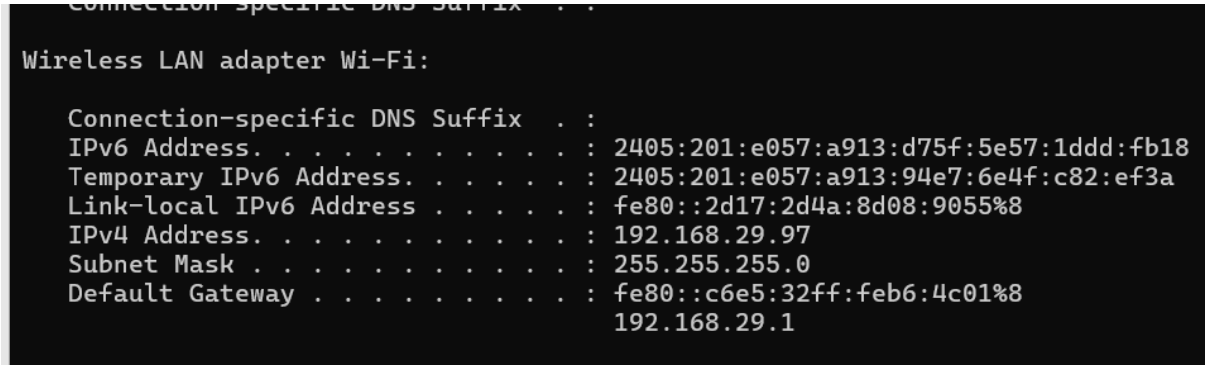
When there are Duplicate IP's are assigned in the network,it becomes Unstable.Some of the packets may received ,some are not or the devices has same IP's not receive any packets.ARP tables are constantly getting refreshed as the two device compete for same IP addresses.

Reason: It can occur when we assign the IP address statically to one device the network and it comes under the DHCP Server IP addresses pool range,So DHCP Server also tries to assign the same address,So the Conflict occurs.

7.How to check our default gateway is reachable or not?

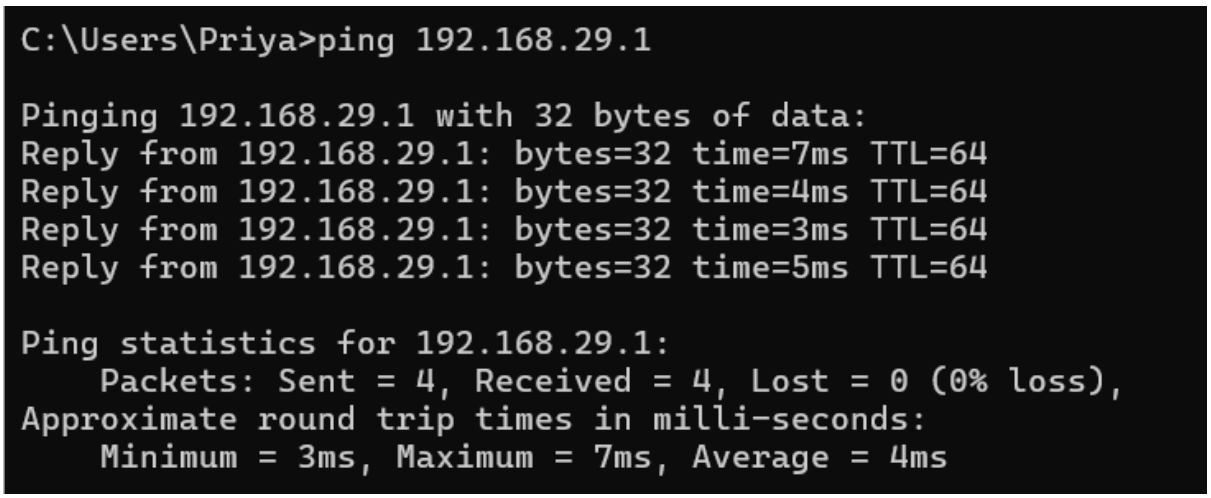
Solution:

Type ipconfig in your command prompt:



Here the Default Gateway IP ----> 192.168.29.1

Try to ping to this IP to say whether its reachable or not



Here it is reachable.

8.Check ifconfig to understand in detail about network interfaces

Solution:

```
    ash (Ash) x25 (CCITT X.25)
saravan@saravan-VirtualBox:~/Desktop$ ifconfig enp0s3
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.29.104  netmask 255.255.255.0  broadcast 192.168.29.255
        ether 08:00:27:e1:52:52  txqueuelen 1000  (Ethernet)
        RX packets 8947  bytes 7707941 (7.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4488  bytes 1591209 (1.5 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

In ifconfig we can see the MTU(Maximum transfer Unit) Size of the interfaces and the IP addresses of the interfaces.

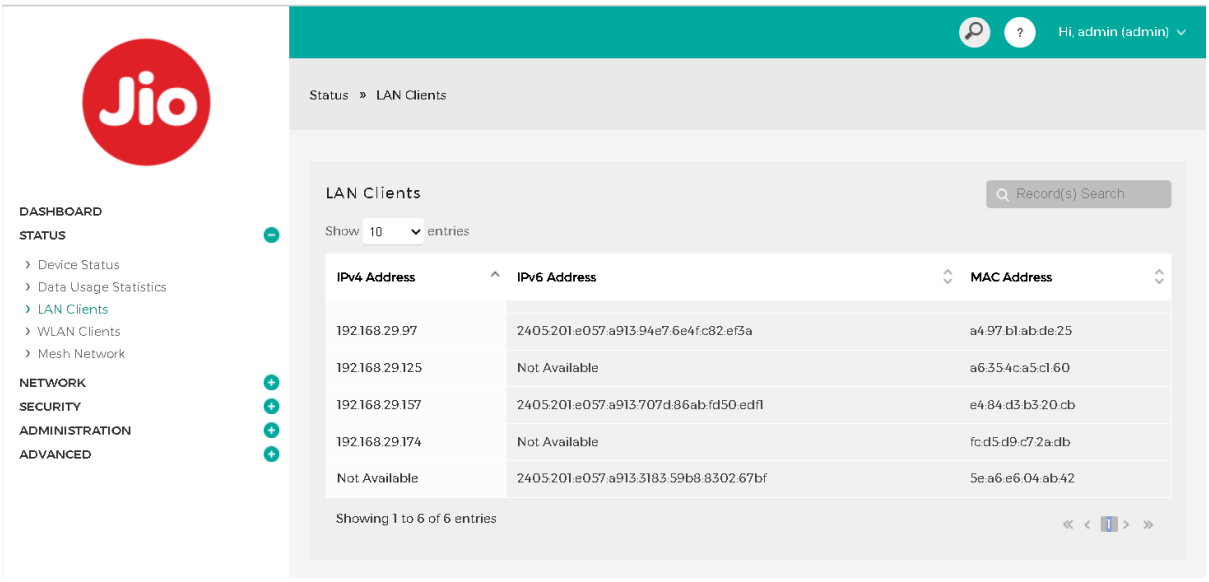
```
saravan@saravan-VirtualBox:~/Desktop$ sudo ethtool enp0s3
Settings for enp0s3:
        Supported ports: [ TP ]
        Supported link modes:   10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
                                1000baseT/Full
        Supported pause frame use: No
        Supports auto-negotiation: Yes
        Supported FEC modes: Not reported
        Advertised link modes:  10baseT/Half 10baseT/Full
                                100baseT/Half 100baseT/Full
                                1000baseT/Full
        Advertised pause frame use: No
        Advertised auto-negotiation: Yes
        Advertised FEC modes: Not reported
        Speed: 1000Mb/s
        Duplex: Full
        Auto-negotiation: on
        Port: Twisted Pair
        PHYAD: 0
        Transceiver: internal
        MDI-X: off (auto)
```

Using this command we can see the interface speed as 1000Mb/s and the Port type: Twisted Pair many info.

Iwconfig - Stands for wireless connection

9.Log into your home router’s web interface and check the connected devices list?

Solution:



These are the connected devices list of my home router web's interface.

10.Explain how a DHCP Server assigns IP addresses to devices in your network?

Solution:

Basically DHCP Server Assigns IP Addresses dynamically rather than static.It consists of four step process.

Step 1 ----> When a client connected to the network,It broadcasts the DHCP discover message to find the DHCP Server.This step is called Discovery.

Step 2 ----> Then the DHCP Server replies with DHCPOFFER to assigning a available ip addresses.This step is called Offer.

Step 3 -----> Then the client replies back with DHCPREQUEST to accept the assigned IP Address and wants to use with the assigned settings.

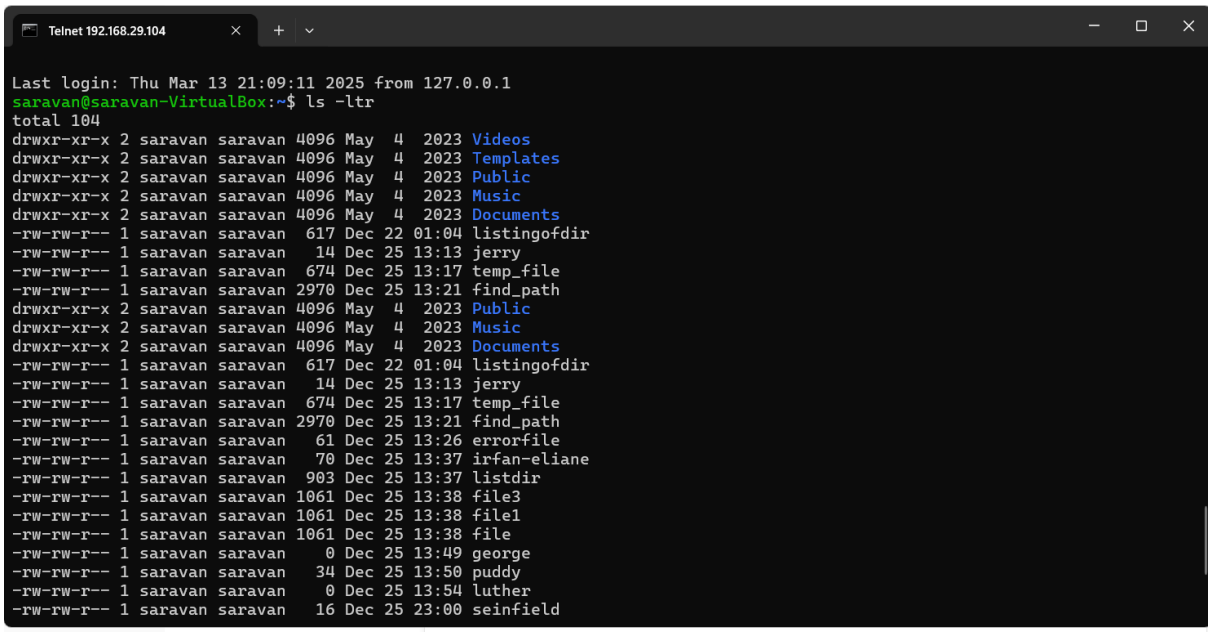
Step 4 -----> Then the DHCP Server acknowledges the message and sends the message to confirm the IP Address and the other configurable network settings.

11. Using a terminal connect to remote machine via SSH and telnet

Solution:

```
C:\Users\Priya>ssh saravan@192.168.29.104
saravan@192.168.29.104's password:
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-41-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

Expanded Security Maintenance for Applications is not enabled.

543 updates can be applied immediately.
368 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

7 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

New release '24.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Thu Mar 13 21:09:11 2025 from 127.0.0.1
saravan@saravan-VirtualBox:~$ ls -ltr
total 104
drwxr-xr-x 2 saravan saravan 4096 May  4  2023 Videos
drwxr-xr-x 2 saravan saravan 4096 May  4  2023 Templates
drwxr-xr-x 2 saravan saravan 4096 May  4  2023 Public
drwxr-xr-x 2 saravan saravan 4096 May  4  2023 Music
drwxr-xr-x 2 saravan saravan 4096 May  4  2023 Documents
-rw-rw-r-- 1 saravan saravan  617 Dec 22 01:04 listingofdir
-rw-rw-r-- 1 saravan saravan   14 Dec 25 13:13 jerry
```

Here using SSH (Secure Shell connection) we can access the remote machine and operate in the machine remotely.SSH uses Port 22 as default port for its connection.



Using Telnet logged into the Linux VM Remotely.Telnet(Telecommunication Network)

It is used to access the system through Command line interface.Basically it is client – server model.Defaultly it uses Port 23 for the telnet services.