

CLOUD COMPUTING LAB

ASSIGNMENT 2

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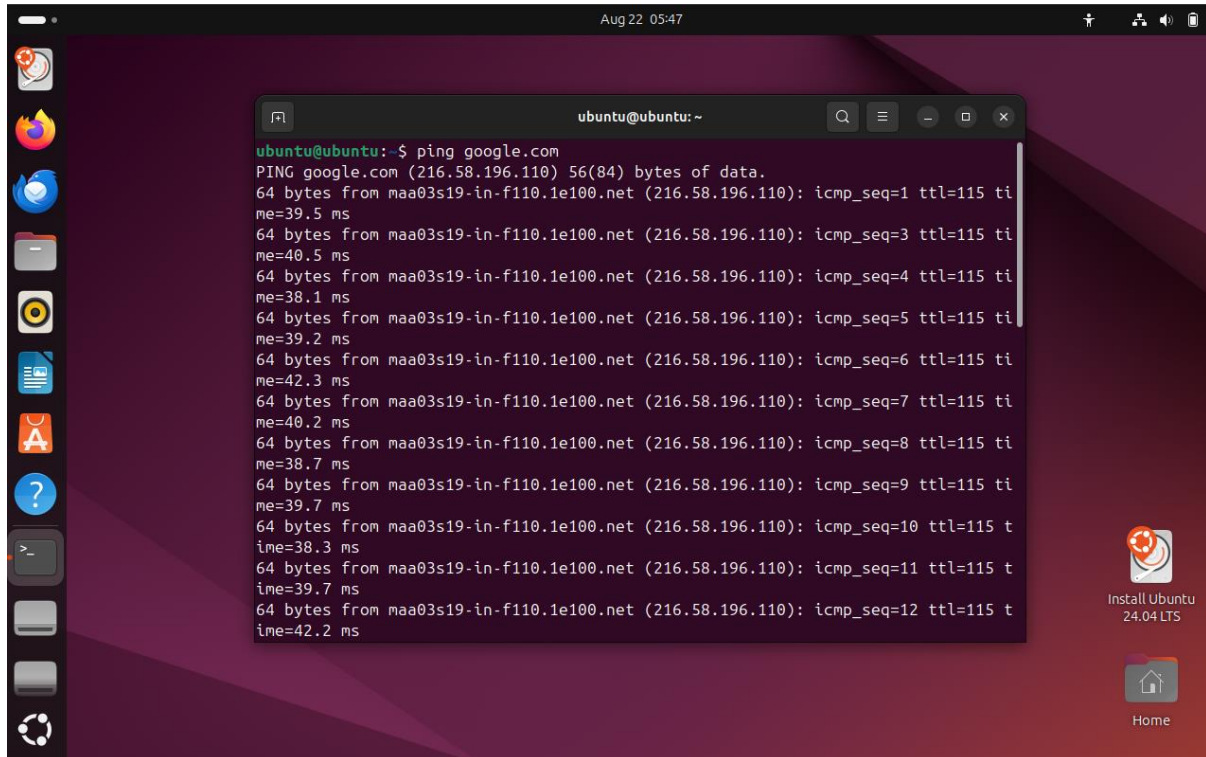
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SWAPNIL MAL(002211001123)

Task 1: Check the internet connection on the installed guest operating systems.

Usually, it works automatically as long as the host system has Internet in it.

The connectivity of the Linux VM was checked to ensure an active internet connection, which is usually shared depending on the host system configuration. In this case, the Linux VM already had internet access by default, confirmed using the `ping` command to test reachability on an IP network.



The screenshot shows an Ubuntu 24.04 LTS desktop environment. A terminal window is open, displaying the output of a `ping google.com` command. The output shows that the connection is successful, with 12 pings received from the IP address 216.58.196.110. The terminal window title is `ubuntu@ubuntu: ~`. The desktop background is a dark purple gradient. On the left side, there is a dock with icons for various applications including Firefox, LibreOffice, and the Dash. On the right side, there are icons for 'Install Ubuntu 24.04 LTS' and 'Home'.

```
ubuntu@ubuntu: ~  
ubuntu@ubuntu:~$ ping google.com  
PING google.com (216.58.196.110) 56(84) bytes of data:  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=1 ttl=115 time=39.5 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=3 ttl=115 time=40.5 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=4 ttl=115 time=38.1 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=5 ttl=115 time=39.2 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=6 ttl=115 time=42.3 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=7 ttl=115 time=40.2 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=8 ttl=115 time=38.7 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=9 ttl=115 time=39.7 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=10 ttl=115 time=38.3 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=11 ttl=115 time=39.7 ms  
64 bytes from maa03s19-in-f110.1e100.net (216.58.196.110): icmp_seq=12 ttl=115 time=42.2 ms
```

Task 2: Transfer a file between one guest operating system to another guest operating system, where first guest system is your guest system and second guest system is from another group. Mention the paired group's roll numbers along with your group's roll number in the documentation.

We utilized SSH (Secure Shell) and SCP (Secure Copy Protocol) to accomplish the task, which involved securely accessing and managing the remote Linux VM as well as transferring files between the host system and the VM. SSH allowed us to establish an encrypted connection to the VM, providing a secure environment for executing commands remotely, while SCP enabled the secure and efficient transfer of files over the SSH connection. This combination of tools ensured both the integrity and confidentiality of the data being transmitted, making them ideal for managing the remote system and facilitating the necessary file exchanges.

```
Aug 22 05:50
ubuntu@ubuntu: ~
ubuntu@ubuntu:~$ sudo apt install ssh
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh ssh-import-id
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 837 kB of archives.
After this operation, 6809 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 openssh-sftp-server amd64 1:9.6p1-3ubuntu13 [37.3 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 openssh-server amd64 1:9.6p1-3ubuntu13 [510 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble/main amd64 ncurses-term all 6.4+20240113-1ubuntu2 [275 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 ssh all 1:9.6p1-3ubuntu13 [4650 B]
Get:5 http://archive.ubuntu.com/ubuntu noble/main amd64 ssh-import-id all 5.11-0ubuntu2 [10.0 kB]
Fetched 837 kB in 3s (334 kB/s)
Preconfiguring packages ...
Selecting previously unselected package openssh-sftp-server.
(Reading database ... 210655 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a9.6p1-3ubuntu13_amd64.deb ...
Unpacking openssh-sftp-server (1:9.6p1-3ubuntu13) ...
Selecting previously unselected package openssh-server.
Preparing to unpack .../openssh-server_1%3a9.6p1-3ubuntu13_amd64.deb ...
Unpacking openssh-server (1:9.6p1-3ubuntu13) ...
Selecting previously unselected package ncurses-term.
Preparing to unpack .../ncurses-term_6.4+20240113-1ubuntu2_all.deb ...
Unpacking ncurses-term (6.4+20240113-1ubuntu2) ...
Selecting previously unselected package ssh.
Preparing to unpack .../ssh_1%3a9.6p1-3ubuntu13_all.deb ...
Unpacking ssh (1:9.6p1-3ubuntu13) ...
```

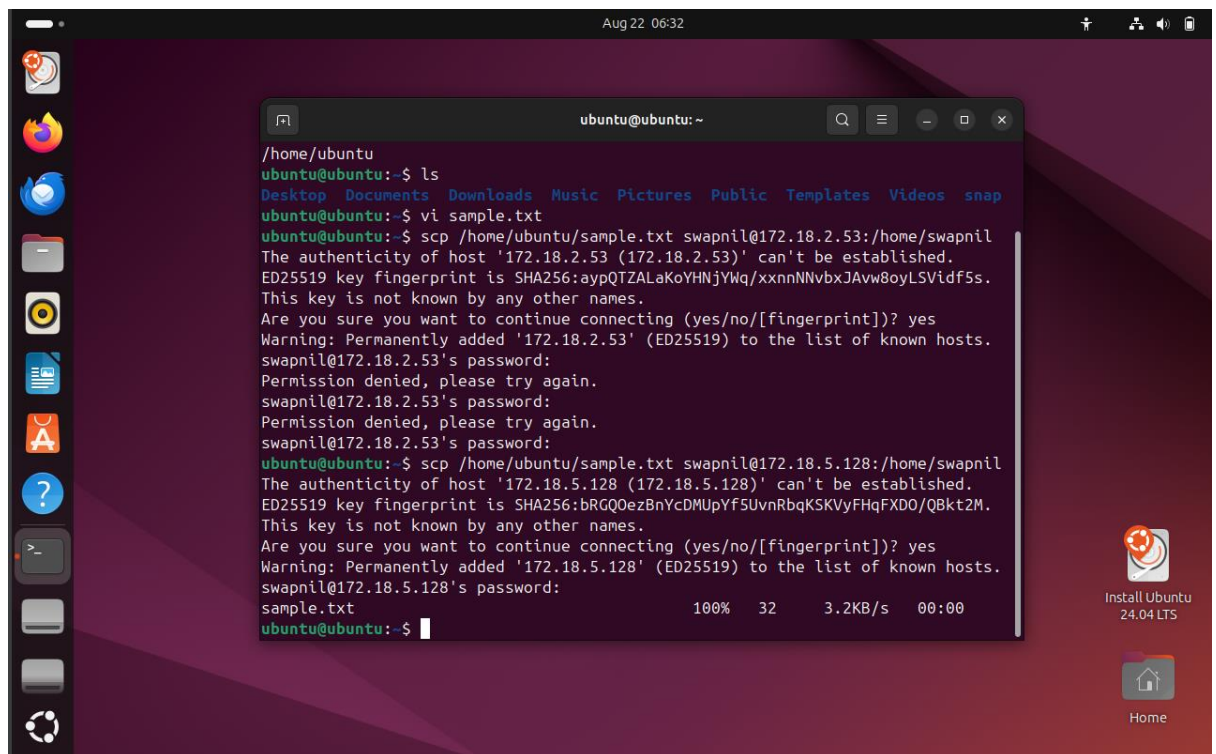
Next, we started SSH and established a connection between our computers using the following commands:

```
ubuntu@ubuntu:~$ sudo systemctl start ssh
ubuntu@ubuntu:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
ubuntu@ubuntu:~$
```

We made a demo text file named 'sample.txt,' with some text .

```
ubuntu@ubuntu:~$ pwd
/home/ubuntu
ubuntu@ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  snap
ubuntu@ubuntu:~$ vi sample.txt
ubuntu@ubuntu:~$
```

We transferred it to Swapnil's virtual machine using the scp command. After being prompted for his password, we entered it, and the file was successfully transferred to his VM, as demonstrated.



```
swapnil@swapnil-VirtualBox:~$ ls
add  a.out  Desktop  Downloads  hello.cpp  Pictures  sample.txt  Templates
an.c  cppfiles  Documents  file.txt  Music      Public     snap         Videos
swapnil@swapnil-VirtualBox:~$
```

Task 3: Install a C compiler in the virtual machine and create a C program file and run it in your guest operating system and once it is successfully run on your guest system, send the file to your friend's guest system with whom you made a pair for the above sub-task.

The first step was to install a C compiler. Among the many available options, we chose GCC, a widely used compiler for C and C++ programs. We installed it using the `apt` package manager.

```
ubuntu@ubuntu: ~  
Warning: Permanently added '172.18.5.128' (ED25519) to the list of known hosts.  
swapnil@172.18.5.128's password:  
sample.txt          100%   32    3.2KB/s   00:00  
ubuntu@ubuntu:~$ sudo apt install gcc  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following additional packages will be installed:  
  binutils binutils-common binutils-x86-64-linux-gnu gcc-13  
  gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu libasan8 libbinutils libcc1-0  
  libctf-nobfd0 libctf0 libgcc-13-dev libgprofng0 libhwasan0 libitm1 liblsan0  
  libquadmath0 libsframe1 libtsan2 libubsan1  
Suggested packages:  
  binutils-doc gprofng-gui gcc-multilib make autoconf automake libtool flex  
  bison gcc-doc gcc-13-multilib gcc-13-doc gcc-13-locales gdb-x86-64-linux-gnu  
The following NEW packages will be installed:  
  binutils binutils-common binutils-x86-64-linux-gnu gcc gcc-13  
  gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu libasan8 libbinutils libcc1-0  
  libctf-nobfd0 libctf0 libgcc-13-dev libgprofng0 libhwasan0 libitm1 liblsan0  
  libquadmath0 libsframe1 libtsan2 libubsan1  
0 upgraded, 21 newly installed, 0 to remove and 0 not upgraded.  
Need to get 0 B/39.5 MB of archives.  
After this operation, 144 MB of additional disk space will be used.  
Do you want to continue? [Y/n]
```

```
ubuntu@ubuntu: ~
GNU nano 7.2 hello.c *
#include<stdio.h>
int main(){
printf("hello world");
return 0;
}

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

```
ubuntu@ubuntu:~$ vi hello.c
ubuntu@ubuntu:~$ rm hello.c
ubuntu@ubuntu:~$ nano hello.c
ubuntu@ubuntu:~$ gcc hello.c
ubuntu@ubuntu:~$ ./a.out
hello worldubuntu@ubuntu:~$
```

After that we moved the `hello.c` program to our group partner Swapnil's VM using the `scp` command as shown below.

```
ubuntu@ubuntu:~$ scp /home/ubuntu/hello.c swapnil@172.18.5.128:/home/swapnil
swapnil@172.18.5.128's password:
Permission denied, please try again.
swapnil@172.18.5.128's password:
Permission denied, please try again.
swapnil@172.18.5.128's password:
hello.c                                                                100% 65 6.6KB/s 00:00
ubuntu@ubuntu:~$
```

As demonstrated, the file was copied to his VM as intended and the procedure completed without an issue.

```
swapnil@swapnil-VirtualBox:~$ ls
add a.out Desktop Downloads hello.c Music Public snap Videos
an.c cppFiles Documents file.txt hello.cpp Pictures sample.txt Templates
swapnil@swapnil-VirtualBox:~$
```

Task 4: Delete that C file present in your guest system and run the C file present in your friend's guest system from your guest system.

To simulate a situation where the C program was no longer present on our guest system, we first deleted the `hello.c` file using the rm command.

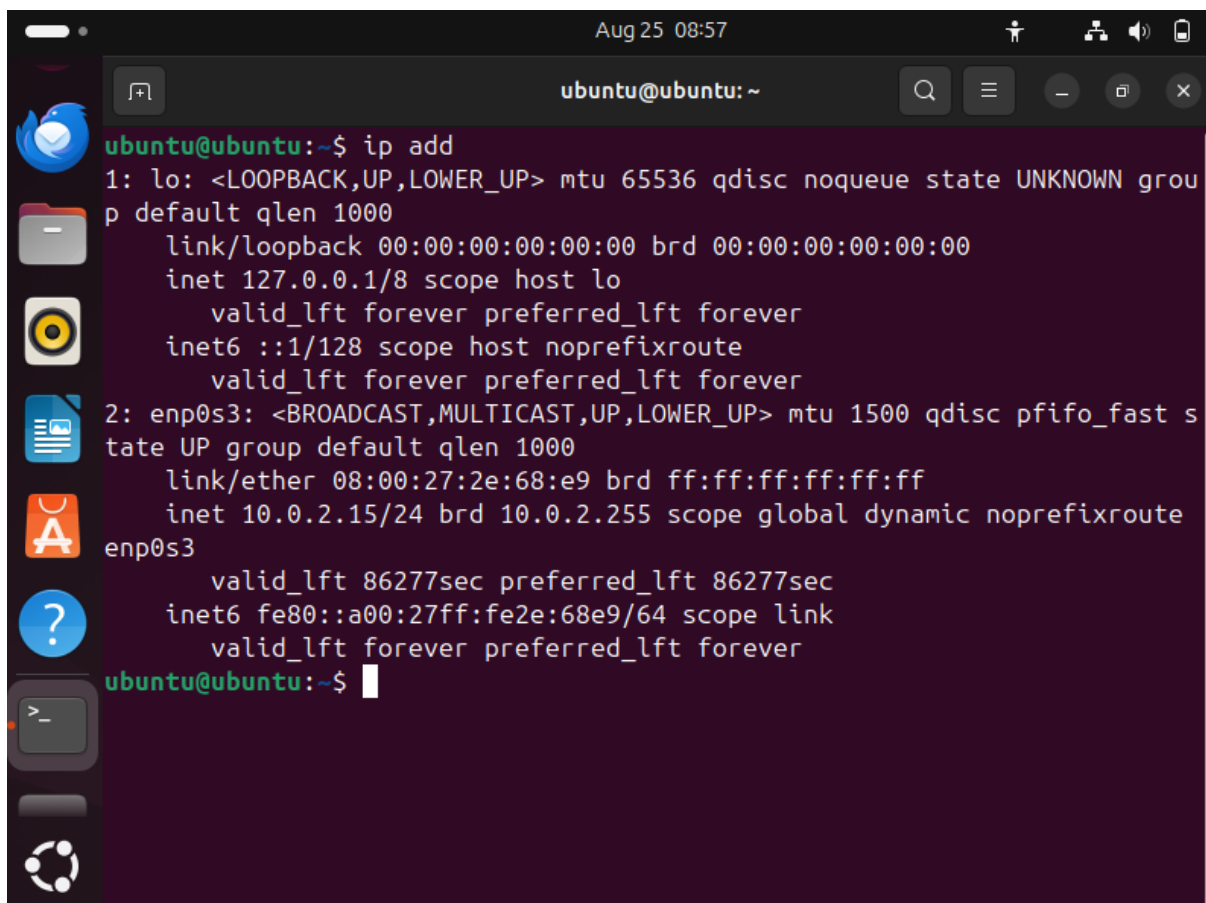
```
ubuntu@ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  a.out  hello.c  sample.txt  snap
ubuntu@ubuntu:~$ rm hello.c
ubuntu@ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  a.out  sample.txt  snap
ubuntu@ubuntu:~$
```

We accessed a remote server via SSH to compile and run a C program. We used the gcc compiler to compile the hello.c file, located in the remote directory /home/swapnil/, into an executable named abc. After successful compilation, we executed the program, which printed "hello world" in the terminal, confirming that our code ran correctly.

```
ubuntu@ubuntu:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  a.out  sample.txt  snap
ubuntu@ubuntu:~$ ssh swapnil@172.18.5.128 "gcc /home/swapnil/hello.c -o /home/swapnil/abc && /home/swapnil/abc"
swapnil@172.18.5.128's password:
hello worldubuntu@ubuntu:~$
```

Task -5: File transfer from host to guest operating system.

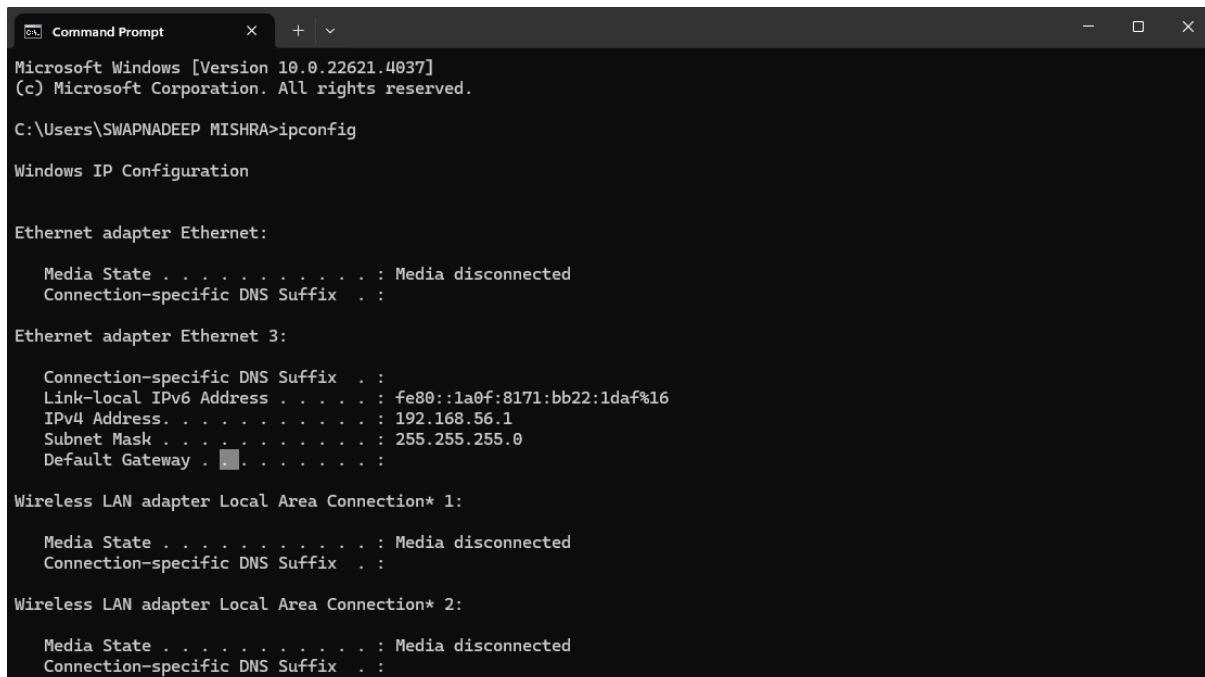
At first we open the terminal in our guest(ubuntu) system and enter the command "ip add" to get the ip address.



The screenshot shows a terminal window titled 'ubuntu@ubuntu: ~' with a search bar and window controls. The terminal output for the 'ip add' command is as follows:

```
ubuntu@ubuntu:~$ ip add
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 noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:2e:68:e9 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86277sec preferred_lft 86277sec
    inet6 fe80::a00:27ff:fe2e:68e9/64 scope link
        valid_lft forever preferred_lft forever
ubuntu@ubuntu:~$
```


Then we open cmd in our host windows 11 system and enter the command “ipconfig” to get the ip address.



```
Command Prompt
Microsoft Windows [Version 10.0.22621.4037]
(c) Microsoft Corporation. All rights reserved.

C:\Users\SWAPNADEEP MISHRA>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet 3:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::1a0f:8171:bb22:1daf%16
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

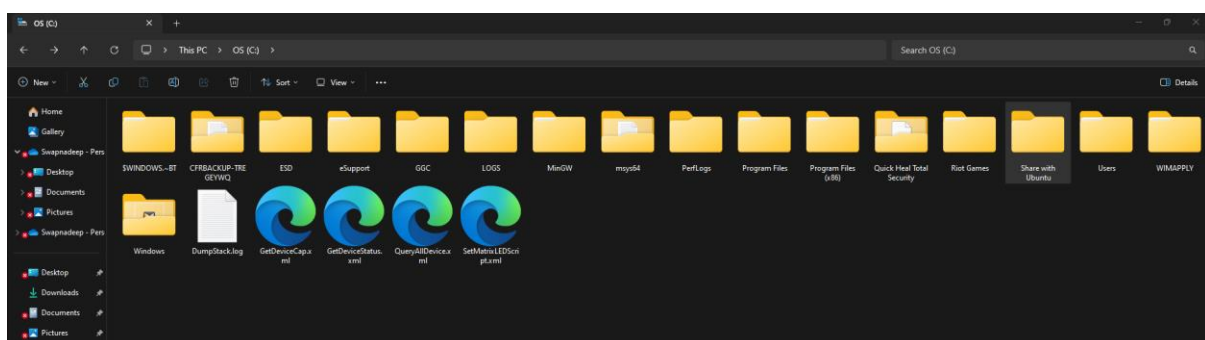
Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

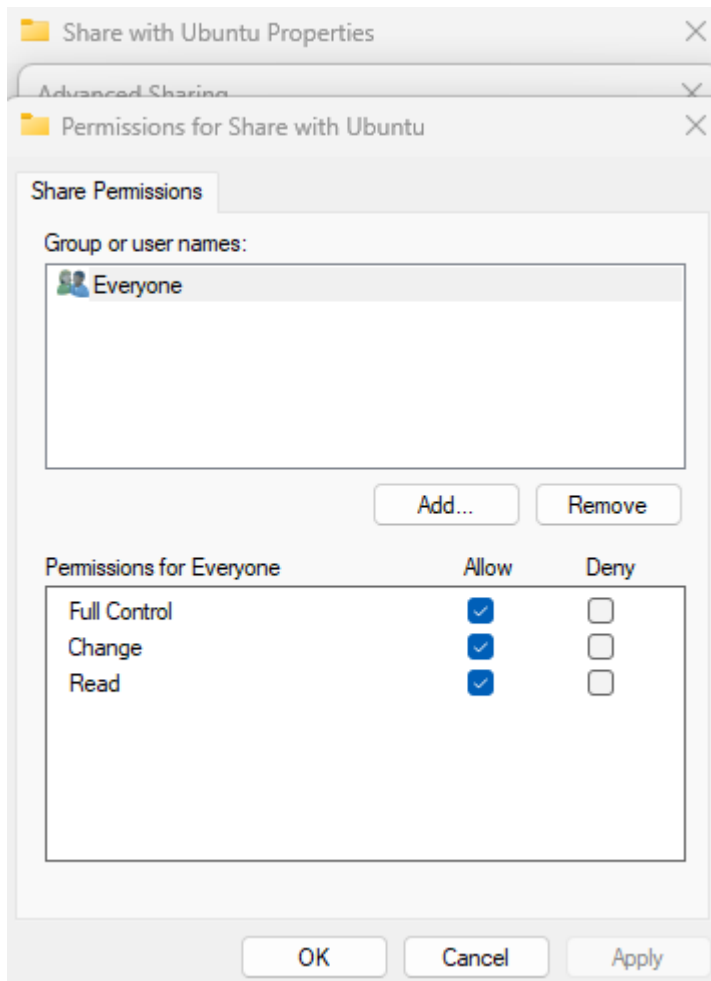
Wireless LAN adapter Local Area Connection* 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
```

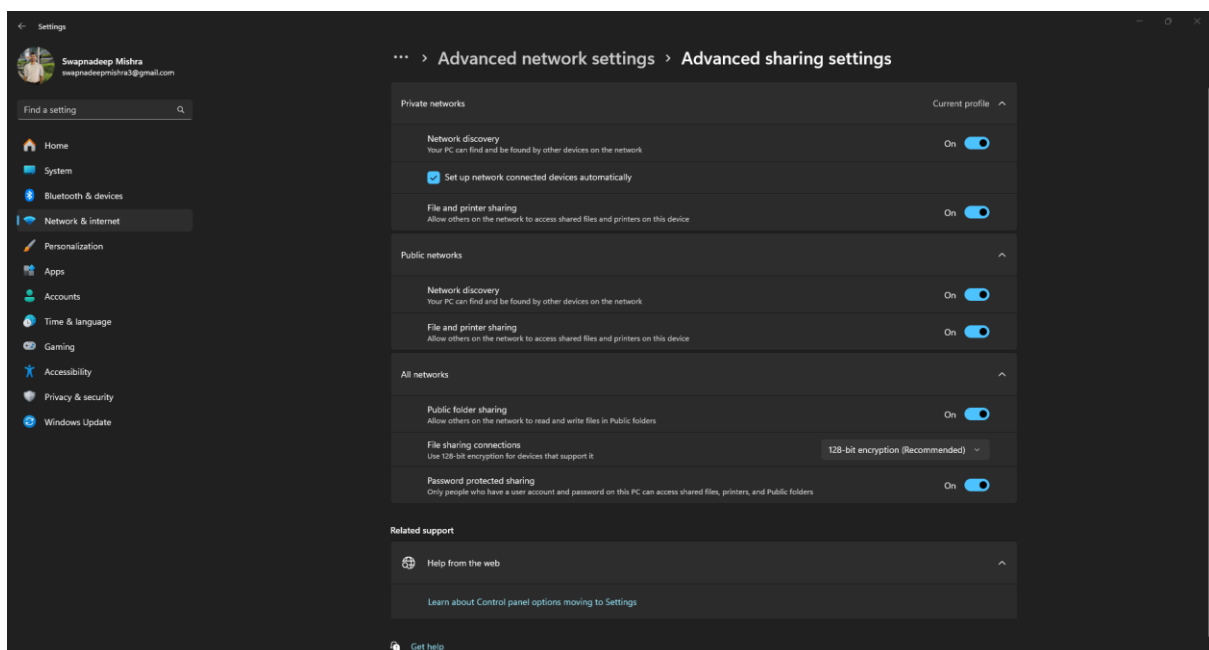
After that we created a folder named “Share with Ubuntu” in our Local disk C.



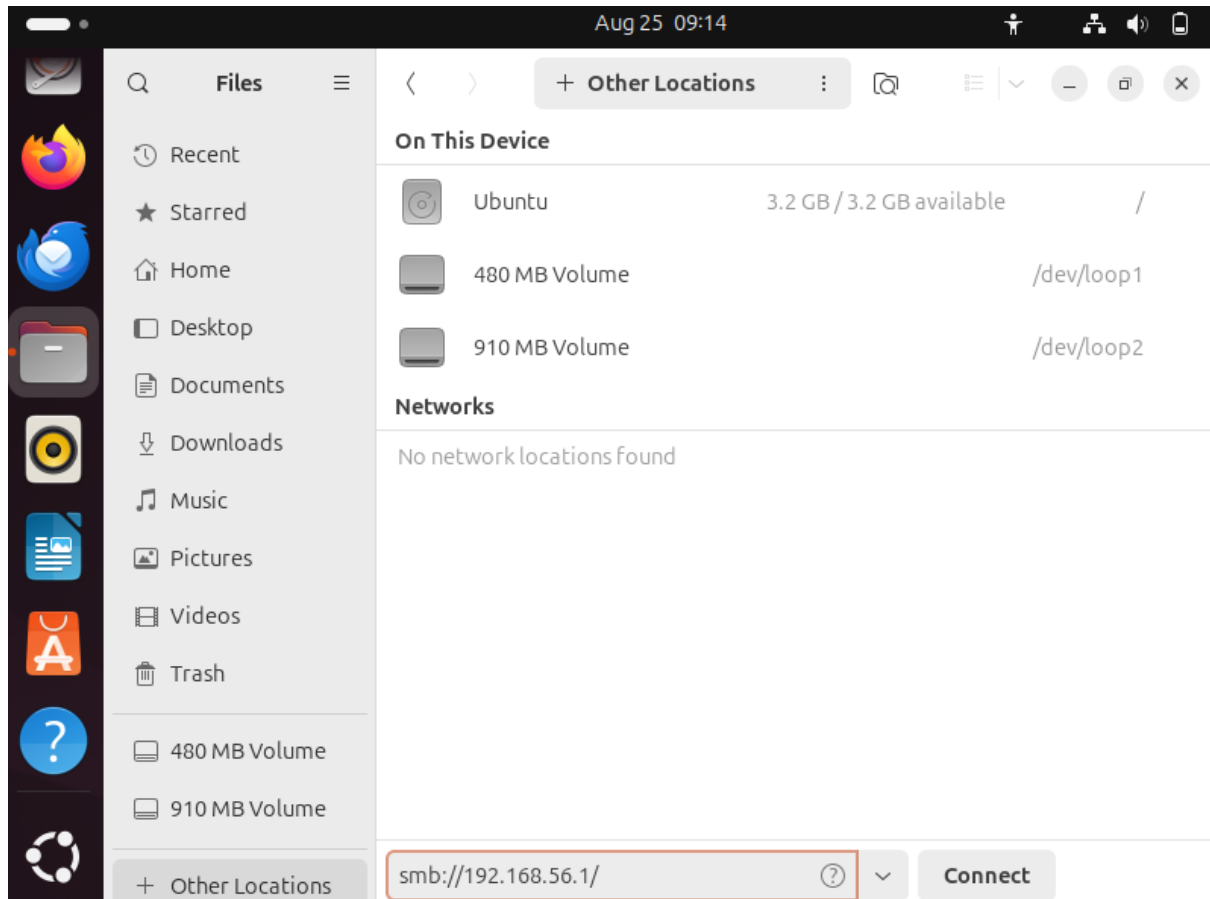
After that we gave all the sharing permissions to the created file thus it will not show us any issues while sharing.



Then opening the settings we opened the network & internet and we gave access to all private , public and all network sharing options .



After that we opened our guest system and opened files. Next in the files we went to other locations and in that field we enter our ip address of our host system and press the connect button.



After pressing connect we saw that the folder that we created was there . Then we create a file inside the folder in our windows system and after refreshing that in ubuntu system we saw that the folder is also created in our guest system.

