NETWORKING AND SYSTEM ADMINISTRATION
LAB RECORD

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ROLL NO: 31

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BASIC LINUX COMMANDS

1. pwd (Print Working Directory)

The pwd command is used to find out the path of the current working directory.The command will return an absolute (full) path, which is basically a path of all the directories that starts with a forward slash (/).

2. history

The history command is used to view the previously executed command.

3. man

The man command is used to display the user manual of any command that we can run on the terminal.

4. cd

The cd command, also known as chdir (change directory), is a command-line shell command used to change the current working directory in various operating systems.

5. ls

The ls command is used to view the contents of a directory. By default, this command will display the contents of your current working directory.

6. mkdir

The mkdir command is used to make a new directory.

7. rmdir

The rmdir command is used to to delete a directory. However, rmdir only allows you to delete empty directories.

8. touch

The touch command allows you to create a blank new file through the Linux command line.

9. rm

The rm command is used to delete directories and the contents within them.To remove a file use rm filename

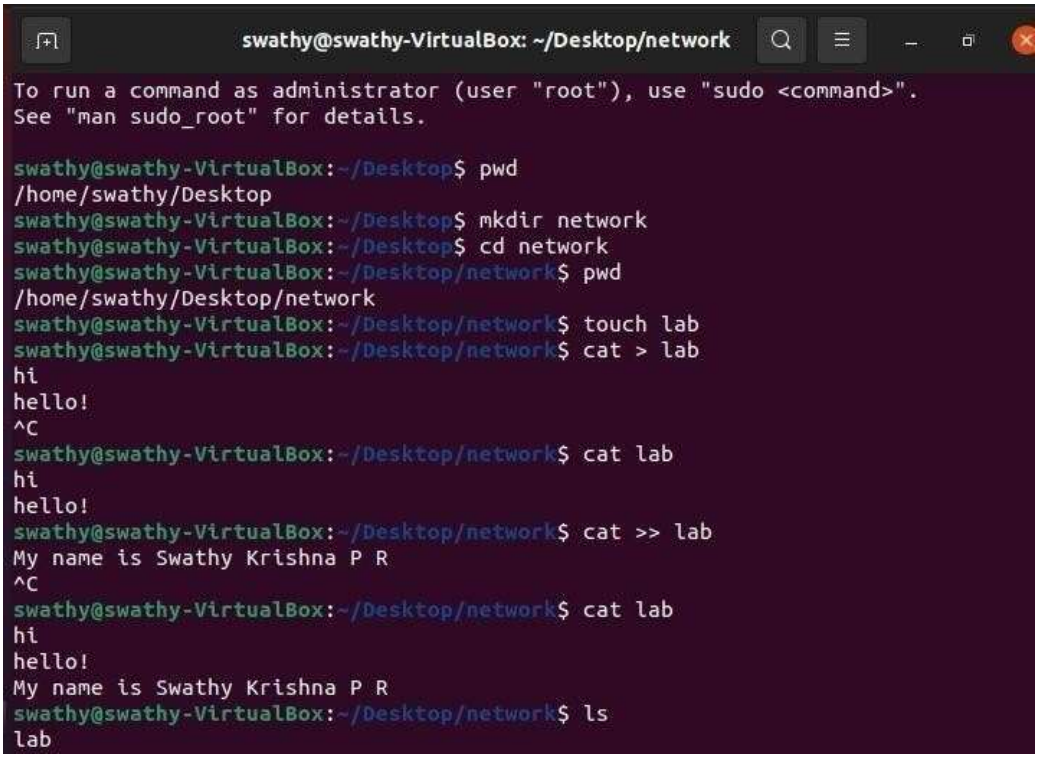
10. cat

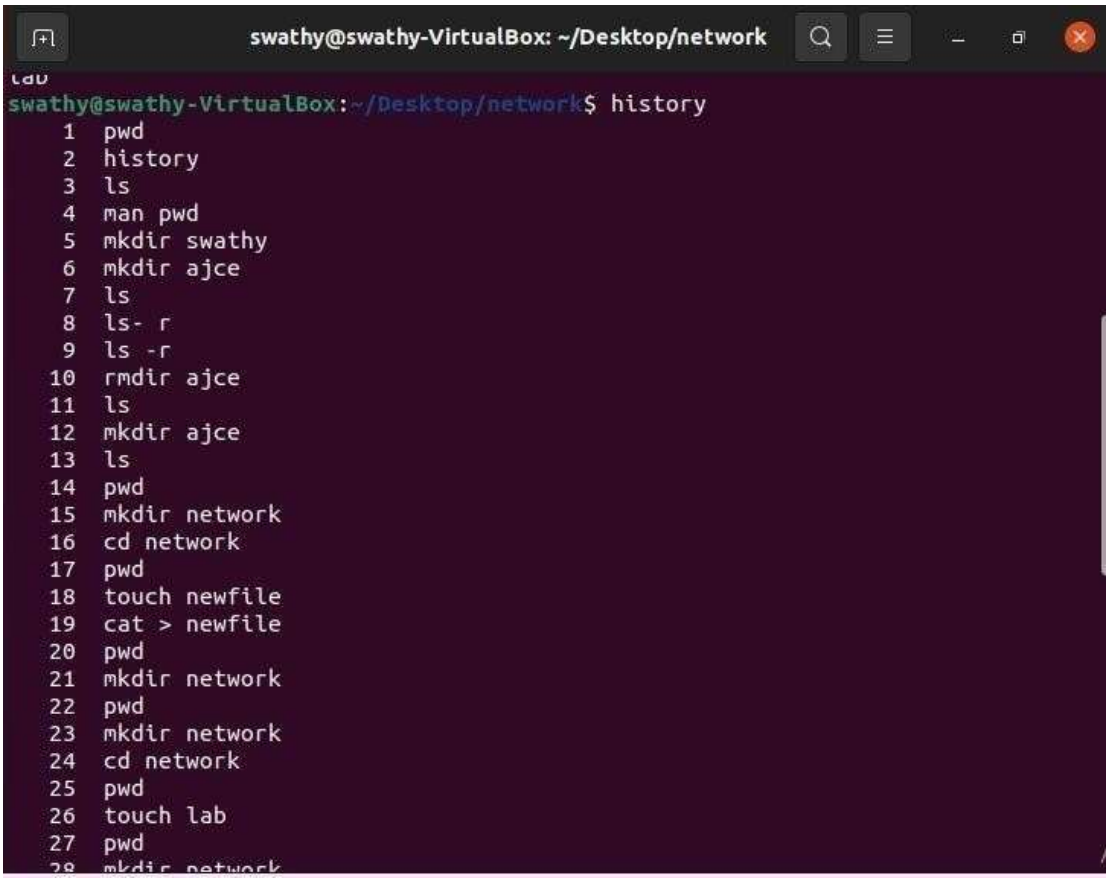
The cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout.

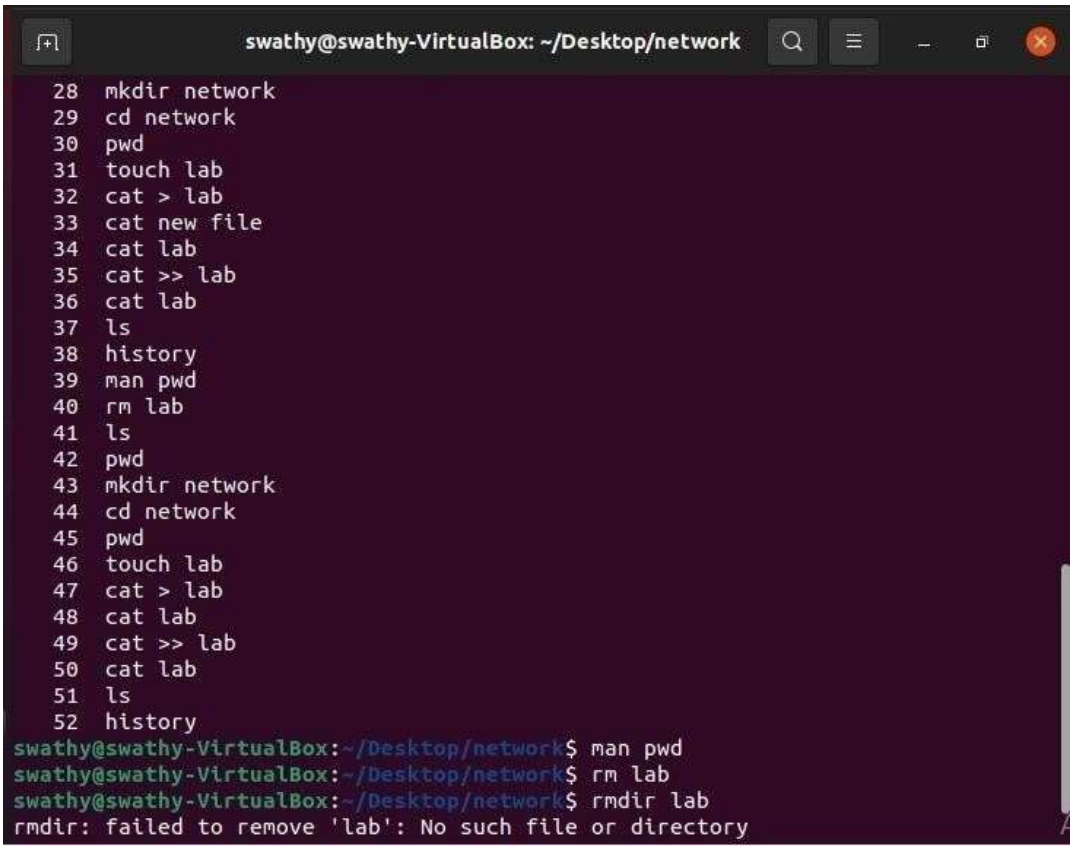
cat > filename creates a new file

cat >> myfile insert data to a file

OUTPUT




swathy@swathy-VirtualBox: ~/Desktop/network
swathy@swathy-VirtualBox:~/Desktop/network$ history
1 pwd
2 history
3 ls
4 man pwd
5 mkdir swathy
6 mkdir ajce
7 ls
8 ls- r
9 ls -r
10 rmdir ajce
11 ls
12 mkdir ajce
13 ls
14 pwd
15 mkdir network
16 cd network
17 pwd
18 touch newfile
19 cat > newfile
20 pwd
21 mkdir network
22 pwd
23 mkdir network
24 cd network
25 pwd
26 touch lab
27 pwd


swathy@swathy-VirtualBox: ~/Desktop/network
28 mkdir network
29 cd network
30 pwd
31 touch lab
32 cat > lab
33 cat new file
34 cat lab
35 cat >> lab
36 cat lab
37 ls
38 history
39 man pwd
40 rm lab
41 ls
42 pwd
43 mkdir network
44 cd network
45 pwd
46 touch lab
47 cat > lab
48 cat lab
49 cat >> lab
50 cat lab
51 ls
52 history
swathy@swathy-VirtualBox:~/Desktop/network$ man pwd
swathy@swathy-VirtualBox:~/Desktop/network$ rm lab
swathy@swathy-VirtualBox:~/Desktop/network$ rmdir lab
rmdir: failed to remove 'lab': No such file or directory

11. echo

The echo command is used to move some data into a file.

```
swathy@swathy-VirtualBox:~/Desktop$ touch song1.txt
swathy@swathy-VirtualBox:~/Desktop$ ls
network   song1.txt
swathy@swathy-VirtualBox:~/Desktop$ echo swathy >> song1.txt
swathy@swathy-VirtualBox:~/Desktop$ cat song1.txt
swathy
```

12. head

The head command is used to view the first lines of any text file. By default, it will show the first ten lines, but you can change this number to your liking.

```
swathy@swathy-VirtualBox:~/Desktop$ head -n 3 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
```

13. tail

The tail command will display the last ten lines of a text file.

```
swathy@swathy-VirtualBox:~/Desktop$ tail /etc/passwd
sssd:x:119:124:SSSD system user,,,:/var/lib/sss:/usr/sbin/nologin
saned:x:120:126::/var/lib/saned:/usr/sbin/nologin
colord:x:121:127:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:128::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:129:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
hplip:x:124:7:HPLIP system user,,,:/run/hplip:/bin/false
gnome-initial-setup:x:125:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:126:131:Gnome Display Manager:/var/lib/gdm3:/bin/false
swathy:x:1000:1000:Swathy Krishna P R,,,:/home/swathy:/bin/bash
```

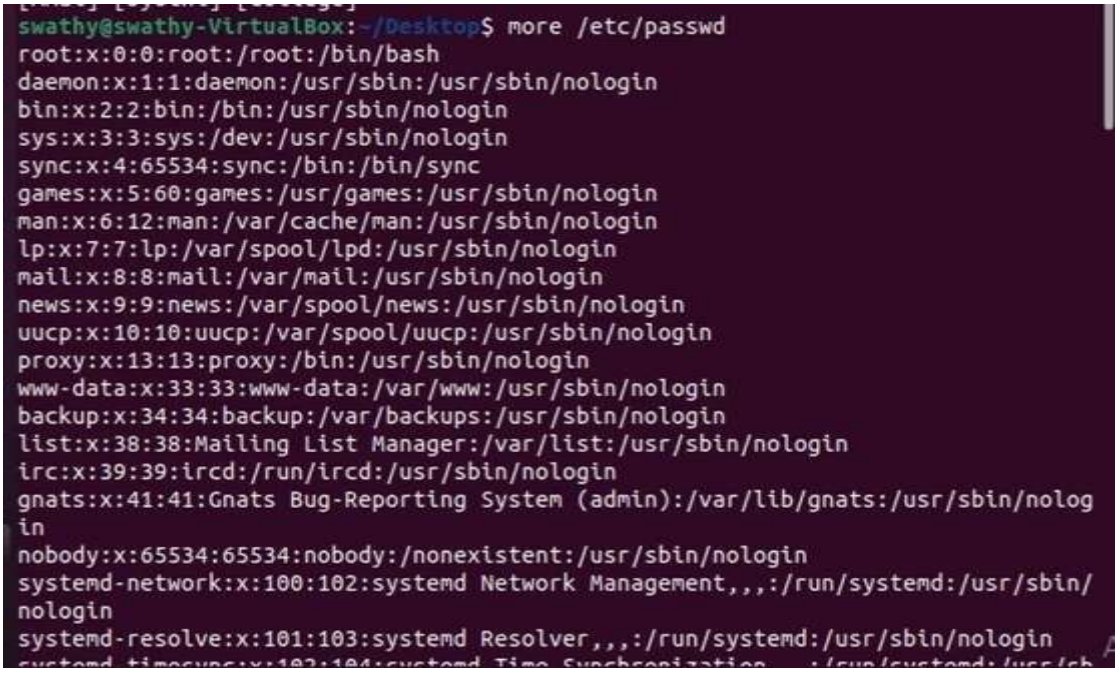
14. read

The read the contents of a line into a variable. The read command can be used with and without arguments.

```
swathy@swathy-VirtualBox:~/Desktop$ read v1 v2 v3
Amal Jyothi College
swathy@swathy-VirtualBox:~/Desktop$ echo ["$v1"] ["$v2"] ["$v3"]
[Amal] [Jyothi] [College]
```

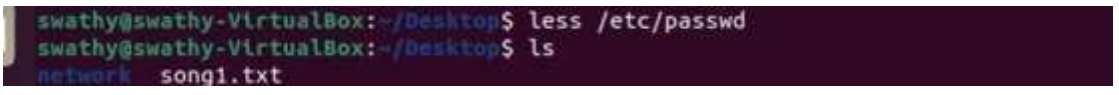
15. more

The more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large. The more command also allows the user do scroll up and down through the page.



16. less

Less command is linux utility which can be used to read contents of text file one page(one screen) per time.



17. cut

The cut command is used for cutting out the sections from each line of files and writing the result to standard output. It can be used to cut parts of a line by byte position, character and field

```
swathy@swathy-VirtualBox:~/Desktop$ cat song1.txt
swathy
swathy@swathy-VirtualBox:~/Desktop$ echo cat >> song1.txt
swathy@swathy-VirtualBox:~/Desktop$ echo flower >> song1.txt
swathy@swathy-VirtualBox:~/Desktop$ cat song1.txt
swathy
cat
flower
swathy@swathy-VirtualBox:~/Desktop$ cut -b 1,2,3 song1.txt
swa
cat
flo
```

18. paste

It is used to join files horizontally (parallel merging) by outputting lines consisting of lines from each file specified, separated by tab as delimiter, to the standard output.

```
swathy@swathy-VirtualBox:~/Desktop$ paste number.txt song1.txt
1       swathy
2       cat
3       flower
```

19. uname

The uname command, short for Unix Name, will print detailed information about your Linux system like the machine name, operating system, kernel, and so on.

```
swathy@swathy-VirtualBox:~/Desktop$ uname
Linux
swathy@swathy-VirtualBox:~/Desktop$ uname -r
5.11.0-16-generic
swathy@swathy-VirtualBox:~/Desktop$ uname -v
#17-Ubuntu SMP Wed Apr 14 20:12:43 UTC 2021
swathy@swathy-VirtualBox:~/Desktop$ man uname
swathy@swathy-VirtualBox:~/Desktop$ uname -p
x86_64
```

20. cp

The cp command is used to copy files from the current directory to a different directory.

```
swathy@swathy-VirtualBox:~/Desktop$ touch v1.txt v2.txt
swathy@swathy-VirtualBox:~/Desktop$ ls
network  number.txt  song1.txt  v1.txt  v2.txt
swathy@swathy-VirtualBox:~/Desktop$ mkdir ajce
swathy@swathy-VirtualBox:~/Desktop$ ls
ajce  network  number.txt  song1.txt  v1.txt  v2.txt
swathy@swathy-VirtualBox:~/Desktop$ cp v1.txt ajce/
swathy@swathy-VirtualBox:~/Desktop$ ls ajce
v1.txt
swathy@swathy-VirtualBox:~/Desktop$ cp v2.txt ajce/
swathy@swathy-VirtualBox:~/Desktop$ ls ajce
v1.txt  v2.txt
```

21. mv

The primary use of the mv command is to move files, it can also be used to rename files. The arguments in mv are similar to the cp command. You need to type mv, the file's name, and the destination's directory.

```
swathy@swathy-VirtualBox:~/Desktop$ mv v1.txt ajce/
swathy@swathy-VirtualBox:~/Desktop$ ls ajce
v1.txt  v2.txt
```

22. locate

To locate a file, just like the search command in Windows.

```
swathy@swathy-VirtualBox:~/Desktop$ locate number*song
Command 'locate' not found, but can be installed with:
sudo apt install mlocate
```

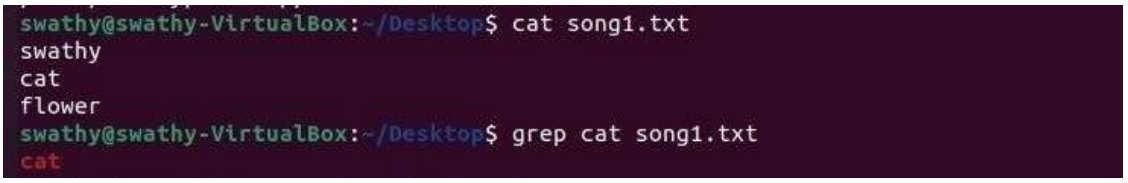
23. find

Similar to the locate command, using find also searches for files and directories. The difference is, you use the find command to locate files within a given directory.

```
swathy@swathy-VirtualBox:~/Desktop$ find /home/ -name song1.txt
/home/swathy/.local/share/Trash/files/song1.txt
/home/swathy/Desktop/song1.txt
swathy@swathy-VirtualBox:~/Desktop$ ls
ajce  network  number.txt  song1.txt  v2.txt
swathy@swathy-VirtualBox:~/Desktop$ find /home/ -name v2.txt
/home/swathy/Desktop/ajce/v2.txt
/home/swathy/Desktop/v2.txt
```

24. grep

Another basic Linux command that is undoubtedly helpful for everyday use is grep. It helps to search through all the text in a given file.



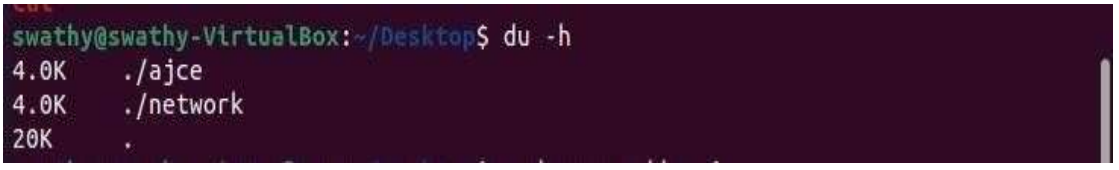
25. df

Use df command to get a report on the system's disk space usage, shown in percentage and KBs. If you want to see the report in megabytes, type df -m.

26. du

The du (Disk Usage) command is used to check how much space a file or a directory takes. However, the disk usage summary will show disk block numbers instead of the usual size format. If you want to see it in bytes, kilobytes, and megabytes, add the -h argument to the command line.

• $du –h



27. useradd

The useradd is used to create a new user, while passwd is adding a password to that user's account. To add a new person named John type, useradd John and then to add his password type, passwd 123456789.

```
swathy@swathy-VirtualBox:~/Desktop$ sudo useradd soja
[sudo] password for swathy:
Sorry, try again.
[sudo] password for swathy:
Sorry, try again.
[sudo] password for swathy:
```

28. userdel

Remove a user is very similar to adding a new user. To delete the users account type, userdel UserName.

```
swathy@swathy-VirtualBox:~/Desktop$  sudo passwd soja
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: password updated successfully
swathy@swathy-VirtualBox:~/Desktop$ sudo userdel soja
swathy@swathy-VirtualBox:~/Desktop$
```

29. sudo

SuperUser Do(sudo) command enables you to perform tasks that require administrative or root permissions.

30. passwd

Changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account.

```
swathy@swathy-VirtualBox:~/Desktop$  sudo passwd soja
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: password updated successfully
```

Q.Explain linux commands usermod, groupadd, groups, groupmod, groupdel, chmod, chown, id, ps, top with examples

COMMANDS

31. usermod

• usermod command is used to change the properties of a user in Linux through the command line

• command-line utility that allows you to modify a user's logininformation

• #usermod --help

• #usermod –u 2000 swathy

```
swathy@LAPTOP-1TOUJQNG:~$ usermod -u 2000 swathy
usermod: user swathy is currently used by process 10
swathy@LAPTOP-1TOUJQNG:~$ usermod --help
Usage: usermod [options] LOGIN
```

32. groupadd

• groupadd command creates a new group account using the values specified on the command line and the default values from the system.

• #gropuadd student

```
swathy@LAPTOP-1TOUJQNG:~$ sudo groupadd student
[sudo] password for swathy:
```

33. groups

Groups command print the groups a user is in

```
swathy@LAPTOP-1TOUJQNG:~$ sudo groups swathy
swathy : swathy adm dialout cdrom floppy sudo audio dip video plugdev netdev
```

34. groupdel

• groupdel command modifies the system account files, deleting all entries that refer to group. The named group must exist

• #groupdel marketing

```
swathy@LAPTOP-1TOUJQNG:~$ sudo groupadd -g 1010 mygroup1
[sudo] password for swathy:
swathy@LAPTOP-1TOUJQNG:~$ getent group mygroup1
mygroup1:x:1010:
swathy@LAPTOP-1TOUJQNG:~$ sudo groupadd swathy12
swathy@LAPTOP-1TOUJQNG:~$ getent group swathy12
swathy12:x:1011:
swathy@LAPTOP-1TOUJQNG:~$ groupdel swathy12
groupdel: Permission denied.
groupdel: cannot lock /etc/group; try again later.
swathy@LAPTOP-1TOUJQNG:~$ getent group swathy12
swathy12:x:1011:
swathy@LAPTOP-1TOUJQNG:~$ sudo groupdel swathy12
```

35. groupmod

• The groupmod command modifies the definition of the specified

group by modifying the appropriate entry in the groupdatabase.

groupmod -n group1 group2

```
swathy@LAPTOP-1TOUJQNG:~$ sudo groupadd student2
swathy@LAPTOP-1TOUJQNG:~$ groupmod -n swathy12 student2
groupmod: Permission denied.
groupmod: cannot lock /etc/group; try again later.
swathy@LAPTOP-1TOUJQNG:~$ sudo groupmod-n swathy12 student2
sudo: groupmod-n: command not found
swathy@LAPTOP-1TOUJQNG:~$ sudo groupmod -n swathy12 student2
```

36. chmod

• To change directory permissions of file/ Directory in Linux.

#chmod whowhatwhich file/directory.

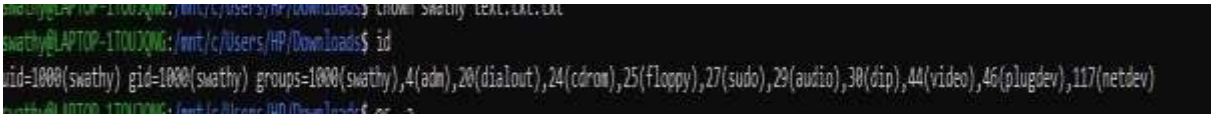
```
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ chmod +rwx text.txt.txt
```

37. chown

• The chown command allows you to change the user and/or group ownership of a given file, directory.

38. id

• id command in Linux is used to find out user and group names and numeric ID's (UID or group ID) of the current user.

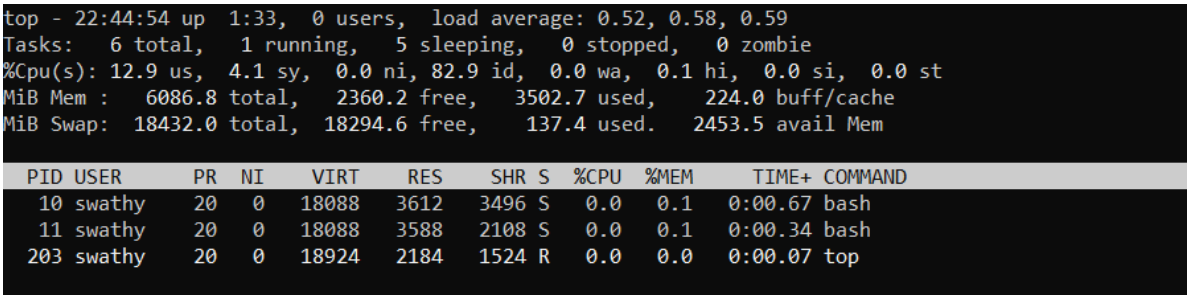


39. ps

• The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system

40. top

•The top command is used to show the Linux processes. It provides a dynamic real-time view of the running system



Q. Explain linux commands wc, tar(create, extract using gzip, xz, bzip2), expr, redirections and piping, ssh, ssh-keygen, scp, ssh-copy-id with examples

COMMANDS

41. wc

• wc stands for word count.

• Used for counting purpose.

• It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.

• #wc state.txt

```
/home/swathy/.hushlogin file.
swathy@LAPTOP-1TOUJQNG:~$ cd /mnt
swathy@LAPTOP-1TOUJQNG:/mnt$ cd c
swathy@LAPTOP-1TOUJQNG:/mnt/c$ cd Users
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users$ cd HP
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP$ cd Downloads
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ wc qwert.txt
 0  2 23 qwert.txt
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ wc qwert.txt
 6  7 92 qwert.txt
```

42. tar

• The Linux ‘tar’stands for tape archive, is used to create Archive and extract the Archive files

• Linux tar command to create compressed or uncompressed Archive files

```
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ tar cf archieve.tar qwert.txt capital.txt
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ ls
'!qhlogs.doc'                          RESUME.pdf
 Appointment_slip.pdf                  SmartWorkbench_32.exe
'CT20213724165_Application (1).pdf'    'Swathy'\''s Resume-converted-converted (1).pdf'
'CT20213724165_Application (10).pdf'   'Unconfirmed 91588.crdownload'
'CT20213724165_Application (11).pdf'   VC_redist.x64.exe
'CT20213724165_Application (12).pdf'   VC_redist.x86.exe
'CT20213724165_Application (2).pdf'    VirtualBox-6.1.26-145957-Win.exe
'CT20213724165_Application (3).pdf'    ZoomInstaller.exe
'CT20213724165_Application (4).pdf'    archieve.tar
'CT20213724165_Application (5).pdf'    capital.txt
'CT20213724165_Application (6).pdf'    'certificate (1).pdf'
'CT20213724165_Application (7).pdf'    certificate.pdf
'CT20213724165_Application (8).pdf'    com.alightcreative.motion-v3.7.1.apk
'CT20213724165_Application (9).pdf'    desktop.ini
 CT20213724165_Application.pdf         dia-setup-0.97.2-2-unsigned.exe
 CT20213724165_Resume.pdf              filmora-idco_setup_full1901.exe
'Desktop - Shortcut.lnk'               mysql-workbench-community-8.0.26-winx64.msi
 LAB.rar                               qwert.txt
 LabExam3728.pdf                       text.txt.txt
'New Text Document.txt'                ubuntu-21.04-desktop-amd64.iso
'New folder'                           xampp-windows-x64-8.0.9-0-VS16-installer.exe
```

43. expr

• The expr command evaluates a given expression and displays its corresponding output. It is used for:

• Basic operations like addition, subtraction, multiplication, division, and modulus on integers.

• Evaluating regular expressions, string operations like substring, length of strings etc.

• Performing operations on variables inside a shell script

#expr 10 + 2

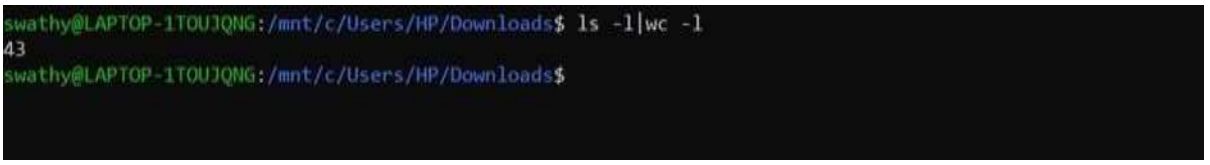
```
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ expr 5 + 10
15
```

44. Redirections & Piping 7

• A pipe is a form of redirection to send the output of one command/program/process to another command/program/process for further processing.

• Pipe is used to combine two or more commands, the output of one command acts as input to another command, and this command's output may act as input to the next command and so on.

#ls -l | wc - l



45. ssh

• ssh stands for "Secure Shell".

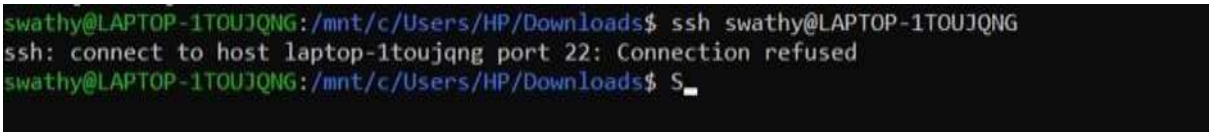
• It is a protocol used to securely connect to a remoteserver/system.

• ssh is secure in the sense that it transfers the data in encrypted form between the host and the client.

• It transfers inputs from the client to the host and relays back the output. ssh runs at TCP/IP port 22.

#ssh user_name@host(IP/Domain_name)

#ssh –X root@server1.example.com



46. scp

• SCP (secure copy) is a command-line utility that allows you tosecurely

• copy files and directories between two locations.

• With scp, you can copy a file or directory:

• From your local system to a remotesystem.

• From a remote system to your localsystem.

• Between two remote systems from your local system.

• Remote file system locations are specified in format[user@]host:/path

47. ssh-keygen

• ssh-keygen command to generate a public/private authentication

key pair. Authentication keys allow a user to connect to a remote system

without supplying a password. Keys must be generated for each user separately.

If you generate key pairs as the root user, only the root can use the keys.

$ssh-keygen -t rsa

```
swathy@LAPTOP-1TOUJQNG:/mnt/c/Users/HP/Downloads$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/swathy/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:XmBrLu+Y1MkWjySIW0IWlcFjkNtZdX5G/nTkZQS0OxY swathy@LAPTOP-1TOUJQNG
The key's randomart image is:
+---[RSA 3072]----+
|  o=oo .. . ..oo=|
|  ..= .  o o   =.|
|  o+ +  o . + E o|
| o..o. . o o o + |
|  o o . S .   =  |
|   +   O *   . . |
|  .   o O .      |
|     . *         |
|      o.o        |
+----[SHA256]-----+
```

48. ssh-copy-id

• The ssh-copy-id command allows you to install an SSH key on a remote server's authorized keys.

• This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.

$ssh-copy-id username@remote_host

Execute the following commands in the ubuntu terminal

i) Create six files with name of the form songX.mp3

```
swathy@LAPTOP-1TOUJQNG:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
swathy@LAPTOP-1TOUJQNG:~$
```

ii) Create six files with name of the form snapX.mp3

```
swathy@LAPTOP-1TOUJQNG:~$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg
swathy@LAPTOP-1TOUJQNG:~$
```

iii) Create six files with name of the form filmX.mp3

```
swathy@LAPTOP-1TOUJQNG:~$ touch film1.mp4 film2.mp4 film3.mp4 file4.mp4 file5.mp4 file6.mp4
swathy@LAPTOP-1TOUJQNG:~$
```

iv) From your home directory, move the song files into your music subdirectory, the snapshotfiles into your pictures subdirectory, and the movie files into videos subdirectory.

```
swathy@LAPTOP-1TOUJQNG:~$ mv *.mp3 ./Music/
swathy@LAPTOP-1TOUJQNG:~$ mv *.jpg ./Pictures/
swathy@LAPTOP-1TOUJQNG:~$ mv *.mp4 ./Vedios/
```

v) In your home directory, create three subdirectories for organizing your files. Call these directories friends, family, and work. Create all three with one command

```
swathy@LAPTOP-1TOUJQNG:~$ mkdir -p {friends,family,work}
```

vi) Copy song files to the friends folder and snap files to family folder.

```
swathy@LAPTOP-1TOUJQNG:~$ cp /home/swathy/Music song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/swathy/friends/
swathy@LAPTOP-1TOUJQNG:~$ cp /home/swathy/Pictures snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/swathy/family/
```

vii) Attempt to delete both family and friends projects with a single rmdircommand.

```
swathy@LAPTOP-1TOUJQNG:~$ rmdir {friends,family}
```

viii) Use another command that will succeed in deleting both the family and friends folder.

```
swathy@LAPTOP-1TOUJQNG:~$ rm - friends family
```

ix) Redirect a long listing of all home directory files, including hidden, into a file named allfiles.txt. Confirm that the file contains the listing.

```
swathy@LAPTOP-1TOUJQNG:~$ ls -a > allfiles.txt
swathy@LAPTOP-1TOUJQNG:~$
```

x) In the command window, display today's date with day of the week, month, date and year

```
swathy@LAPTOP-1TOUJQNG:~$ date
Tue Aug 17 19:29:24 IST 2021
swathy@LAPTOP-1TOUJQNG:~$
```

xi) Add the user Juliet

```
swathy@LAPTOP-1TOUJQNG:~$ sudo useradd Juliet
[sudo] password for swathy:
swathy@LAPTOP-1TOUJQNG:~$
```

xii) Confirm that Juliet has been added by examining the /etc/passwd file

```
swathy@LAPTOP-1TOUJQNG:~$ cat /etc/passwd | grep Juliet
Juliet:x:1001:1012::/home/Juliet:/bin/sh
swathy@LAPTOP-1TOUJQNG:~$
```

xiii) Use the passwd command to initialize Juliet's password

```
swathy@LAPTOP-1TOUJQNG:~$ sudo passwd Juliet
New password:
Retype new password:
passwd: password updated successfully
swathy@LAPTOP-1TOUJQNG:~$
```

xiv) Create a supplementary group called Shakespeare with a group id of 30000

```
swathy@LAPTOP-1TOUJQNG:~$ sudo groupadd -g 30000 Shakespheare
swathy@LAPTOP-1TOUJQNG:~$
```

xv) Create a supplementary group called artists

```
swathy@LAPTOP-1TOUJQNG:~$ sudo groupadd artist
swathy@LAPTOP-1TOUJQNG:~$
```

xvi) Confirm that Shakespeare and artists have been added by examining the /etc/group file.

```
swathy@LAPTOP-1TOUJQNG:~$ less /etc/group
Shakespheare:x:30000:
artist:x:30001:
```

xvii) Add the Juliet user to the Shakespeare group as a supplementary group.

```
swathy@LAPTOP-1TOUJQNG:~$ sudo usermod -G Shakespheare Juliet
swathy@LAPTOP-1TOUJQNG:~$
```

xviii) Confirm that Juliet has been added using the id command.

```
swathy@LAPTOP-1TOUJQNG:~$ id Juliet
uid=1001(Juliet) gid=1012(Juliet) groups=1012(Juliet),30000(Shakespheare)
swathy@LAPTOP-1TOUJQNG:~$
```

xix) Add Romeo and Hamlet to the Shakespeare group.

```
swathy@LAPTOP-1TOUJQNG:~$ sudo useradd Romeo
swathy@LAPTOP-1TOUJQNG:~$ sudo useradd Hamlet
swathy@LAPTOP-1TOUJQNG:~$ sudo usermod -G Shakespheare Romeo
swathy@LAPTOP-1TOUJQNG:~$ sudo usermod -G Shakespheare Hamlet
swathy@LAPTOP-1TOUJQNG:~$
```

xx) Add Reba, Dolly and Elvis to the artists group.

```
swathy@LAPTOP-1TOUJQNG:~$ sudo useradd Reba
swathy@LAPTOP-1TOUJQNG:~$ sudo useradd Dolly
swathy@LAPTOP-1TOUJQNG:~$ sudo useradd Elvis
swathy@LAPTOP-1TOUJQNG:~$ sudo usermod -G artist Reba
swathy@LAPTOP-1TOUJQNG:~$ sudo usermod -G artist Dolly
swathy@LAPTOP-1TOUJQNG:~$ sudo usermod -G artist Elvis
swathy@LAPTOP-1TOUJQNG:~$
```

xxi) Verify the supplemental group memberships by examining the /etc/group file.

```
swathy@LAPTOP-1TOUJQNG:~$ less /etc/group
swathy@LAPTOP-1TOUJQNG:~$
Juliet:x:1001:
Shakespheare:x:30000:Juliet,Romeo,Hamlet
artist:x:30001:Reba,Dolly,Elvis
Romeo:x:1002:
Hamlet:x:1003:
Reba:x:1004:
Dolly:x:1005:
Elvis:x:1006:
```

xxii) Attempt to remove user Dolly.

```
swathy@LAPTOP-1TOUJQNG:~$ sudo userdel Dolly
swathy@LAPTOP-1TOUJQNG:~$
```

1. Try out these network commands in Window as well as in Linux and perform at least 4 options with each command: ping, route, traceroute, nslookup, Ip Config, NetStat .

WINDOWS

Ping:

```
C:\Users\acer>ping google.com

Pinging google.com [2404:6800:4007:816::200e] with 32 bytes of data:
Reply from 2404:6800:4007:816::200e: time=91ms
Reply from 2404:6800:4007:816::200e: time=108ms
Reply from 2404:6800:4007:816::200e: time=133ms
Request timed out.

Ping statistics for 2404:6800:4007:816::200e:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 91ms, Maximum = 133ms, Average = 110ms
```

```
C:\Users\acer>ping -a google.com

Pinging google.com [2404:6800:4007:816::200e] with 32 bytes of data:
Reply from 2404:6800:4007:816::200e: time=139ms
Reply from 2404:6800:4007:816::200e: time=87ms
Reply from 2404:6800:4007:816::200e: time=94ms
Reply from 2404:6800:4007:816::200e: time=66ms

Ping statistics for 2404:6800:4007:816::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 66ms, Maximum = 139ms, Average = 96ms
```

```
C:\Users\acer>ping -t google.com

Pinging google.com [2404:6800:4007:816::200e] with 32 bytes of data:
Reply from 2404:6800:4007:816::200e: time=95ms
Reply from 2404:6800:4007:816::200e: time=80ms
Reply from 2404:6800:4007:816::200e: time=59ms
Reply from 2404:6800:4007:816::200e: time=82ms
Reply from 2404:6800:4007:816::200e: time=90ms
Reply from 2404:6800:4007:816::200e: time=54ms
Reply from 2404:6800:4007:816::200e: time=88ms
Reply from 2404:6800:4007:816::200e: time=161ms
Reply from 2404:6800:4007:816::200e: time=99ms
Reply from 2404:6800:4007:816::200e: time=73ms
Reply from 2404:6800:4007:816::200e: time=81ms
Reply from 2404:6800:4007:816::200e: time=61ms
Reply from 2404:6800:4007:816::200e: time=52ms
Reply from 2404:6800:4007:816::200e: time=75ms
Reply from 2404:6800:4007:816::200e: time=68ms
Reply from 2404:6800:4007:816::200e: time=57ms
Reply from 2404:6800:4007:816::200e: time=77ms
Reply from 2404:6800:4007:816::200e: time=73ms
Reply from 2404:6800:4007:816::200e: time=73ms
Reply from 2404:6800:4007:816::200e: time=53ms
Reply from 2404:6800:4007:816::200e: time=72ms
Reply from 2404:6800:4007:816::200e: time=64ms
Reply from 2404:6800:4007:816::200e: time=91ms
Reply from 2404:6800:4007:816::200e: time=72ms
Reply from 2404:6800:4007:816::200e: time=65ms
Reply from 2404:6800:4007:816::200e: time=58ms

Ping statistics for 2404:6800:4007:816::200e:
    Packets: Sent = 26, Received = 26, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 52ms, Maximum = 161ms, Average = 75ms
Control-C
^C
```

```
C:\Users\acer>ping -j google.com

Pinging google.com [142.250.195.14] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.195.14:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\Users\acer>ping -4 google.com

Pinging google.com [142.250.195.14] with 32 bytes of data:
Reply from 142.250.195.14: bytes=32 time=901ms TTL=111
Reply from 142.250.195.14: bytes=32 time=144ms TTL=111
Reply from 142.250.195.14: bytes=32 time=157ms TTL=111
Reply from 142.250.195.14: bytes=32 time=711ms TTL=111

Ping statistics for 142.250.195.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 144ms, Maximum = 901ms, Average = 478ms
```

Route

```
C:\Users\acer>route print
===========================================================================
Interface List
 24...98 29 a6 42 e0 55 ......Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
 22...ea 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter
 17...fa 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  7...e8 2a 44 d5 87 e5 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
 15...e8 2a 44 d5 87 e6 ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0  192.168.108.237  192.168.108.151     55
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
     192.168.56.0    255.255.255.0         On-link      192.168.56.1    281
     192.168.56.1  255.255.255.255         On-link      192.168.56.1    281
   192.168.56.255  255.255.255.255         On-link      192.168.56.1    281
    192.168.108.0    255.255.255.0         On-link   192.168.108.151    311
  192.168.108.151  255.255.255.255         On-link   192.168.108.151    311
  192.168.108.255  255.255.255.255         On-link   192.168.108.151    311
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link      192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link   192.168.108.151    311
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link   192.168.108.151    311
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\acer>route print -4
===========================================================================
Interface List
 24...98 29 a6 42 e0 55 ......Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
 22...ea 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter
 17...fa 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  7...e8 2a 44 d5 87 e5 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
 15...e8 2a 44 d5 87 e6 ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0  192.168.108.237  192.168.108.151     55
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
     192.168.56.0    255.255.255.0         On-link      192.168.56.1    281
     192.168.56.1  255.255.255.255         On-link      192.168.56.1    281
   192.168.56.255  255.255.255.255         On-link      192.168.56.1    281
    192.168.108.0    255.255.255.0         On-link   192.168.108.151    311
  192.168.108.151  255.255.255.255         On-link   192.168.108.151    311
  192.168.108.255  255.255.255.255         On-link   192.168.108.151    311
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link      192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link   192.168.108.151    311
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link   192.168.108.151    311
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\acer>route -6

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
                  [MASK netmask]  [gateway] [METRIC metric]  [IF interface]

  -f           Clears the routing tables of all gateway entries.  If this is
               used in conjunction with one of the commands, the tables are
               cleared prior to running the command.

  -p           When used with the ADD command, makes a route persistent across
               boots of the system. By default, routes are not preserved
               when the system is restarted. Ignored for all other commands,
               which always affect the appropriate persistent routes.

  -4           Force using IPv4.

  -6           Force using IPv6.

  command      One of these:
                 PRINT     Prints  a route
                 ADD       Adds    a route
                 DELETE    Deletes a route
                 CHANGE    Modifies an existing route
  destination  Specifies the host.
  MASK         Specifies that the next parameter is the 'netmask' value.
  netmask      Specifies a subnet mask value for this route entry.
               If not specified, it defaults to 255.255.255.255.
  gateway      Specifies gateway.
  interface    the interface number for the specified route.
  METRIC       specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database
file NETWORKS. The symbolic names for gateway are looked up in the host name
database file HOSTS.

If the command is PRINT or DELETE. Destination or gateway can be a wildcard,
(wildcard is specified as a star '*'), or the gateway argument may be omitted.
```

```
C:\Users\acer>route print *157
===========================================================================
Interface List
 24...98 29 a6 42 e0 55 ......Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
 22...ea 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter
 17...fa 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  7...e8 2a 44 d5 87 e5 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
 15...e8 2a 44 d5 87 e6 ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
  None
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
  None
Persistent Routes:
  None
```

```
C:\Users\acer>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

  1     6 ms     4 ms     3 ms  192.168.108.237
  2     *        *        *     Request timed out.
  3   104 ms    97 ms    95 ms  56.8.63.77
  4   127 ms    97 ms    69 ms  192.168.35.238
  5    60 ms    51 ms    61 ms  192.168.35.237
  6    63 ms    58 ms    56 ms  172.26.76.4
  7    55 ms    53 ms    58 ms  ^C
```

```
C:\Users\acer>tracert www.google.com

Tracing route to www.google.com [2404:6800:4007:827::2004]
over a maximum of 30 hops:

  1     5 ms     4 ms     3 ms  2409:4073:2e9d:d01a::d
  2     *        *        *     Request timed out.
  3    96 ms   100 ms    95 ms  2405:200:366:eeee:20::20
  4   200 ms    53 ms    75 ms  2405:200:801:3500::1e2
  5   107 ms    76 ms    77 ms  2405:200:801:3500::1e3
  6   110 ms    78 ms    74 ms  2405:200:801:3500::1e9
  7     *     ^C
```

```
C:\Users\acer>tracert -d www.google.com

Tracing route to www.google.com [2404:6800:4007:827::2004]
over a maximum of 30 hops:

  1     3 ms     3 ms     3 ms  2409:4073:2e9d:d01a::d
  2     *        *        *     Request timed out.
  3    58 ms    76 ms    73 ms  2405:200:366:eeee:20::20
  4    98 ms    75 ms    74 ms  2405:200:801:3500::1e2
  5   102 ms   118 ms    72 ms  2405:200:801:3500::1e3
  6    67 ms    62 ms    64 ms  2405:200:801:3500::1e9
  7     *        *     ^C
```

```
C:\Users\acer>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1     6 ms     4 ms     3 ms  192.168.108.237
  2     *        *        *     Request timed out.
  3    59 ms    82 ms    85 ms  56.8.63.73
  4    66 ms    54 ms    40 ms  192.168.35.240
  5   273 ms    55 ms   140 ms  ^C
```

Nslookup

```
C:\Users\acer>nslookup
Default Server:  UnKnown
Address:  192.168.108.237
```

```
C:\Users\acer>nslookup
Default Server:  UnKnown
Address:  192.168.108.237
```

```
C:\Users\acer>nslookup -g=MX google.com
*** Invalid option: g=MX
Server:  UnKnown
Address:  192.168.108.237

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4002:820::200e
          142.250.183.238
```

Ipconfig

```
C:\Users\acer>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::6d69:a328:564:62f9%12
   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  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4073:2e9d:d01a:d477:e710:5db1:9a52
   Temporary IPv6 Address. . . . . . : 2409:4073:2e9d:d01a:cee:ad8c:6152:3a71
   Link-local IPv6 Address . . . . . : fe80::d477:e710:5db1:9a52%7
   IPv4 Address. . . . . . . . . . . : 192.168.108.151
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::e42e:13ff:fec7:367c%7
                                       192.168.108.237

Ethernet adapter Bluetooth Network Connection:

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

```
C:\Users\acer>ipconfig /displaying

Error: unrecognized or incomplete command line.

USAGE:
    ipconfig [/allcompartments] [/? | /all |
                                 /renew [adapter] | /release [adapter] |
                                 /renew6 [adapter] | /release6 [adapter] |
                                 /flushdns | /displaydns | /registerdns |
                                 /showclassid adapter |
                                 /setclassid adapter [classid] |
                                 /showclassid6 adapter |
                                 /setclassid6 adapter [classid] ]

where
    adapter             Connection name
                       (wildcard characters * and ? allowed, see examples)

    Options:
       /?               Display this help message
       /all             Display full configuration information.
       /release         Release the IPv4 address for the specified adapter.
       /release6        Release the IPv6 address for the specified adapter.
       /renew           Renew the IPv4 address for the specified adapter.
       /renew6          Renew the IPv6 address for the specified adapter.
       /flushdns        Purges the DNS Resolver cache.
       /registerdns     Refreshes all DHCP leases and re-registers DNS names
       /displaydns      Display the contents of the DNS Resolver Cache.
       /showclassid     Displays all the dhcp class IDs allowed for adapter.
       /setclassid      Modifies the dhcp class id.
       /showclassid6    Displays all the IPv6 DHCP class IDs allowed for adapter.
       /setclassid6     Modifies the IPv6 DHCP class id.


The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.
```

```
C:\Users\acer>ipconfig /displaying

Error: unrecognized or incomplete command line.

USAGE:
    ipconfig [/allcompartments] [/? | /all |
                                 /renew [adapter] | /release [adapter] |
                                 /renew6 [adapter] | /release6 [adapter] |
                                 /flushdns | /displaydns | /registerdns |
                                 /showclassid adapter |
                                 /setclassid adapter [classid] |
                                 /showclassid6 adapter |
                                 /setclassid6 adapter [classid] ]

where
    adapter             Connection name
                       (wildcard characters * and ? allowed, see examples)

    Options:
       /?               Display this help message
       /all             Display full configuration information.
       /release         Release the IPv4 address for the specified adapter.
       /release6        Release the IPv6 address for the specified adapter.
       /renew           Renew the IPv4 address for the specified adapter.
       /renew6          Renew the IPv6 address for the specified adapter.
       /flushdns        Purges the DNS Resolver cache.
       /registerdns     Refreshes all DHCP leases and re-registers DNS names
       /displaydns      Display the contents of the DNS Resolver Cache.
       /showclassid     Displays all the dhcp class IDs allowed for adapter.
       /setclassid      Modifies the dhcp class id.
       /showclassid6    Displays all the IPv6 DHCP class IDs allowed for adapter.
       /setclassid6     Modifies the IPv6 DHCP class id.


The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address
leases for all adapters bound to TCP/IP will be released or renewed.
```

NetSat

```
C:\Users\acer>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:50869        DESKTOP-SHTJPRU:50870  ESTABLISHED
  TCP    127.0.0.1:50870        DESKTOP-SHTJPRU:50869  ESTABLISHED
  TCP    127.0.0.1:55518        DESKTOP-SHTJPRU:55519  ESTABLISHED
  TCP    127.0.0.1:55519        DESKTOP-SHTJPRU:55518  ESTABLISHED
  TCP    127.0.0.1:57195        DESKTOP-SHTJPRU:57196  ESTABLISHED
  TCP    127.0.0.1:57196        DESKTOP-SHTJPRU:57195  ESTABLISHED
  TCP    127.0.0.1:59716        DESKTOP-SHTJPRU:59717  ESTABLISHED
  TCP    127.0.0.1:59717        DESKTOP-SHTJPRU:59716  ESTABLISHED
  TCP    192.168.108.151:49526  20.44.229.112:https    TIME_WAIT
  TCP    192.168.108.151:51026  17:http                TIME_WAIT
^C
```

```
^C
C:\Users\acer>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:50869        127.0.0.1:50870        ESTABLISHED
  TCP    127.0.0.1:50870        127.0.0.1:50869        ESTABLISHED
  TCP    127.0.0.1:55518        127.0.0.1:55519        ESTABLISHED
  TCP    127.0.0.1:55519        127.0.0.1:55518        ESTABLISHED
  TCP    127.0.0.1:57195        127.0.0.1:57196        ESTABLISHED
  TCP    127.0.0.1:57196        127.0.0.1:57195        ESTABLISHED
  TCP    127.0.0.1:59716        127.0.0.1:59717        ESTABLISHED
  TCP    127.0.0.1:59717        127.0.0.1:59716        ESTABLISHED
  TCP    192.168.108.151:49526  20.44.229.112:443      TIME_WAIT
  TCP    192.168.108.151:51026  35.232.111.17:80       TIME_WAIT
  TCP    192.168.108.151:51027  20.44.229.112:443      TIME_WAIT
  TCP    192.168.108.151:51028  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:51029  20.44.229.112:443      ESTABLISHED
  TCP    192.168.108.151:52519  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:52525  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:56802  117.18.232.200:443     CLOSE_WAIT
  TCP    192.168.108.151:56805  184.84.176.64:443      CLOSE_WAIT
  TCP    192.168.108.151:58322  20.197.71.89:443       ESTABLISHED
  TCP    [2409:4073:2e9d:d01a:cee:ad8c:6152:3a71]:51025  [2404:6800:4003:c00::bc]:5228  ESTABLISHED
```

```
C:\Users\acer>netstat -n 5

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:50869        127.0.0.1:50870        ESTABLISHED
  TCP    127.0.0.1:50870        127.0.0.1:50869        ESTABLISHED
  TCP    127.0.0.1:55518        127.0.0.1:55519        ESTABLISHED
  TCP    127.0.0.1:55519        127.0.0.1:55518        ESTABLISHED
  TCP    127.0.0.1:57195        127.0.0.1:57196        ESTABLISHED
  TCP    127.0.0.1:57196        127.0.0.1:57195        ESTABLISHED
  TCP    127.0.0.1:59716        127.0.0.1:59717        ESTABLISHED
  TCP    127.0.0.1:59717        127.0.0.1:59716        ESTABLISHED
  TCP    192.168.108.151:51027  20.44.229.112:443      TIME_WAIT
  TCP    192.168.108.151:51028  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:51029  20.44.229.112:443      ESTABLISHED
  TCP    192.168.108.151:52519  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:52525  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:56802  117.18.232.200:443     CLOSE_WAIT
  TCP    192.168.108.151:56805  184.84.176.64:443      CLOSE_WAIT
  TCP    192.168.108.151:58322  20.197.71.89:443       ESTABLISHED
  TCP    [2409:4073:2e9d:d01a:cee:ad8c:6152:3a71]:51025  [2404:6800:4003:c00::bc]:5228  ESTABLISHED
^C
```

```
^C
C:\Users\acer>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:445            DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:808            DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:2869           DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:5040           DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:28252          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49664          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49665          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49666          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49667          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49676          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49704          DESKTOP-SHTJPRU:0      LISTENING
  TCP    127.0.0.1:50869        DESKTOP-SHTJPRU:50870  ESTABLISHED
  TCP    127.0.0.1:50870        DESKTOP-SHTJPRU:50869  ESTABLISHED
  TCP    127.0.0.1:55518        DESKTOP-SHTJPRU:55519  ESTABLISHED
  TCP    127.0.0.1:55519        DESKTOP-SHTJPRU:55518  ESTABLISHED
  TCP    127.0.0.1:57195        DESKTOP-SHTJPRU:57196  ESTABLISHED
  TCP    127.0.0.1:57196        DESKTOP-SHTJPRU:57195  ESTABLISHED
  TCP    127.0.0.1:59716        DESKTOP-SHTJPRU:59717  ESTABLISHED
  TCP    127.0.0.1:59717        DESKTOP-SHTJPRU:59716  ESTABLISHED
  TCP    192.168.56.1:139       DESKTOP-SHTJPRU:0      LISTENING
  TCP    192.168.108.151:139    DESKTOP-SHTJPRU:0      LISTENING
^C
```

UBUNTU

Ping

```
swathy@swathy-VirtualBox:~/Desktop$ ping www.google.com
PING www.google.com (142.250.193.4) 56(84) bytes of data.
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=1 ttl=110 time
=105 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=2 ttl=110 time
=131 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=3 ttl=110 time
=131 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=4 ttl=110 time
=129 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=5 ttl=110 time
=136 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=6 ttl=110 time
=124 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=7 ttl=110 time
=124 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=8 ttl=110 time
=105 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=9 ttl=110 time
=103 ms
^C
--- www.google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8017ms
rtt min/avg/max/mdev = 103.194/120.834/135.635/12.017 ms
```

```
swathy@swathy-VirtualBox:~/Desktop$ ping -a google.com
PING google.com (142.250.77.110) 56(84) bytes of data.
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=1 ttl=110 ti
me=68.2 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=2 ttl=110 ti
me=67.3 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 ti
me=95.1 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2005ms
rtt min/avg/max/mdev = 67.261/76.859/95.095/12.900 ms
```

```
swathy@swathy-VirtualBox:~/Desktop$ ping -V google.com
ping from iputils 20210202
```

```
swathy@swathy-VirtualBox:~/Desktop$ ping -b google.com
PING google.com (142.250.77.110) 56(84) bytes of data.
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=1 ttl=110 ti
me=84.5 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=2 ttl=110 ti
me=112 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 ti
me=81.6 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 81.558/92.624/111.842/13.640 ms
```

Route

```
swathy@swathy-VirtualBox:~/Desktop$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
```

```
swathy@swathy-VirtualBox:~/Desktop$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
```

```
swathy@swathy-VirtualBox:~/Desktop$ route -Cn
Kernel IP routing cache
Source          Destination     Gateway         Flags Metric Ref    Use Iface
```

```
swathy@swathy-VirtualBox:~/Desktop$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
```

Traceroute

```
swathy@swathy-VirtualBox:~/Desktop$ traceroute google.com
traceroute to google.com (142.250.194.78), 64 hops max
  1   10.0.2.2  0.374ms  0.347ms  0.424ms
  2   *  *  *
  3   *  *  *
  4   *  *  *
  5   *  *  *
  6   *  *  *
  7   *  *  *
  8   *  *  *
  9   *  *  *
```

```
swathy@swathy-VirtualBox:~/Desktop$ traceroute -V
traceroute (GNU inetutils) 2.0
Copyright (C) 2021 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
```

Nslookup

```
swathy@swathy-VirtualBox:~/Desktop$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.183.238
Name:   google.com
Address: 2404:6800:4007:817::200e
```

```
swathy@swathy-VirtualBox:~/Desktop$ nslookup  -q=MX google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
google.com      mail exchanger = 20 alt1.aspmx.l.google.com.
google.com      mail exchanger = 50 alt4.aspmx.l.google.com.
google.com      mail exchanger = 30 alt2.aspmx.l.google.com.
google.com      mail exchanger = 40 alt3.aspmx.l.google.com.
google.com      mail exchanger = 10 aspmx.l.google.com.
```

```
swathy@swathy-VirtualBox:~/Desktop$ nslookup  -type=soa redhat.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
redhat.com
        origin = a1-68.akam.net
        mail addr = noc.redhat.com
        serial = 2021091002
        refresh = 300
        retry = 180
        expire = 604800
        minimum = 14400
```

```
swathy@swathy-VirtualBox:~/Desktop$ nslookup  -type=a google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.77.142
```

Ifconfig

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::11b7:5552:7848:59d6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9d:53:44  txqueuelen 1000  (Ethernet)
        RX packets 855  bytes 657641 (657.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 875  bytes 87098 (87.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 443  bytes 40775 (40.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 443  bytes 40775 (40.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::11b7:5552:7848:59d6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9d:53:44  txqueuelen 1000  (Ethernet)
        RX packets 855  bytes 657641 (657.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 875  bytes 87098 (87.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 443  bytes 40775 (40.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 443  bytes 40775 (40.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig -s
Iface      MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500      855      0      0 0           875      0      0      0 BMRU
lo       65536      443      0      0 0           443      0      0      0 LRU
```

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::11b7:5552:7848:59d6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9d:53:44  txqueuelen 1000  (Ethernet)
        RX packets 855  bytes 657641 (657.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 875  bytes 87098 (87.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 443  bytes 40775 (40.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 443  bytes 40775 (40.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Netstat

```
swathy@swathy-VirtualBox:~/Desktop$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 swathy-VirtualBo:bootpc _gateway:bootps         ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    19419    /run/user/1000/syste
md/notify
unix  3      [ ]         DGRAM                    15463    /run/systemd/notify
unix  2      [ ]         DGRAM                    15477    /run/systemd/journal
/syslog
unix  17     [ ]         DGRAM                    15486    /run/systemd/journal
/dev-log
unix  8      [ ]         DGRAM                    15488    /run/systemd/journal
/socket
unix  3      [ ]         STREAM     CONNECTED     20518    /run/dbus/system_bus
_socket
unix  3      [ ]         STREAM     CONNECTED     18661    /run/dbus/system_bus
_socket
unix  2      [ ]         DGRAM                    15593
unix  3      [ ]         STREAM     CONNECTED     20457    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     17582
unix  3      [ ]         STREAM     CONNECTED     17465
unix  3      [ ]         STREAM     CONNECTED     21961    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     20465    /run/systemd/journal
```

```
swathy@swathy-VirtualBox:~/Desktop$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp        0      0 0.0.0.0:39623           0.0.0.0:*
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 swathy-VirtualBo:bootpc _gateway:bootps         ESTABLISHED
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:60782              [::]:*
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ACC ]     STREAM     LISTENING     19570    @/tmp/dbus-S8RgEAxO
unix  2      [ ACC ]     STREAM     LISTENING     20479    @/tmp/.ICE-unix/1071
unix  2      [ ACC ]     STREAM     LISTENING     19411    /run/mysqld/mysqld.s
ock
unix  2      [ ACC ]     STREAM     LISTENING     20856    @/tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM     LISTENING     22260    @/home/swathy/.cache
/ibus/dbus-4JLAFVsN
```

2. Identify and perform 5 more network commands and it's working.

i. ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses.

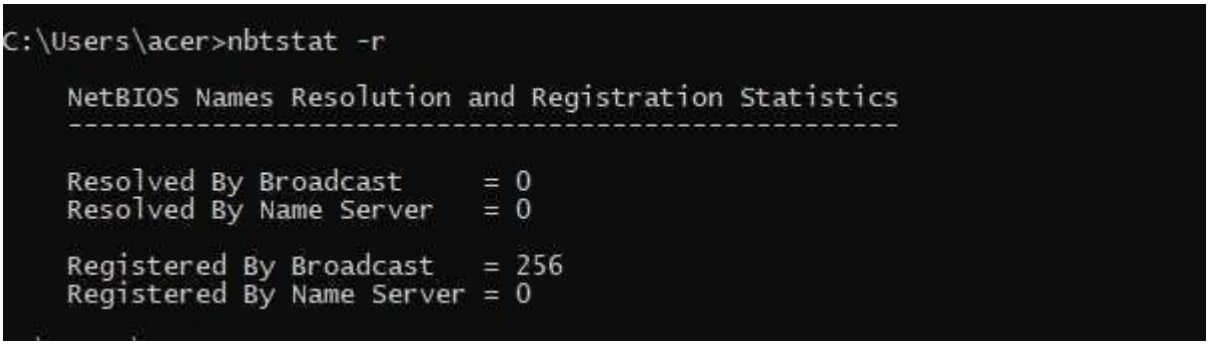
Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.

```
^C
C:\Users\acer>arp -a

Interface: 192.168.108.151 --- 0x7
  Internet Address      Physical Address      Type
  192.168.108.237       e6-2e-13-c7-36-7c     dynamic
  192.168.108.255       ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.56.1 --- 0xc
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
```

ii. NbtStat

Computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The

computer name is sometimes referred to as the NetBIOS name. Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server. Of course, NetBIOS over TCP/IP can occasionallybreak down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.



iii. Hostname

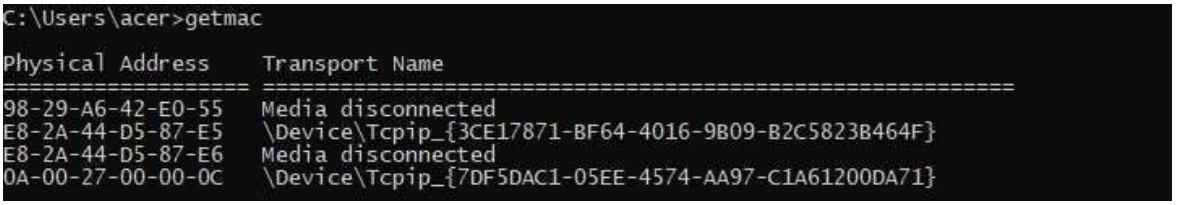
The previously discussed NbtStat command can provide you with the host name that has been assigned to a Windows device, if you know which switch to use with the command. However, if you're just looking for a fast and easy way of verifying a computer's name, then try using the Hostname command. Typing Hostname at the command prompt returns the local computer name.

iv. PathPing Earlier,

I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the PathPing tool is a utility that combines the best aspects of Tracert and Ping. Entering the PathPing command followed by a host name initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five minutes) to gather statistics, and then reports latency and packet loss statistics that are more detailed than those provided by Ping or Tracert.

v. getmac

Command Another very simple command that shows the MAC address of your network interfaces



LAMP INSTALLATION

The name LAMP is an acronym of the following programs: Linux
Operating System
Apache HTTP Server
MySQL database management system PHP
programming language

1. Installation of Apache Server.

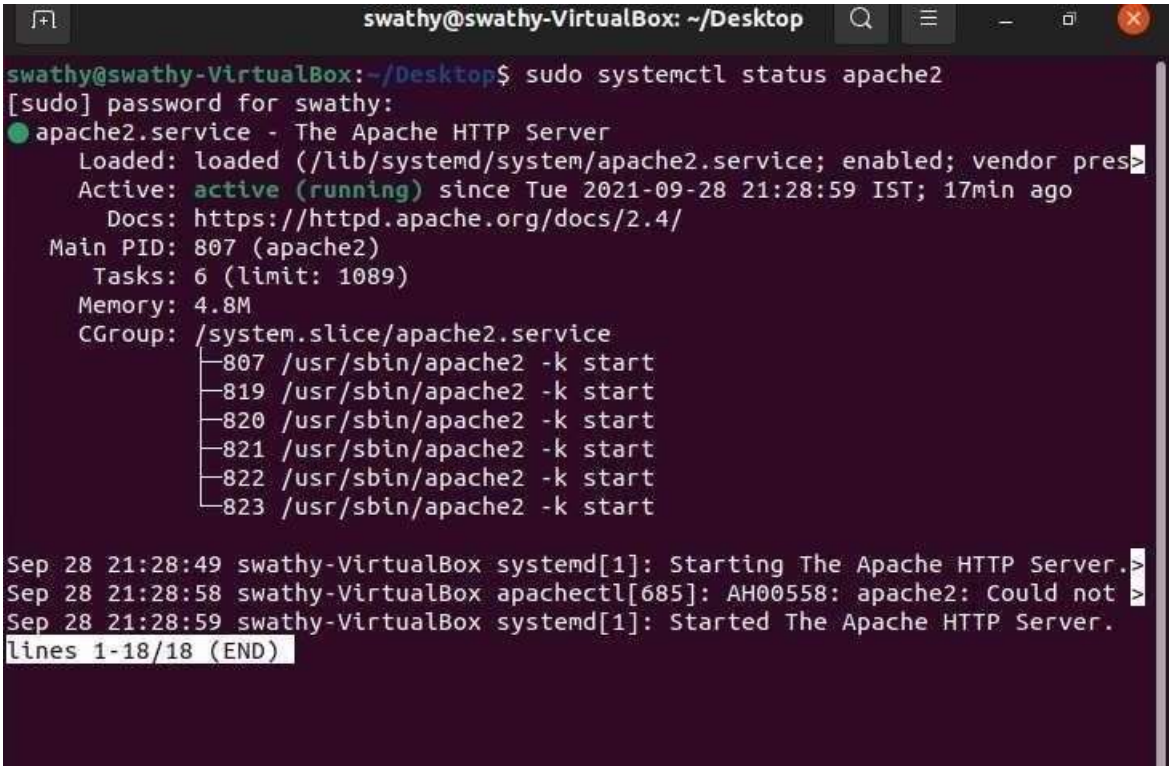
Command:

sudo apt-get install apache2

Press y (yes) and hit ENTER to permit the installation

Check if Apache is installed correctly by running the Apache service status. Use the following the command:

sudo service apache2 status



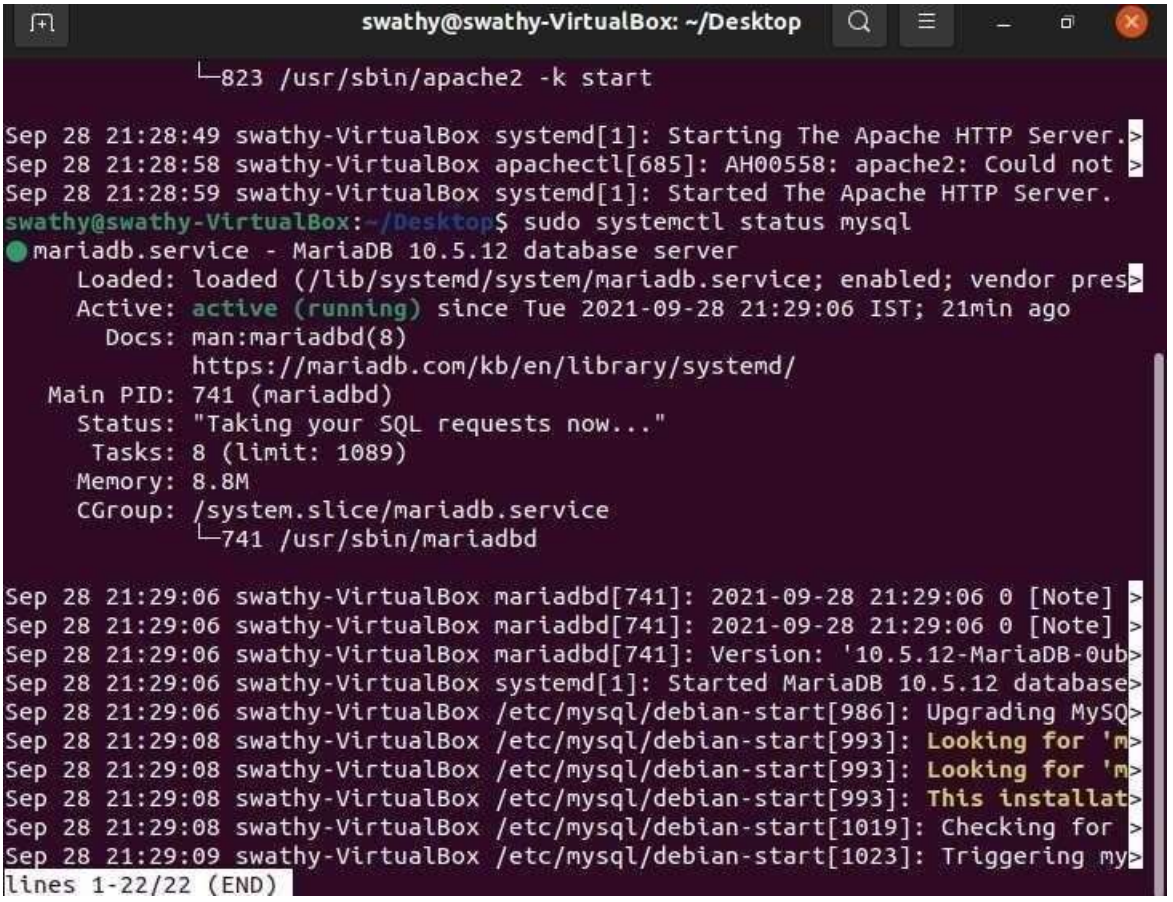
2. Installation of MariaDB

MariaDB is an open source relational database management system (RDBMS)

Command: sudo apt install mariadb-server mariadb-client

Check mariadb Installation

sudo systemctl status mysql (if it is not working sudo systemctl start mysql)



3.

2. Install PHP

Command:

sudo apt install php libapache2-mod-php php-opcache php-cli php- gd php-curl php-mysql

Restart apache2

sudo systemctl restart apache2

check installation

open http://127.0.0.1/phpinfo.php in any browser

3. Install phpmyadmin

Command:

sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl

(It asks for webserver select apache2, select db-configuration and set

password)

Restart apache2

sudo systemctl restart apache2

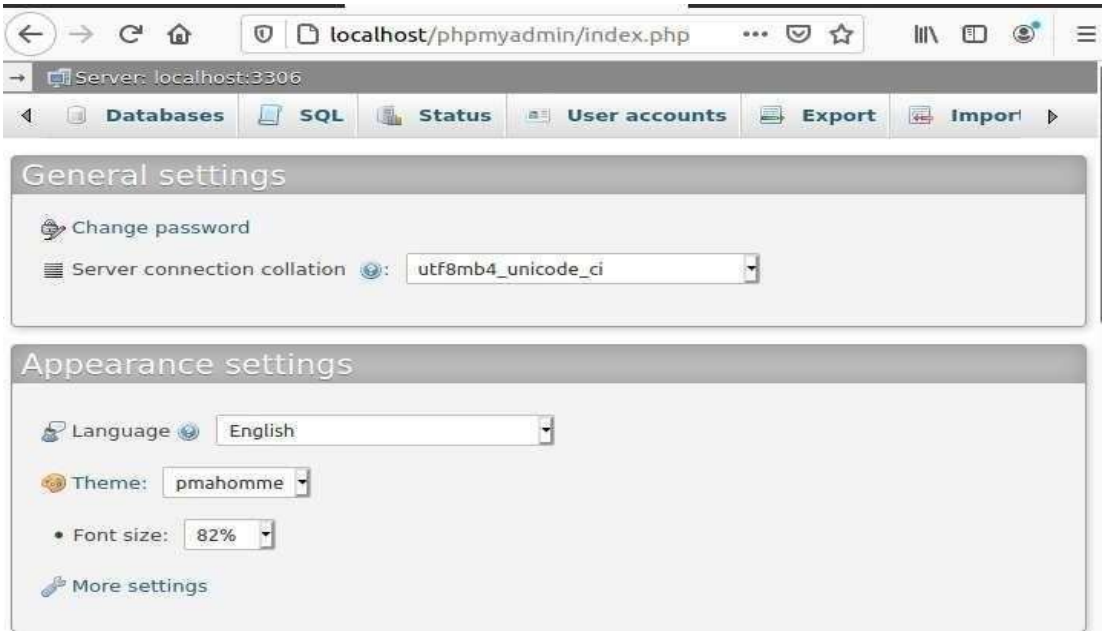
Check phpmyadmin

Open a browser

http://localhost/phpmyadmin

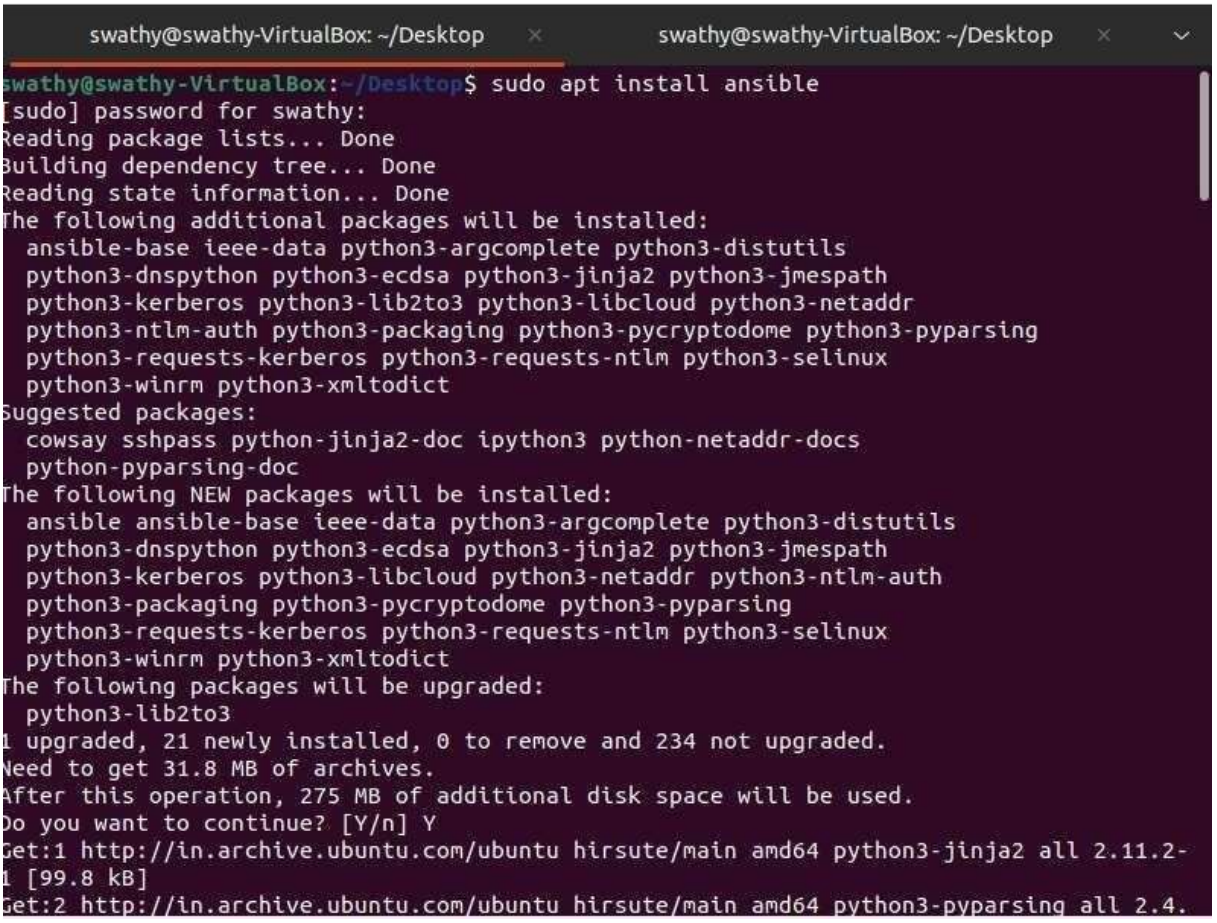
username : root

password : yourpassword



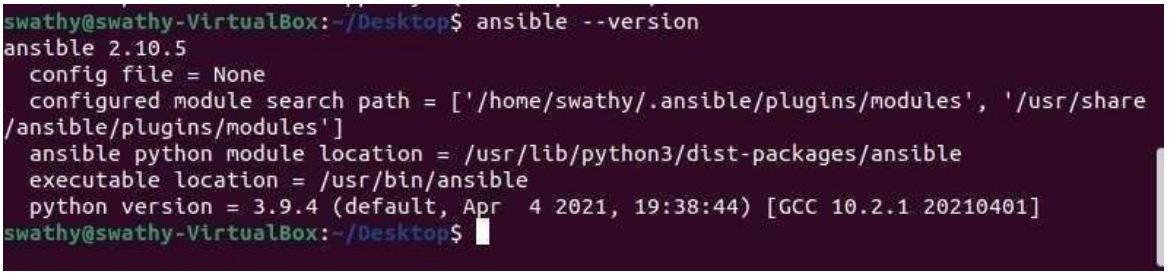
Ansible Installation

Step 1: sudo apt install ansible



Installation Check

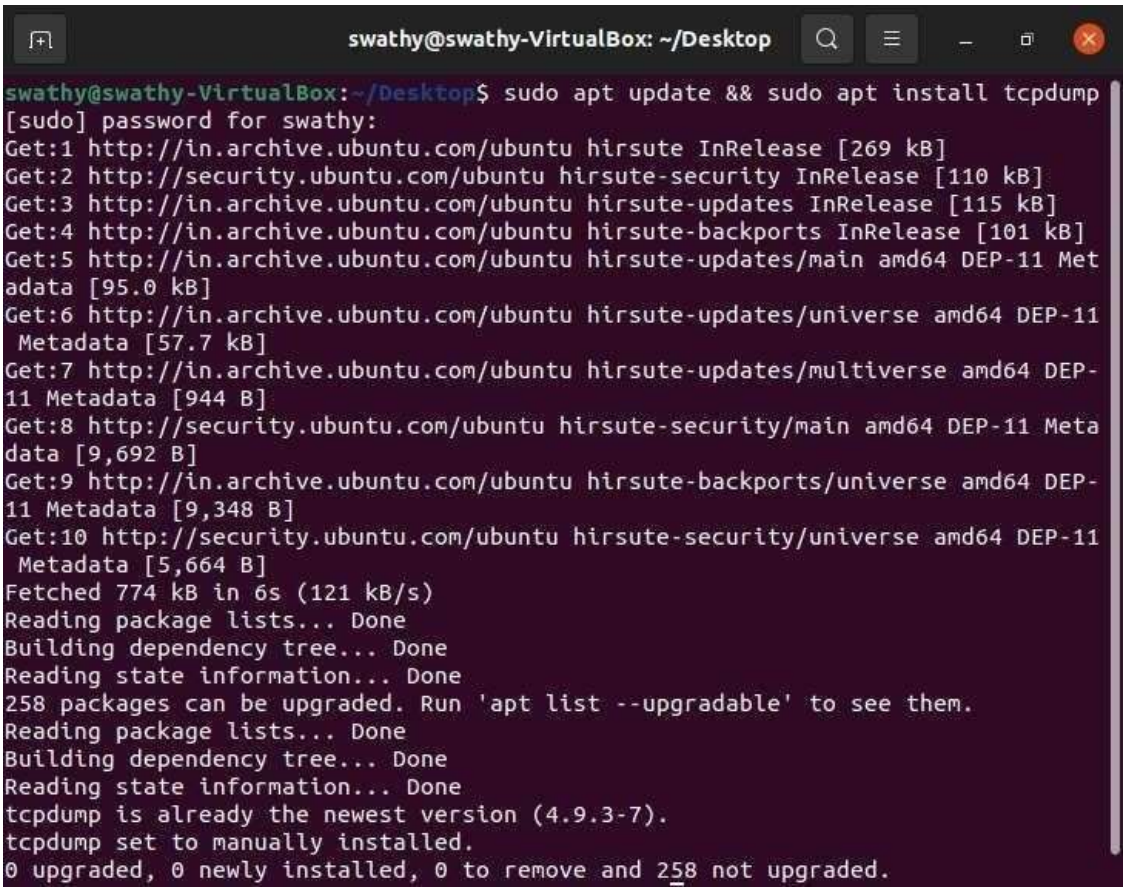
Step 2: ansible -- version



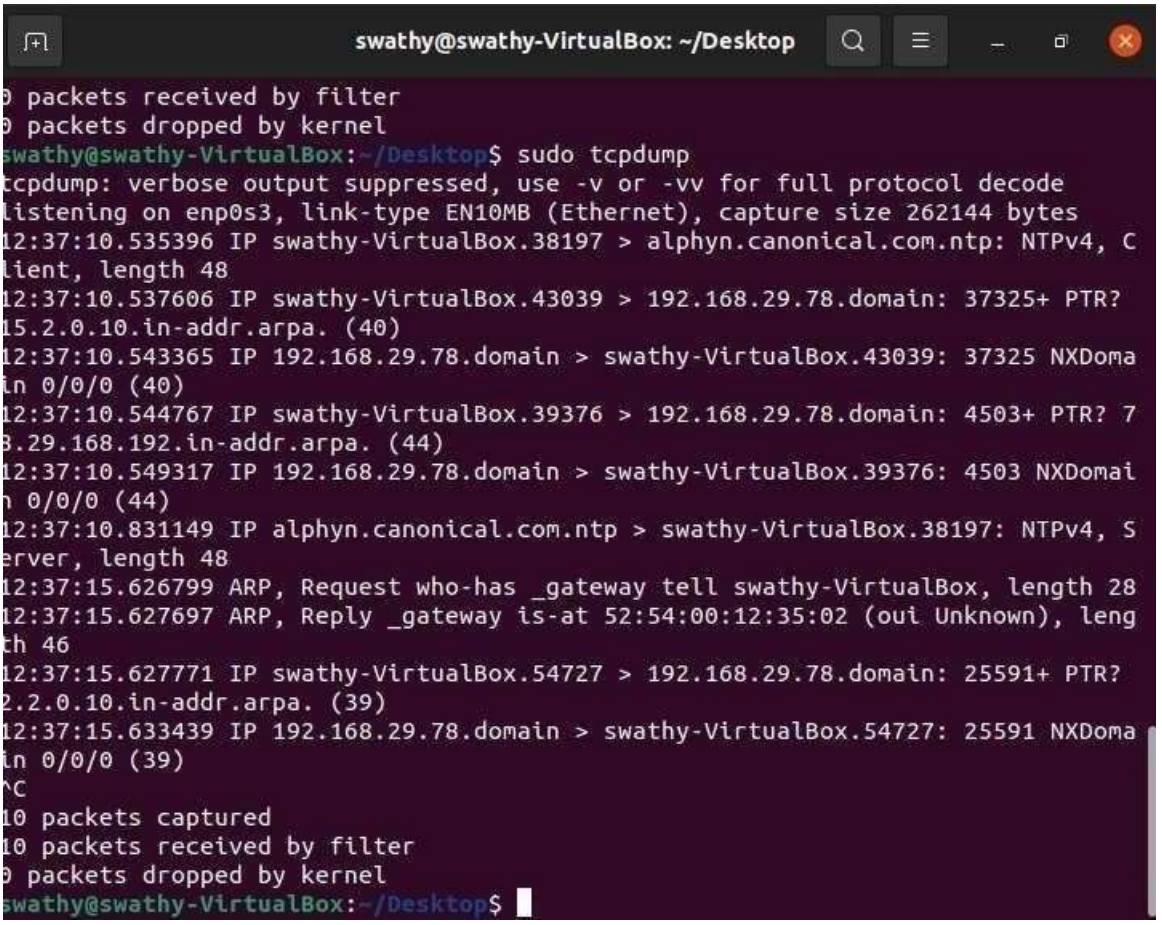
1. Execute tcpdump and its options on your own system, and submit the output screenshot as a

document.

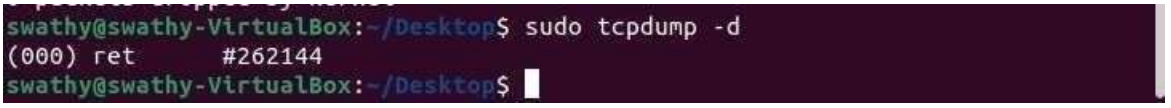
Sudo apt install tcpdump



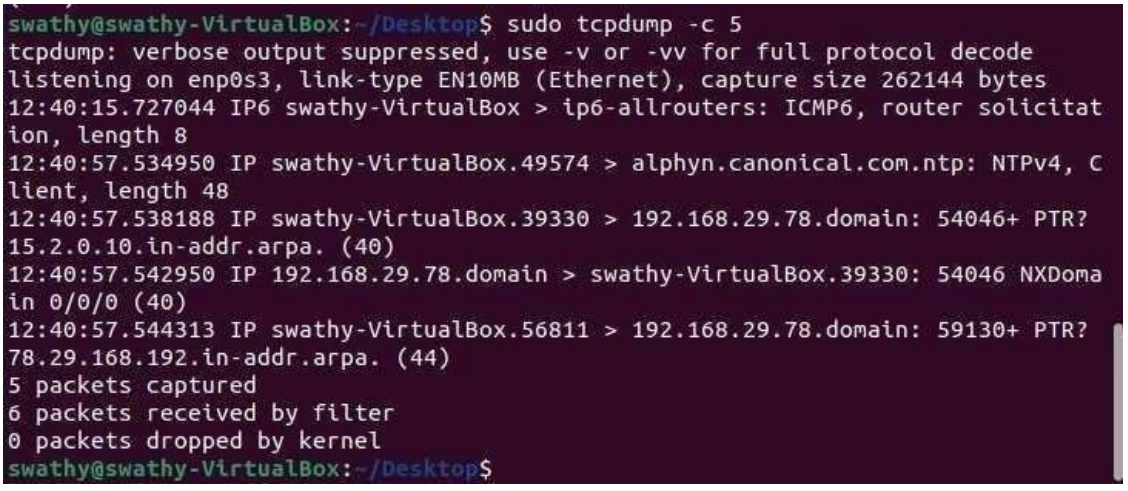
Sudo tcpdump



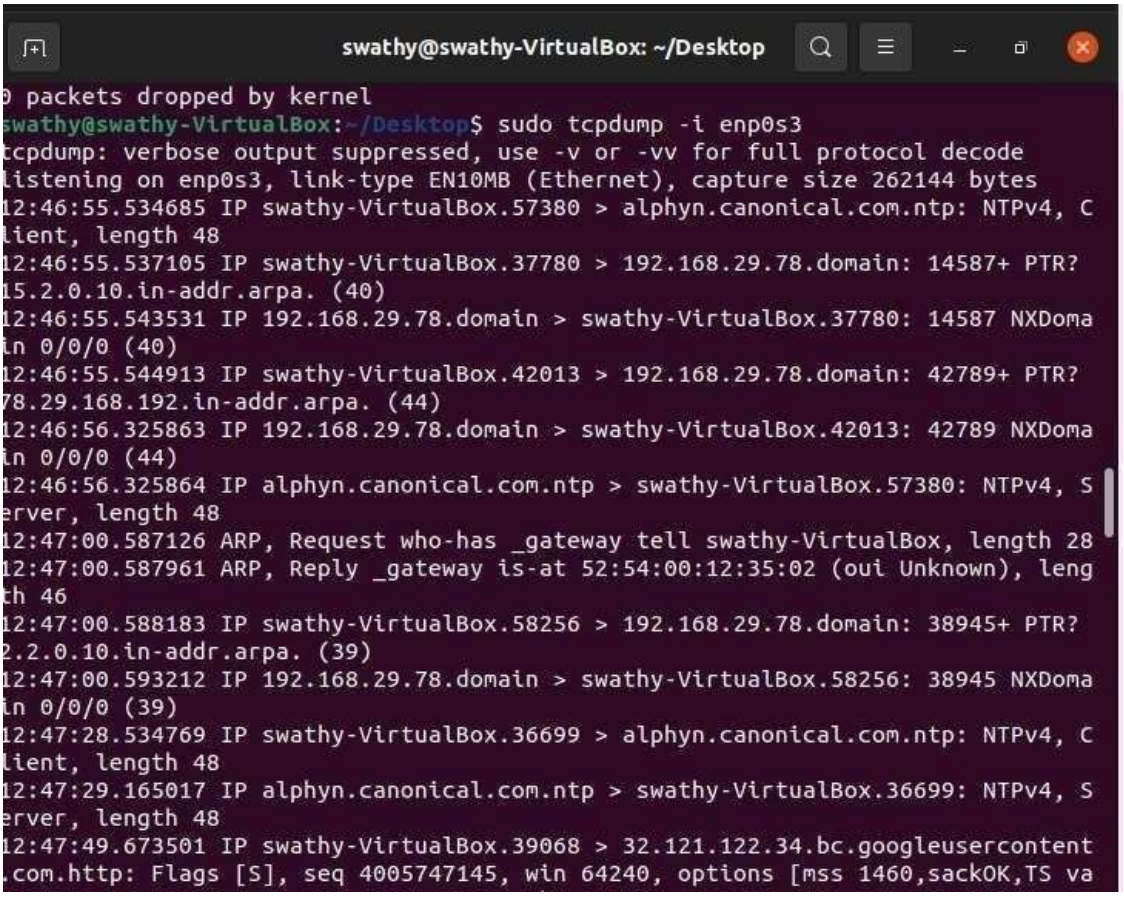
Sudo tcpdump –d



Sudo tcpdump -c 5



Sudo tcpdum -I enp2s0

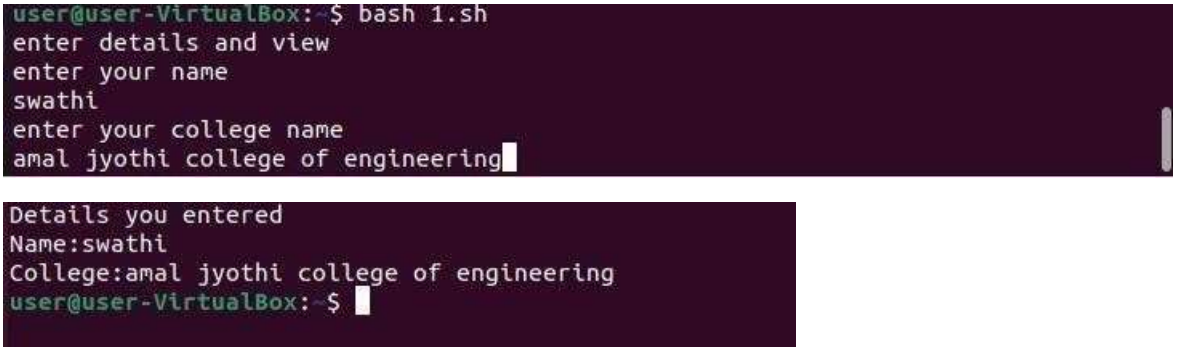


Shell Scripting

1. Write a shell script to ask your name, and college name and print it on the screen.

```
echo "enter details and view"
echo enter your name
read name
echo enter your college name
read c
clear
echo Details you entered
echo Name:$name
echo College:$c
```

OUTPUT:



2. Write a shell script to set a value for a variable and display it on command line interface.

```
echo "Display value of a variable"
a=50
echo $a
```

OUTPUT:

3. Write a shell script to perform addition, substation, multiplication, division with two numbers that is accepted from user.

```
echo enter a number
read a
echo enter another number
read b
echo enter operation
echo "\n1.addition \n2.subtraction \n3.multiplication \n4.division"
read op
case "$op" in
"1") echo "a+b="$(($a+$b));;
"2") echo "a-b="$(($a-$b));;
"3") echo "a*b="$(($a*$b));;
"4") echo "a/b="$(($a/$b));;
esac
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 3.sh
enter a number
7
enter another number
8
enter operation
\n1.addition \n2.subtraction \n3.multiplication \n4.division
2
a-b=-1
```

4. Write a shell script to check the value of a given number and display whether the number is found or not.

```
echo enter a number
read a
if [ $a -eq 10 ];
then
echo "number found"
else
echo "not found"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 4.sh
enter a number
9
not found
```

5. Write a shell script to display current date, calendar.

```
echo "Today is $(date)"
echo "calender:"
cal
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 5.sh
Today is Saturday 02 October 2021 05:53:45 PM IST
calender:
    October 2021
Su Mo Tu We Th Fr Sa
                1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
```

6. Write a shell script to check a number is even or odd. #!/bin/bash

```
echo enter a number
read n
x=$(( $n % 2 ))
if [ $x -eq 0 ];
then
echo "number is even"
else
echo "number is odd"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 6.sh
enter a number
4
number is even
```

7. Write a shell script to check a number is greater than, less thanor equal to another number.

```
echo enter first number
read a
echo enter second number
read b
if [ $a -gt $b ];
then
```

```
echo "$a is larger"
elif [ $b -gt $a ];
then
echo "$b is larger"
else
echo "both are equal"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 7.sh
enter first number
54
enter second number
34
54 is larger
```

8. Write a shell script to find the sum of first 10 numbers.

```
s=0
for ((i=0;i<=10;i++))
do
s=`expr $s + $i`
done
echo "sum of first 10 numbers=$s"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 8.sh
sum of first 10 numbers=55
```

9. Write a shell script to find the sum, the average and the product of the four integers entered.

```
echo please enter your first number
read a
echo please enter your second number
read b
echo please enter your third number
read c
echo please enter your fourth number
read d
sum=$(($a + $b + $c + $d))
prod=$(($a * $b * $c * $d))
avg=$(echo $sum/4 | bc -l)
```

```
echo "the  sum  is:"$sum
echo "the average is:"$avg
echo "the product is:"$prod
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 9.sh
please enter your first number
1
please enter your second number
2
please enter your third number
3
please enter your fourth number
4
the sum is:10
the average is:2.5000000000000000000
the product is:24
```

10. Write a shell script to find the smallest of three numbers.

```
echo enter first number
read a
echo enter second number
read b
echo enter third number
read c
if [ $a -lt $b ];
then
if [ $a -lt $c ];
then
echo "$a is smallest"
fi
elif [ $b -lt $c ];
then
echo "$b is smallest"
else
echo "$c is smallest";
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 10.sh
enter first number
5
enter second number
2
enter third number
6
2 is smallest
```

11. Write a shell program to find factorial of given number.

```
echo enter a number
read n
f=1
for ((i=2;i<=n;i++))
do
f=$(($f*$i))
done
echo "factorial is $f"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 11.sh
enter a number
5
factorial is 120
```

12. Write a shell program to check a number is palindrome or not.

```
echo enter a number
read n
rev=$(echo $n | rev)
if [ $n -eq $rev ];
then
echo "number is palindrome"
else
echo "number is not palindrome"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 12.sh
enter a number
1221
number is palindrome
```

13. Write a shell script to find the average of the numbers entered in command line.

```
echo enter size
read n
i=1
s=0
echo "enter numbers"
while [ $i -le $n ]
do
read num
s=$((s+num))
i=$((i+1))
done
avg=$(echo $s/$n | bc -l)
echo "average is $avg"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 13.sh
enter size
5
enter numbers
6
7
8
9
4
average is 6.80000000000000000000
```

14. Write a shell program to find the sum of all the digits in a number.

```
echo enter a number
read  n
s=0
while [ $n -gt 0 ]
do
mod=$((n%10))
s=$((s+mod))
n=$((n/10))
done
echo "sum of digit is $s"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 14.sh
enter a number
678
sum of digit is 21
```

15. Write a shell Script to check whether given year is leap year or not.

```
echo enter year
read y
a=$(($y%4))
b=$(($y%100))
c=$(($y%400))
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ];
then
echo "$y is leap year"
else
echo "$y is leap year"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 15.sh
enter year
1994
1994 is leap year
```

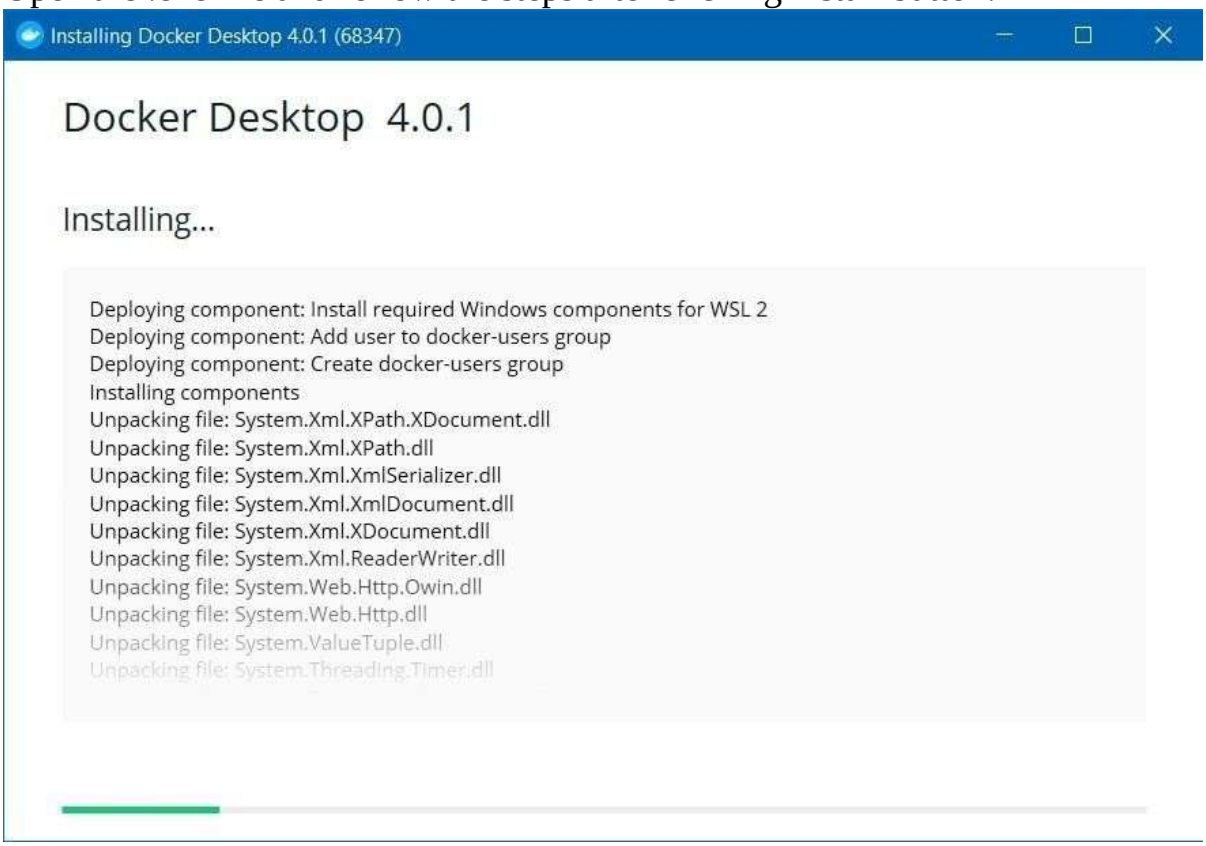
Installing and configuring Docker in Windows

Step-I

Download Docker Desktop installer for Windows from
https://desktop.docker.com/win/main/amd64/Docker%20Desktop%20Installer.exe

Step-II

Open the .exe file and follow the steps after clicking install button.

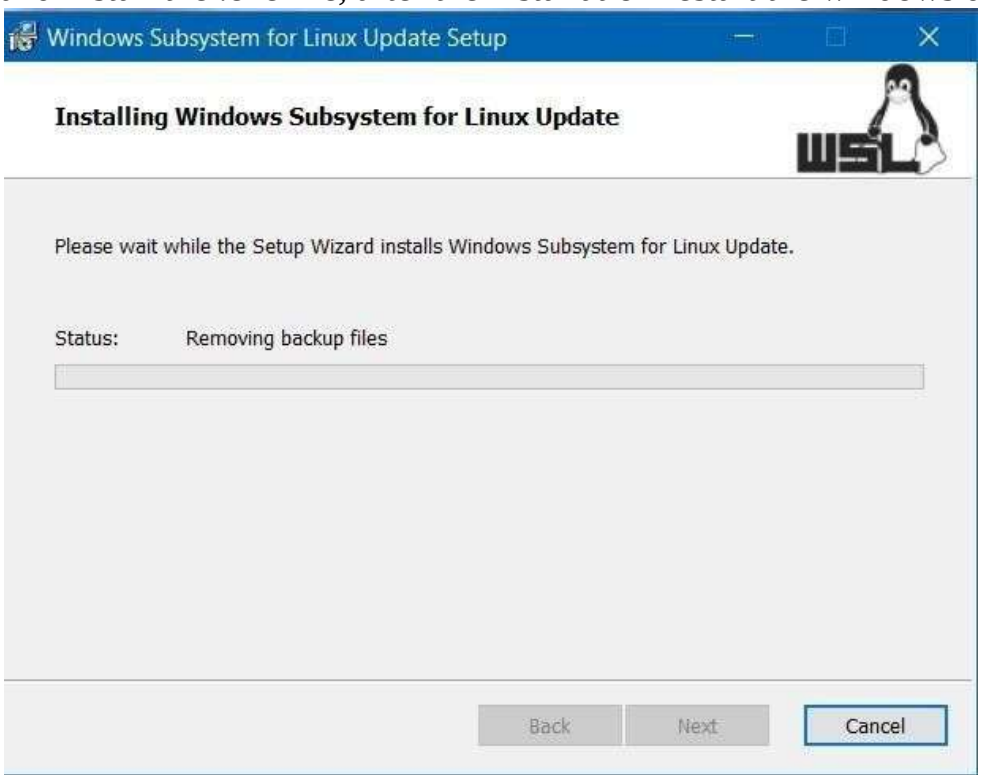


Step-III
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux

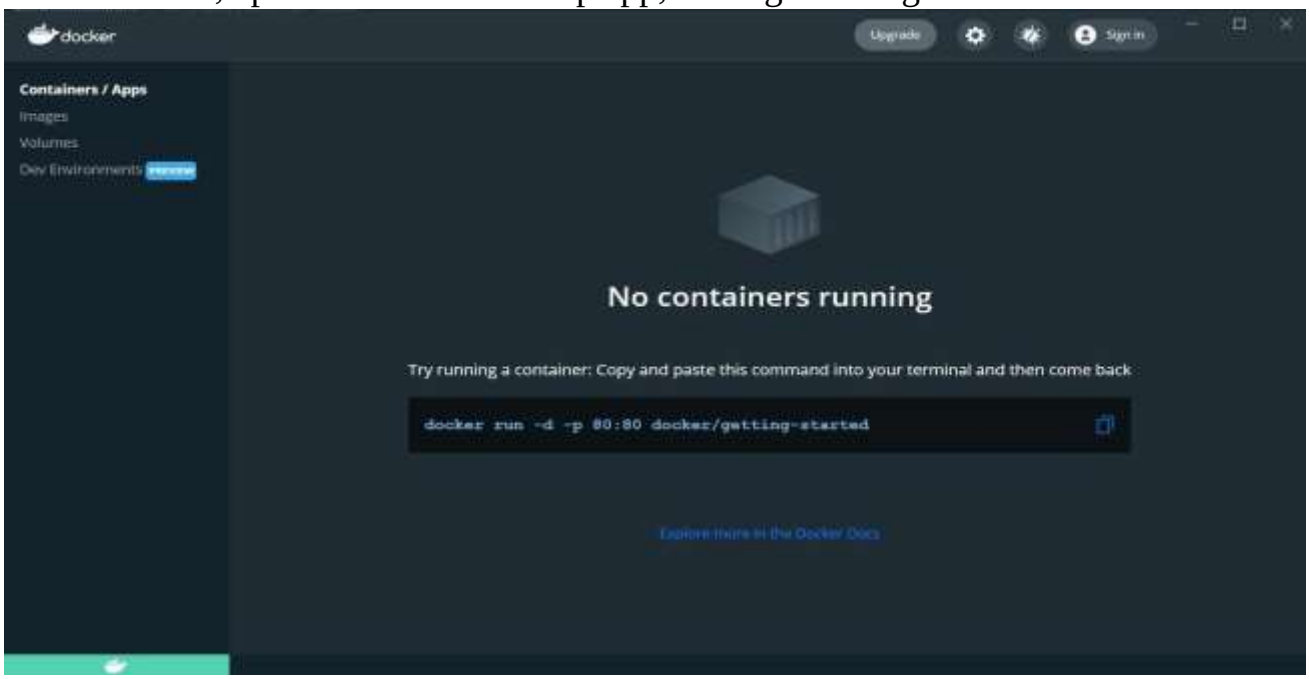
Step-IV

If any WSL 2 error occurs download windows subsystem for linux update package and install the .exe file, after the installation restart the windows device.



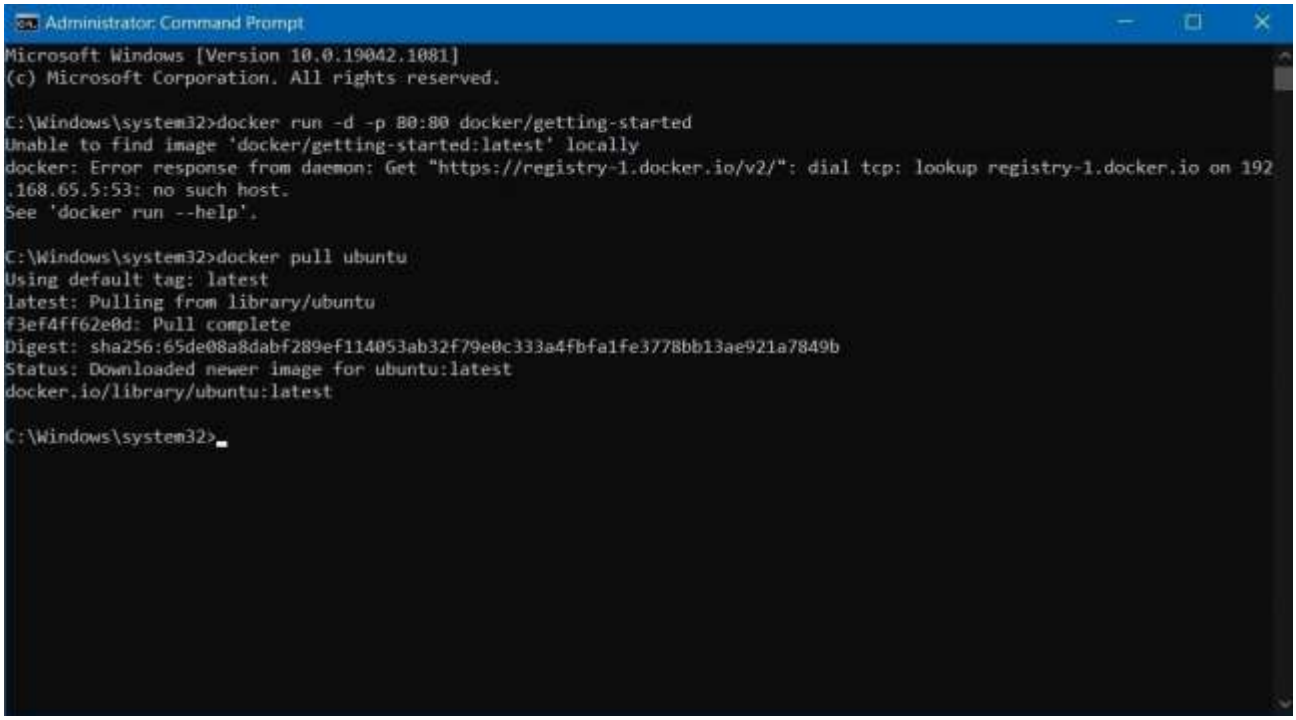
Step-V

Once installed, open the docker desktop app, and signin using the dockerID.

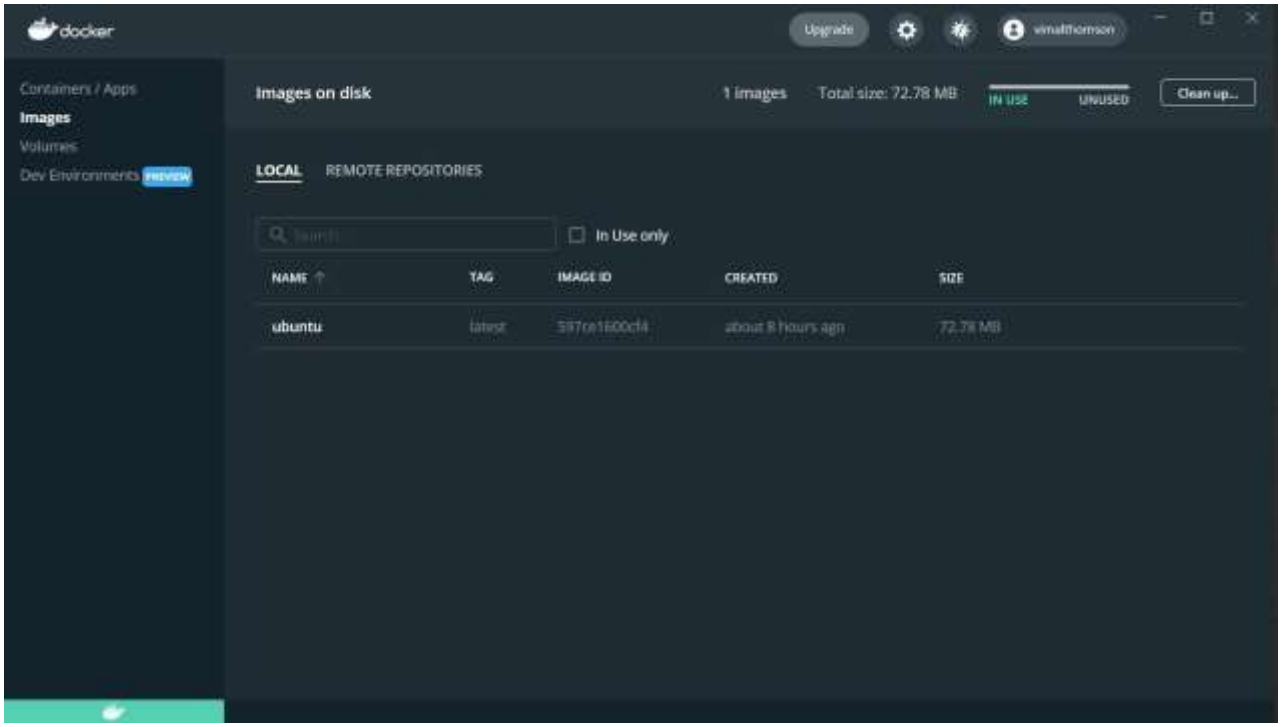


Step-VI

Now pull any image from docker hub using the docker pull command in the command prompt (eg: docker pull ubuntu).

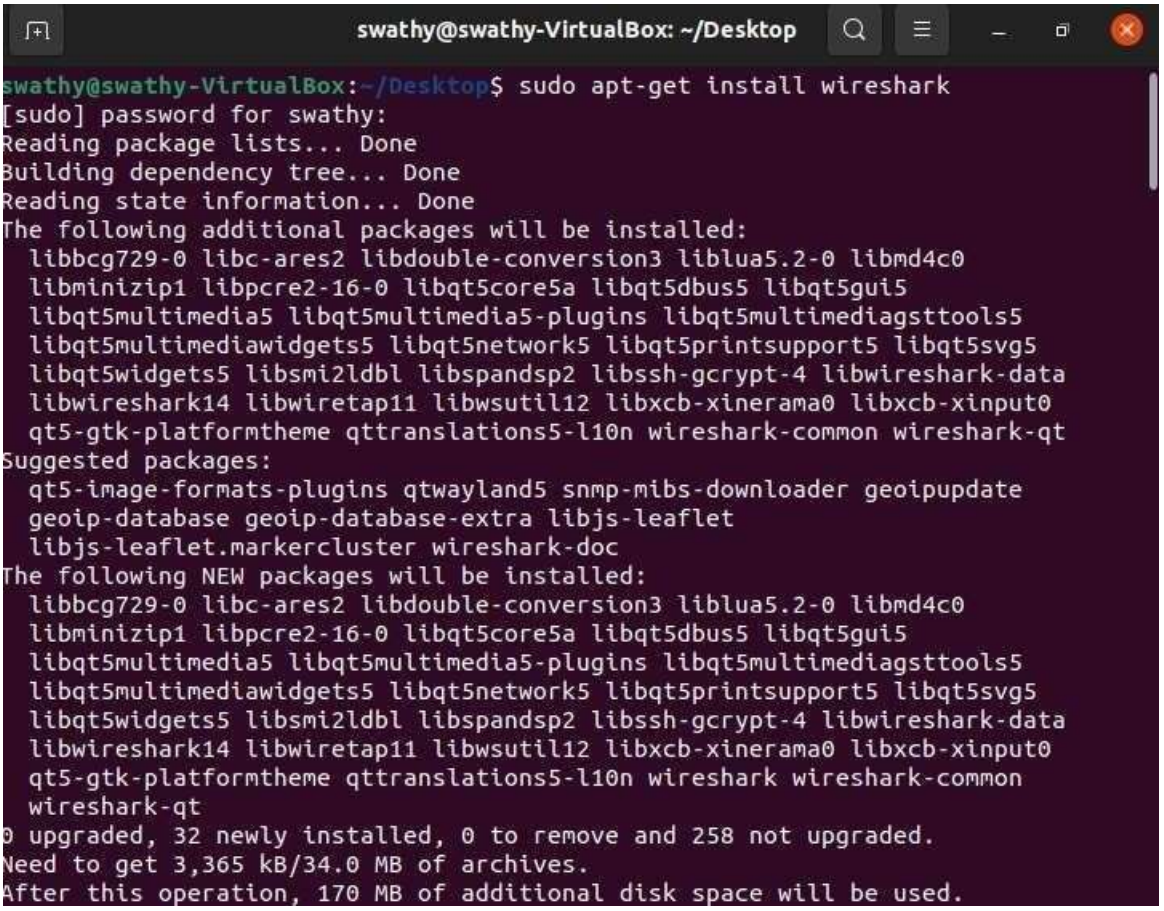


Now in the images tab an image of ubuntu will be displayed, we can run the ubuntu instance using the cli.

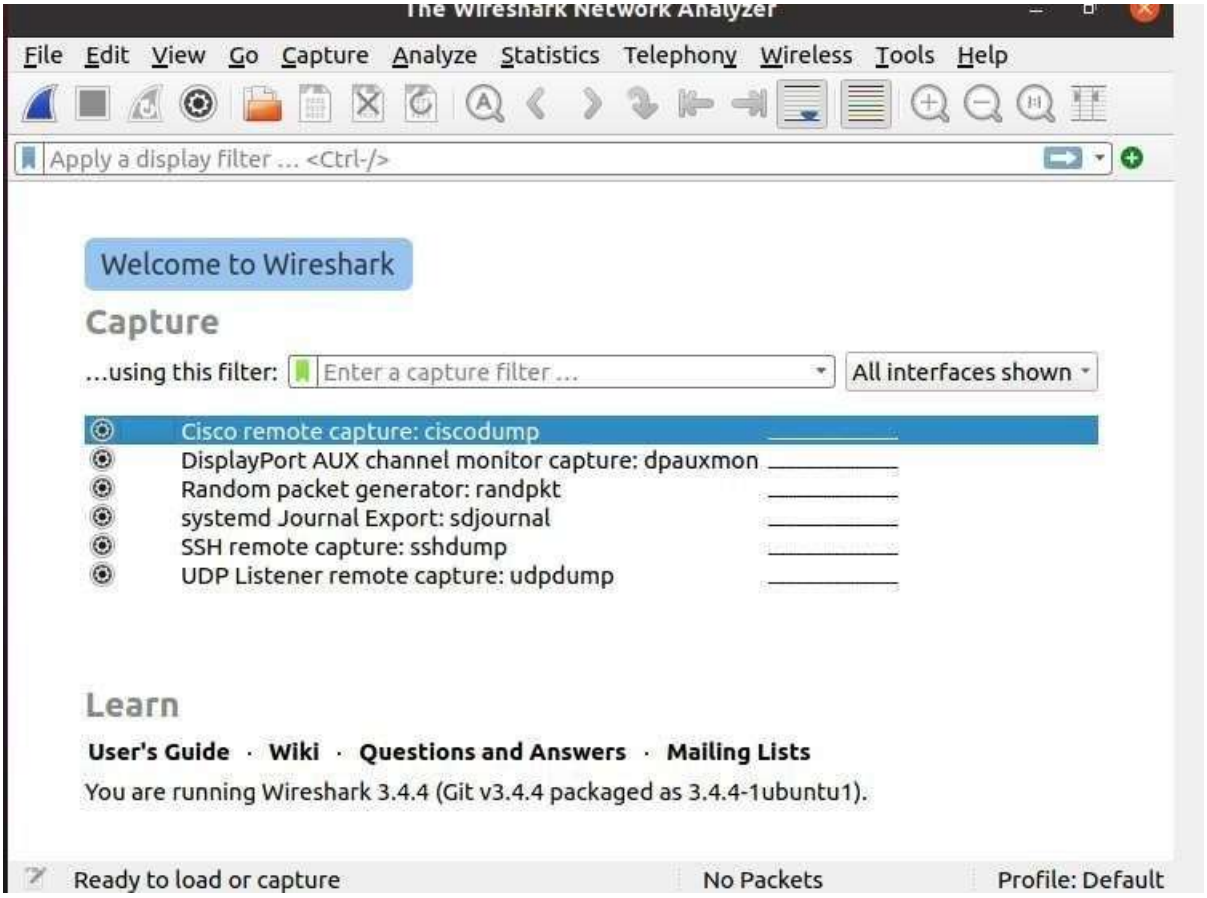


Installing Wireshark in Ubuntu

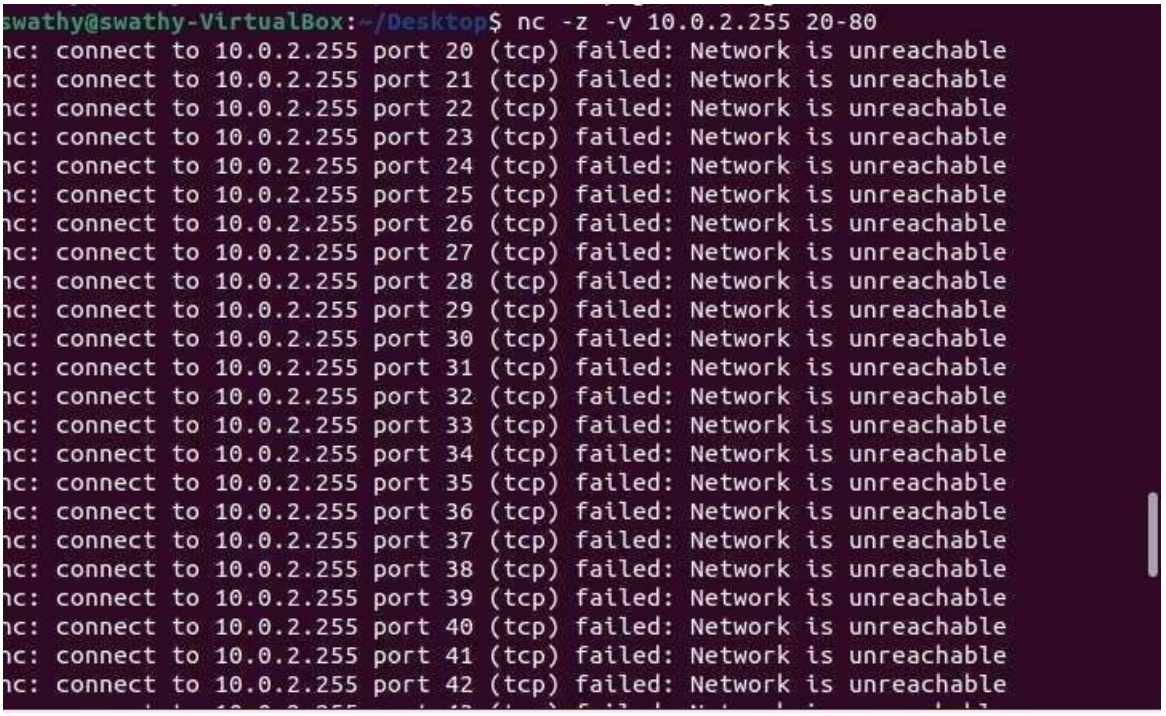
sudo apt-get install wireshark



sudo dpkg-reconfigure wireshark-common



Netcat


swathy@swathy-VirtualBox:~/Desktop$ nc -z -v 10.0.2.255 20-80
nc: connect to 10.0.2.255 port 20 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 21 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 22 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 23 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 24 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 25 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 26 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 27 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 28 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 29 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 30 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 31 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 32 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 33 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 34 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 35 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 36 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 37 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 38 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 39 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 40 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 41 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 42 (tcp) failed: Network is unreachable