20MCA136 -NETWORK AND SYSTEM ADMINISTRATION LAB

RECORD

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1. pwd

When you first open the terminal, you are in the home directory of your user. To know which directory you are in, you can use the **“pwd”** command. It gives us the absolute path, which means the path that starts from the root. The root is the base of the Linux file system. It is denoted by a forward slash(/). The user directory is usually something like "/home/username".

2.history

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

3. ls

Use the **"ls"** command to know what files are in the directory you are in. You can see all the hidden files by using the command **“ls -a”**.

4. cd

Use the **"cd"** command to go to a directory.

5. mkdir

Use the **mkdir** command when you need to create a folder or a directory.

6.rmdir

Use **rmdir** to delete a directory. But **rmdir** can only be used to delete an empty directory. To delete a directory containing files,

7. rm

Use the **rm** command to delete files and directories

8. touch

The **touch** command is used to create a file. It can be anything, from an empty txt file to an empty zip file **9.cat**

Use the **cat** command to display the contents of a file. It is usually used to easily view programs.

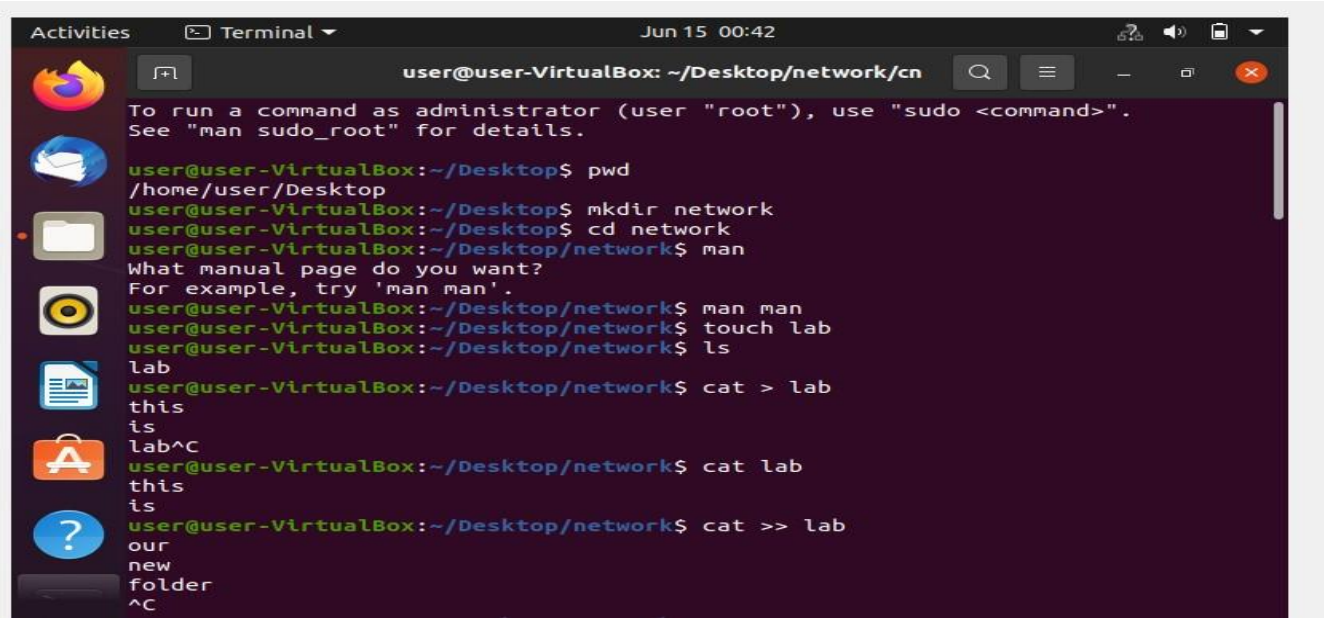
Cat >> filename : append new content to existing content in a file.

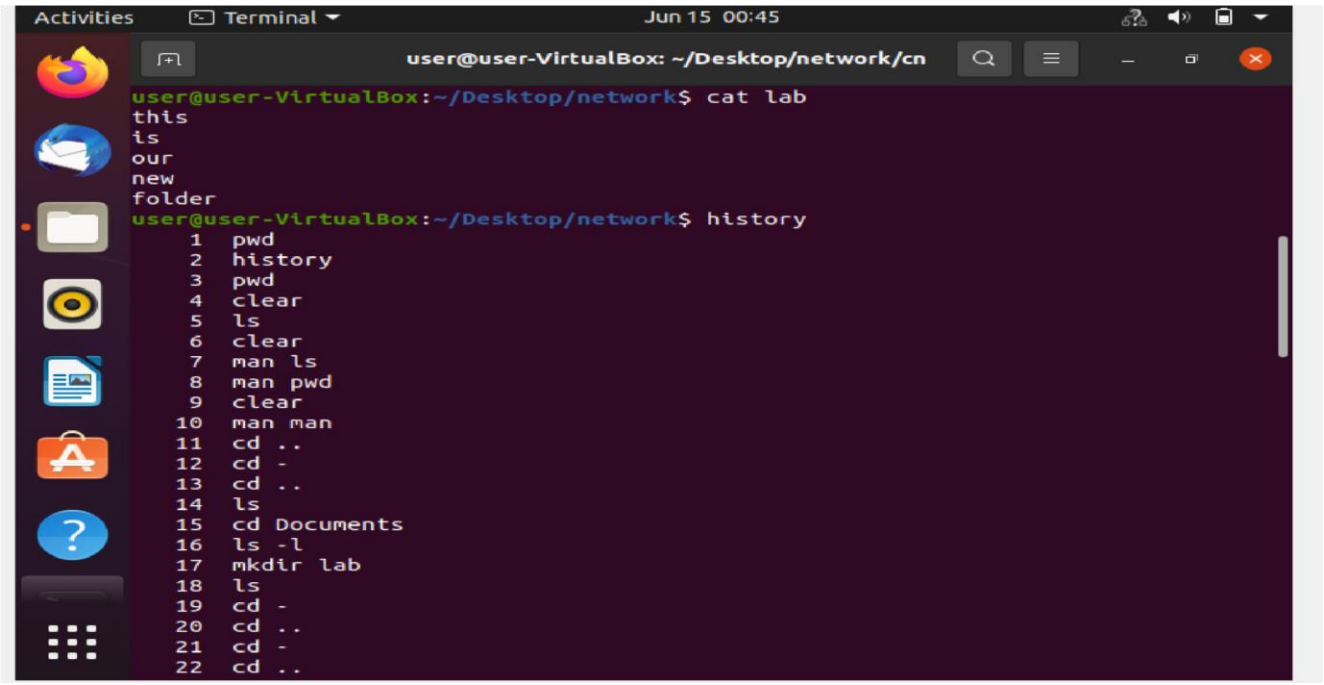
Cat>filename: overwrite existing content in a file

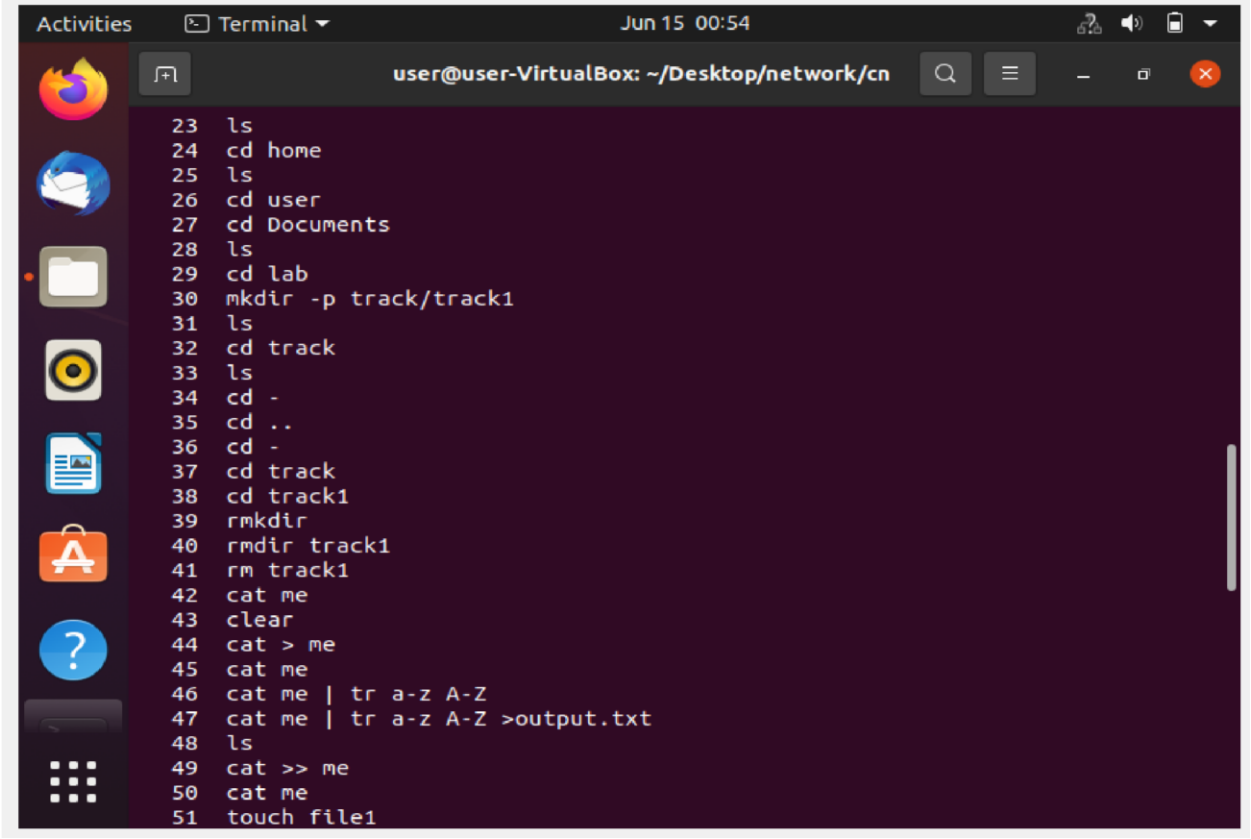
10. man

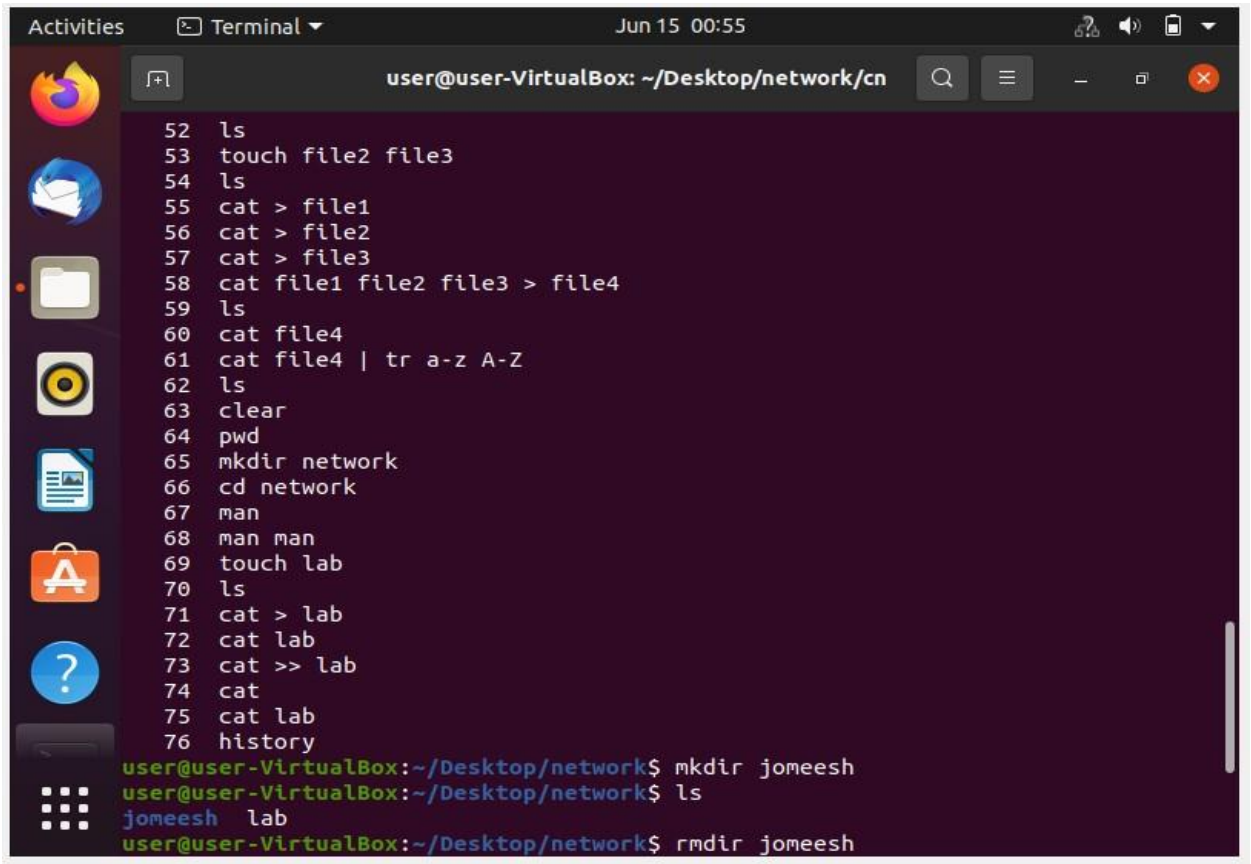
To know more about a command and how to use it, use the **man** command. It shows the manual pages of the command. For example, "**man cd**" shows the manual pages of the **cd** command.

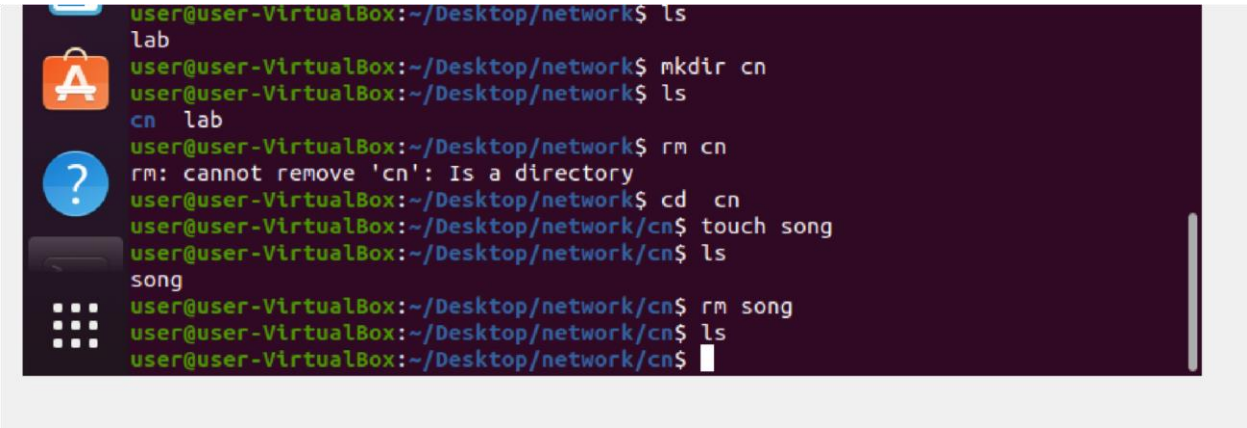
Output






Activities
Terminal
Jun 15 00:54
user@user-VirtualBox: ~/Desktop/network/cn
23 ls
24 cd home
25 ls
26 cd user
27 cd Documents
28 ls
29 cd lab
30 mkdir -p track/track1
31 ls
32 cd track
33 ls
34 cd -
35 cd ..
36 cd -
37 cd track
38 cd track1
39 rmkdir
40 rmdir track1
41 rm track1
42 cat me
43 clear
44 cat > me
45 cat me
46 cat me | tr a-z A-Z
47 cat me | tr a-z A-Z >output.txt
48 ls
49 cat >> me
50 cat me
51 touch file1


Activities
Terminal
Jun 15 00:55
user@user-VirtualBox: ~/Desktop/network/cn
52 ls
53 touch file2 file3
54 ls
55 cat > file1
56 cat > file2
57 cat > file3
58 cat file1 file2 file3 > file4
59 ls
60 cat file4
61 cat file4 | tr a-z A-Z
62 ls
63 clear
64 pwd
65 mkdir network
66 cd network
67 man
68 man man
69 touch lab
70 ls
71 cat > lab
72 cat lab
73 cat >> lab
74 cat
75 cat lab
76 history
user@user-VirtualBox:~/Desktop/network$ mkdir jomeesh
user@user-VirtualBox:~/Desktop/network$ ls
jomeesh lab
user@user-VirtualBox:~/Desktop/network$ rmdir jomeesh



1. echo

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

```
user@user-VirtualBox:~/Desktop/network$ echo "hello";
hello
user@user-VirtualBox:~/Desktop/network$ echo hello;
hello
user@user-VirtualBox:~/Desktop/network$ pwd
/home/user/Desktop/network
user@user-VirtualBox:~/Desktop/network$ touch jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ echo jomeesh >> jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ cat jomeesh.txt
jomeesh
```

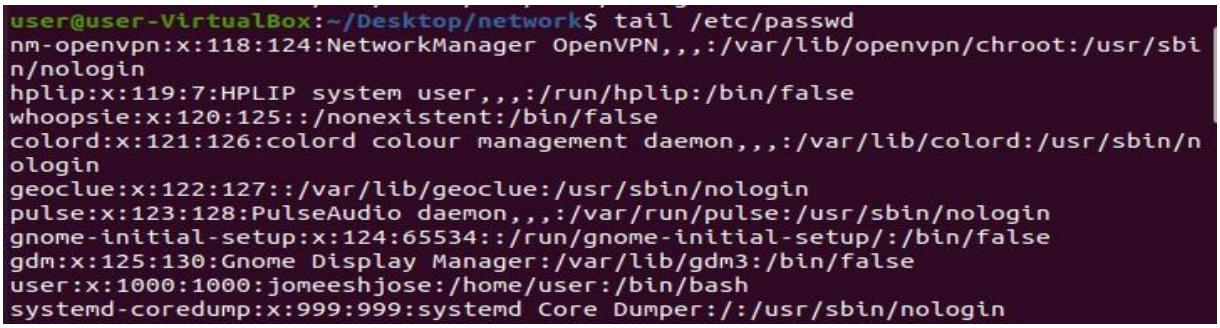
2. head

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.

```
user@user-VirtualBox:~/Desktop/network$ head /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
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
user@user-VirtualBox:~/Desktop/network$ head -n 2 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
```

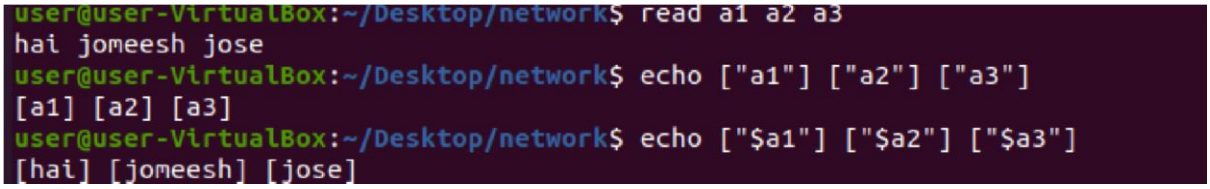
3. tail

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



4. read

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



5. 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.

```
user@user-VirtualBox:~/Desktop/network$ more  /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
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nolog
in
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/
nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sb
in/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
```

6. less

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

```
user@user-VirtualBox:~/Desktop/network$ less /etc/passwd
user@user-VirtualBox:~/Desktop/network$ less /etc/passwd
```

7. 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

```
user@user-VirtualBox:~/Desktop/network$ echo hello >> jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ echo gdmorning >> jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ cat jomeesh.txt
jomeesh
hello
gdmorning
user@user-VirtualBox:~/Desktop/network$ cut -b 1,2,3 jomeesh.txt
jom
hel
gdm
```

8. 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.

```
user@user-VirtualBox:~/Desktop/network$ cat > number.txt
1
2
3
^C
user@user-VirtualBox:~/Desktop/network$ cat number.txt
1
2
3
user@user-VirtualBox:~/Desktop/network$ paste jomeesh.txt number.txt
jomeesh 1
hello   2
gdmorning       3
user@user-VirtualBox:~/Desktop/network$ paste number.txt jomeesh.txt
1       jomeesh
2       hello
3       gdmorning
```

9. 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.

```
user@user-VirtualBox:~/Desktop/network$ uname
Linux
user@user-VirtualBox:~/Desktop/network$ uname -r
5.8.0-55-generic
user@user-VirtualBox:~/Desktop/network$ uname -v
#62~20.04.1-Ubuntu SMP Wed Jun 2 08:55:04 UTC 2021
user@user-VirtualBox:~/Desktop/network$ uname -p
x86_64
```

10. cp

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

```
user@user-VirtualBox:~/Desktop/network$ cp jomeesh.txt cn/
user@user-VirtualBox:~/Desktop/network$ ls cn
da.txt  dey.txt  jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ ls
cn  da.txt  dey.txt  jomeesh.txt  lab  number.txt  state.txt
```

11. 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.

```
user@user-VirtualBox:~/Desktop/network$ mv lab cn/
user@user-VirtualBox:~/Desktop/network$ ls
cn  da.txt  dey.txt  jomeesh.txt  number.txt  state.txt
user@user-VirtualBox:~/Desktop/network$ ls cn
da.txt  dey.txt  jomeesh.txt  lab
```

12. locate

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

```
user@user-VirtualBox:~/Desktop/network$ locate number*da.txt

Command 'locate' not found, but can be installed with:

sudo apt install mlocate
```

13. 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.

```
user@user-VirtualBox:~/Desktop/network$ find /home/ -name state.txt
/home/user/Desktop/network/state.txt
```

14. 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

```
user@user-VirtualBox:~/Desktop/network$ grep jomeesh jomeesh.txt
jomeesh
```

15. 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.

```
user@user-VirtualBox:~/Desktop/network$ df
Filesystem     1K-blocks    Used Available Use% Mounted on
udev             479772       0    479772   0% /dev
tmpfs            101868    1368    100500   2% /run
/dev/sda5       9736500 7336956   1885240  80% /
tmpfs            509324       0    509324   0% /dev/shm
tmpfs              5120       4      5116   1% /run/lock
tmpfs            509324       0    509324   0% /sys/fs/cgroup
/dev/loop3        56832   56832         0 100% /snap/core18/2066
/dev/loop0       224256  224256         0 100% /snap/gnome-3-34-1804/66
/dev/loop5        66688   66688         0 100% /snap/gtk-common-themes/1515
/dev/loop4        66432   66432         0 100% /snap/gtk-common-themes/1514
/dev/loop1        56832   56832         0 100% /snap/core18/1988
/dev/loop2       224256  224256         0 100% /snap/gnome-3-34-1804/72
/dev/loop7        52224   52224         0 100% /snap/snap-store/542
/dev/loop9        32896   32896         0 100% /snap/snapd/12057
/dev/sda1        523248       4    523244   1% /boot/efi
tmpfs            101864      28    101836   1% /run/user/1000
/dev/loop10       33152   33152         0 100% /snap/snapd/12159
/dev/loop8        52224   52224         0 100% /snap/snap-store/547
```

16. 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

```
user@user-VirtualBox:~/Desktop/network$ du
12      ./cn
28      .
user@user-VirtualBox:~/Desktop/network$ du -h
12K     ./cn
28K     .
```

17. 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

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

18. userdel

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

```
user@user-VirtualBox:~/Desktop/network$ sudo userdel jomeesh
```

19. sudo

SuperUser Do(sudo) command enables you to perform tasks that require

administrative or root permissions.

20. 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.

```
user@user-VirtualBox:~/Desktop/network$ sudo passwd jomeesh
New password:
Retype new password:
passwd: password updated successfully
```

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

1. 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 login information
  - #usermod --help
- #usermod –u 2000 user

```
user@user-VirtualBox:~/Desktop/network$ sudo usermod -u 2000 user
usermod: user user is currently used by process 747
user@user-VirtualBox:~/Desktop/network$
```

2. groupadd
   - groupadd command creates a new group account using the values specified on the command line and the default values from the system.
   - #gro u p add jomee

```
user@user-VirtualBox:~/Desktop/network$ sudo groupadd jomee
groupadd: group 'jomee' already exists
user@user-VirtualBox:~/Desktop/network$ sudo groupadd jomee1
user@user-VirtualBox:~/Desktop/network$ sudo groupadd jomee2
```

```
user@user-VirtualBox:~/Desktop/network$ compgen -g jomee
jomee
jomee1
jomee2
user@user-VirtualBox:~/Desktop/network$
```

3. groups - print the groups a user is in
   - #groups user

```
user@user-VirtualBox:~/Desktop/network$ groups user
user : user adm cdrom sudo dip plugdev lpadmin lxd sambashare
user@user-VirtualBox:~/Desktop/network$
```

4. groupdel - groupdel command modifies the system account files, deleting all entries that refer to group. The named group must exist • #groupdel jomee2

```
user@user-VirtualBox:~/Desktop/network$ compgen -g jomee
jomee
jomee1
jomee2
user@user-VirtualBox:~/Desktop/network$ sudo groupdel jomee2
user@user-VirtualBox:~/Desktop/network$ compgen -g jomee
jomee
jomee1
user@user-VirtualBox:~/Desktop/network$
```

5. groupmod - The groupmod command modifies the definition of the specified group by modifying the appropriate entry in the group database.

groupmod -n group1 group2

```
user@user-VirtualBox:~/Desktop/network$ compgen -g jomee
jomee
jomee1
user@user-VirtualBox:~/Desktop/network$ sudo groupmod -n new_group jomee1
user@user-VirtualBox:~/Desktop/network$ compgen -g jomee
jomee
user@user-VirtualBox:~/Desktop/network$ compgen -g new_group
new_group
user@user-VirtualBox:~/Desktop/network$
```

6. chmod - To change directory permissions of file/ Directory in Linux.

#chmod whowhatwhich file/directory

- chmod +rwx filename to add permissions.
- chmod -rwx directoryname to remove permissions.
- chmod +x filename to allow executable permissions.
- chmod -wx filename to take out write and executable permissions.

#chmod u+x test #chmod g-rwx test #chmod o-r test

```
user@user-VirtualBox:~/Desktop/network$ chmod +rwx jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ chmod -w jomeesh.txt
```

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

#chown user jomeesh.txt

```
user@user-VirtualBox:~/Desktop/network$ chown user jomeesh.txt
user@user-VirtualBox:~/Desktop/network$ ls -l jomeesh.txt
-r-xr-xr-x 1 user user 24 Jun 21 21:51 jomeesh.txt
user@user-VirtualBox:~/Desktop/network$
```

8. 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. #id

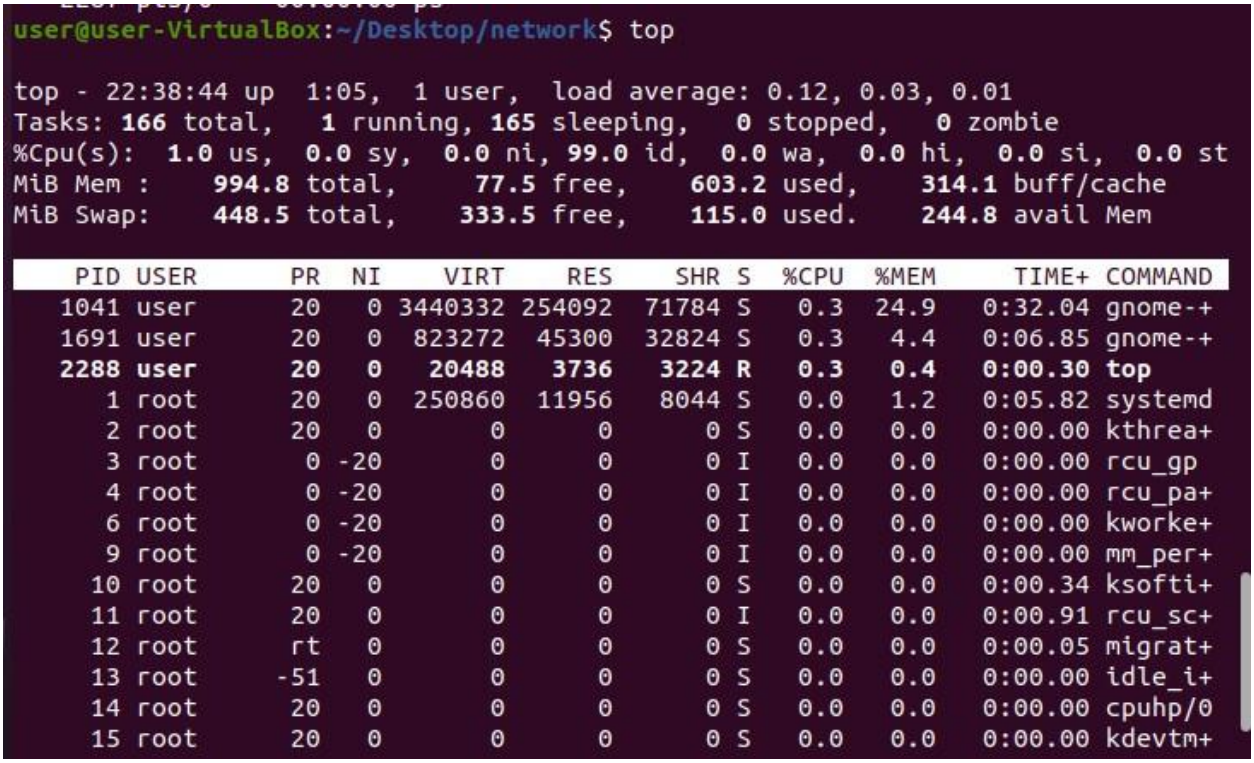
```
user@user-VirtualBox:~/Desktop/network$ id user
uid=1000(user) gid=1000(user) groups=1000(user),4(adm),24(cdrom),27(sudo),30(di
p),46(plugdev),120(lpadmin),131(lxd),132(sambashare)
user@user-VirtualBox:~/Desktop/network$
```

9. 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.
   - PID – This is the unique process ID
   - TTY –This is the type of terminal that the user is logged in to • TIME – This is the time in minutes and seconds that the process has been running
   - CMD – The command that launched the process #ps -a

```
user@user-VirtualBox:~/Desktop/network$ ps -a
    PID TTY          TIME CMD
    796 tty2     00:00:10 Xorg
    904 tty2     00:00:00 gnome-session-b
   2287 pts/0    00:00:00 ps
```

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

#top –u user



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

1. <u>wc</u> 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

#wc state.txt

capital.txt wc -l state.txt

wc -w state.txt

capital.txt wc -c state.txt

wc -m state.txt

```
user@user-VirtualBox:~/Desktop/network$ wc state.txt
 3  3 22 state.txt
user@user-VirtualBox:~/Desktop/network$ wc -l state.txt
3 state.txt
user@user-VirtualBox:~/Desktop/network$ wc -w state.txt
3 state.txt
user@user-VirtualBox:~/Desktop/network$ wc -c state.txt
22 state.txt
user@user-VirtualBox:~/Desktop/network$ wc -m state.txt
22 state.txt
user@user-VirtualBox:~/Desktop/network$
```

2. 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
Options:

-c : Creates Archive

-x : Extract the archive

-f : creates archive with given filename

-t : displays or lists files in archived file
-u : archives and adds to an existing archive file
-v : Displays Verbose Information
-A : Concatenates the archive files

-z : zip, tells tar command that creates tar file using gzip

-j : filter archive tar file using tbzip

-W : Verify a archive file

-r : update or add file or directory in already existed .tar file

#tar cf archive.tar state.txt capital.txt //create archive
file #ls archive.tar

#tar tf /archive.tar // list contents of tar archive file

• Extract an archive created with tar

#mkdir backup

#cd backup

#tar xf /home/meera/Documents/Meera_Linux/archive.tar

• Compression Types gzip(z),bzip2(j), xz(J) #tar czf /abc.tar.gz /etc

#mkdir backup2

#tar cjf /abcd.tar.bz2 /etc

#cd backup2

#tar cJf /abcde.tar.xz /etc

#tar xjf /abcd.tar.bz2

Extract an archive

#mkdir backup3

#mkdir backup1

#cd backup3

#cd backup1

#tar xJf /abcde.tar.xz

#tar xzf /abc.tar.gz

```
user@user-VirtualBox:~/Desktop/network$ tar czf archive1.tar.gz state.txt
user@user-VirtualBox:~/Desktop/network$ ls
archive1.tar.gz  cn  da.txt  dey.txt  jomeesh.txt  number.txt  state.txt
user@user-VirtualBox:~/Desktop/network$ tar xzf archive1.tar.gz
user@user-VirtualBox:~/Desktop/network$ ls
archive1.tar.gz  cn  da.txt  dey.txt  jomeesh.txt  number.txt  state.txt
user@user-VirtualBox:~/Desktop/network$ tar cjf arc2.tar.bz2 state.txt
user@user-VirtualBox:~/Desktop/network$ ls
arc2.tar.bz2     cn      dey.txt      number.txt
archive1.tar.gz  da.txt  jomeesh.txt  state.txt
user@user-VirtualBox:~/Desktop/network$ tar xjf arc2.tar.bz2
user@user-VirtualBox:~/Desktop/network$ tar cjf arc3.tar.x2 state.txt
user@user-VirtualBox:~/Desktop/network$ ls
arc2.tar.bz2  archive1.tar.gz  da.txt   jomeesh.txt  state.txt
arc3.tar.x2   cn               dey.txt  number.txt
user@user-VirtualBox:~/Desktop/network$ tar xjf arc3.tar.x2
```

3. <u>expr</u>

The expr command evaluates a given expression and displays its 6 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 25 – 5

```
user@user-VirtualBox:~/Desktop/network$ expr 25 - 5
20
```

4. <u>Redirections & Piping</u>

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

#cat /etc.passwd.txt | head -7 | tail -5

```
user@user-VirtualBox:~/Desktop/network$ ls -l|wc -l
10
```

5. ssh ssh stands for
"Secure Shell".

It is a protocol used to securely connect to a remote server/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

```
user@user-VirtualBox:~/Desktop$ ssh mca@192.168.6.91
ssh: connect to host 192.168.6.91 port 22: Network is unreachable
```

6.ssh-keygen ssh-keygen command to generate a
public/private authentication

10 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

```
user@user-VirtualBox:~/Desktop/network$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/user/.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:q1t9AeTP/usrkuzDpKEQPMzMdbhu5sexgAJSrKO1MmY user@user-VirtualBox
The key's randomart image is:
+---[RSA 3072]----+
| .     .  .      |
|  o   o .o       |
| o * . o  o      |
|= . O .    +     |
|o+ . =  S   +    |
|+Eo o = oo.. .   |
|oo . = +oO..o    |
|      oo= *...   |
|      oo ..o o=o |
+----[SHA256]-----+
```

1. Managing Files, Creating Users and Groups Using Command-line tools

1. a. Create six files with name of the form songX.mp3

b. Create six files with name of the form snapX.mp3 c. Create six files with name of the form filmX.mp3 (In each set, replace X with the numbers 1 through 6)

```
user@user-VirtualBox:~/Desktop/network/cn$ touch song1.mp3 song2.mp3 song3.mp3
song4.mp3 song5.mp3 song6.mp3
user@user-VirtualBox:~/Desktop/network/cn$ touch snap1.jpg snap2.jpg snap3.jpg
snap4.jpg snap5.jpg snap6.jpg
user@user-VirtualBox:~/Desktop/network/cn$ touch flim1.mp4 flim2.mp4 flim3.mp4
flim4.mp4 flim5.mp4 flim6.mp4
```

2. From your home directory, move the song files into your music subdirectory, the snapshot files into your pictures subdirectory, and the movie files into videos subdirectory.

```
user@user-VirtualBox:~$ mv *.jpg ./Pictures/
user@user-VirtualBox:~$ mv *.mp4 ./Videos/
user@user-VirtualBox:~$ mv *.mp3 ./Music/
```

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

```
user@user-VirtualBox:~$ mkdir -p {friends,family,work}
```

4. Copy song files to the friends folder and snap files to family folder.

```
user@user-VirtualBox:~$ cp /home/user/Music song1.mp3 song2.mp3 song3.mp3 song4
.mp3 song5.mp3 song6.mp3 /home/user/friends/
cp: -r not specified; omitting directory '/home/user/Music'
```

```
user@user-VirtualBox:~$ cp /home/user/Pictures snap1.jpg snap2.jpg snap3.jpg sn
ap4.jpg snap5.jpg snap6.jpg /home/user/family/
cp: -r not specified; omitting directory '/home/user/Pictures'
```

5. Attempt to delete both family and friends projects with a single rmdir command.

```
user@user-VirtualBox:~$ rmdir {friends,family}
```

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

```
user@user-VirtualBox:~$ rm -r friends family
rm: cannot remove 'friends': No such file or directory
rm: cannot remove 'family': No such file or directory
```

7. Redirect a long listing of all home directory files, including hidden, into a file named allfiles.txt. Confirm

that the file contains the listing.

```
user@user-VirtualBox:~$ ls -a > allfiles.txt
user@user-VirtualBox:~$
```

```
user@user-VirtualBox:~$ ls -a
.               .bashrc    Downloads  Pictures  .sudo_as_admi
..              .cache     .gnupg     .profile  Templates
allfiles.txt    .config    .lesshst   Public    Videos
.bash_history   Desktop    .local     snap      work
.bash_logout    Documents  Music      .ssh
```

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

```
user@user-VirtualBox:~$ date
Tuesday 17 August 2021 07:16:08 PM IST
```

9. Add the user Juliet

```
user@user-VirtualBox:~$ sudo useradd Juliet
[sudo] password for user:
```

10. Confirm that Juliet has been added by examining the /etc/passwd file

```
user@user-VirtualBox:~$ cat /etc/passwd | grep Juliet
Juliet:x:1001:1003::/home/Juliet:/bin/sh
```

11. Use the passwd command to initialize Juliet's password

```
user@user-VirtualBox:~$ sudo passwd Juliet
New password:
Retype new password:
passwd: password updated successfully
```

12. Create a supplementary group called Shakespeare with a group id of 30000

```
user@user-VirtualBox:~$ sudo groupadd -g 30000 Shakespeare
```

13. Create a supplementary group called artists.

```
user@user-VirtualBox:~$ sudo groupadd artists
```

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

```
user@user-VirtualBox:~$ less /etc/group
```

```
Juliet:x:1003:
Shakespeare:x:30000:
artists:x:30001:
(END)
```

15. Add the Juliet user to the Shakespeare group as a supplementary group.

```
user@user-VirtualBox:~$ sudo usermod -G Shakespeare Juliet
```

16. Confirm that Juliet has been added using the id command.

```
user@user-VirtualBox:~$ id Juliet
uid=1001(Juliet) gid=1003(Juliet) groups=1003(Juliet),30000(Shakespeare)
```

17. Add Romeo and Hamlet to the Shakespeare group.

```
user@user-VirtualBox:~$ sudo useradd Romeo
user@user-VirtualBox:~$ sudo useradd Hamlet
user@user-VirtualBox:~$ sudo usermod -G Shakespeare Romeo
user@user-VirtualBox:~$ sudo usermod -G Shakespeare Hamlet
user@user-VirtualBox:~$ id Romeo
uid=1002(Romeo) gid=30002(Romeo) groups=30002(Romeo),30000(Shakespeare)
user@user-VirtualBox:~$ id Hamlet
uid=1003(Hamlet) gid=30003(Hamlet) groups=30003(Hamlet),30000(Shakespeare)
```

18. Add Reba, Dolly and Elvis to the artists group.

```
user@user-VirtualBox:~$ sudo useradd Reba
user@user-VirtualBox:~$ sudo useradd Dolly
user@user-VirtualBox:~$ sudo useradd Elvis
user@user-VirtualBox:~$ sudo usermod -G artists Reba
user@user-VirtualBox:~$ sudo usermod -G artists Dolly
user@user-VirtualBox:~$ sudo usermod -G artists Elvis
```

19. Verify the supplemental group memberships by examining the /etc/group file.

```
user@user-VirtualBox:~$ less /etc/group
```

```
Shakespeare:x:30000:Juliet,Romeo,Hamlet
artists:x:30001:Reba,Dolly,Elvis
```

20. Attempt to remove user Dolly.

```
user@user-VirtualBox:~$ sudo userdel Dolly
[sudo] password for user:
user@user-VirtualBox:~$ id Dolly
id: ‘Dolly’: no such user
user@user-VirtualBox:~$
```

windows

1. Ping & traceroute tests

Ping and Trace Route tests can help to identify any connection issues between your network and a specified server (or website) address.
PING test

The PING command is used to test the connection and latency between two network connections. The PING command sends packets of information to a specified IP Address and then measures the time it takes to get a response from the specified computer or device.

```
C:\Users\Jomesh>ping www.google.com

Pinging www.google.com [2404:6800:4007:827::2004] with 32 bytes of data:
Reply from 2404:6800:4007:827::2004: time=66ms
Reply from 2404:6800:4007:827::2004: time=57ms
Reply from 2404:6800:4007:827::2004: time=92ms
Reply from 2404:6800:4007:827::2004: time=95ms

Ping statistics for 2404:6800:4007:827::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 57ms, Maximum = 95ms, Average = 77ms
```

Trace Route test

The TRACERT command is used to conduct a similar test to PING, but instead of displaying the time it takes to connect, it looks at the exact server hops required to connect your computer to the server.
You should already have the CMD prompt dialogue box open, after performing the PING test above.

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

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

  1   160 ms   200 ms   203 ms  2409:4073:4e91:f1c::8d
  2     *        *        *     Request timed out.
  3    43 ms    50 ms    38 ms  2405:200:365:eeee:20::40
  4   103 ms    38 ms    40 ms  2405:200:801:1100::3de
  5    87 ms    30 ms    35 ms  2405:200:801:1100::3df
  6    57 ms    60 ms    55 ms  2405:200:801:600::15
  7     *        *        *     Request timed out.
  8   150 ms   203 ms    50 ms  2001:4860:1:1::170
  9     *      282 ms     *     2404:6800:80d9::1
 10    47 ms    68 ms    48 ms  2001:4860:0:1::448c
 11     *       88 ms   203 ms  2001:4860:0:135f::3
 12    99 ms    63 ms    53 ms  2001:4860:0:1340::1
 13    96 ms    47 ms    72 ms  2001:4860:0:1::559d
 14    95 ms    47 ms    51 ms  maa03s42-in-x04.1e100.net [2404:6800:4007:827::2004]

Trace complete.
```

1. Nslookup

Microsoft Windows includes a tool called NSLOOKUP that you can use via the command prompt. This tool can be used to check DNS records propagation and resolution using different servers, and perform other troubleshooting steps.

```
C:\Users\Jomesh>nslookup aesajce.in
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
Name:    aesajce.in
Address:  103.120.179.46
```

- Type nslookup -q=XX where XX is a type of a DNS record. Some of the available types are MX, A, CNAME, and TXT. The records are then displayed, to exit the tool type exit

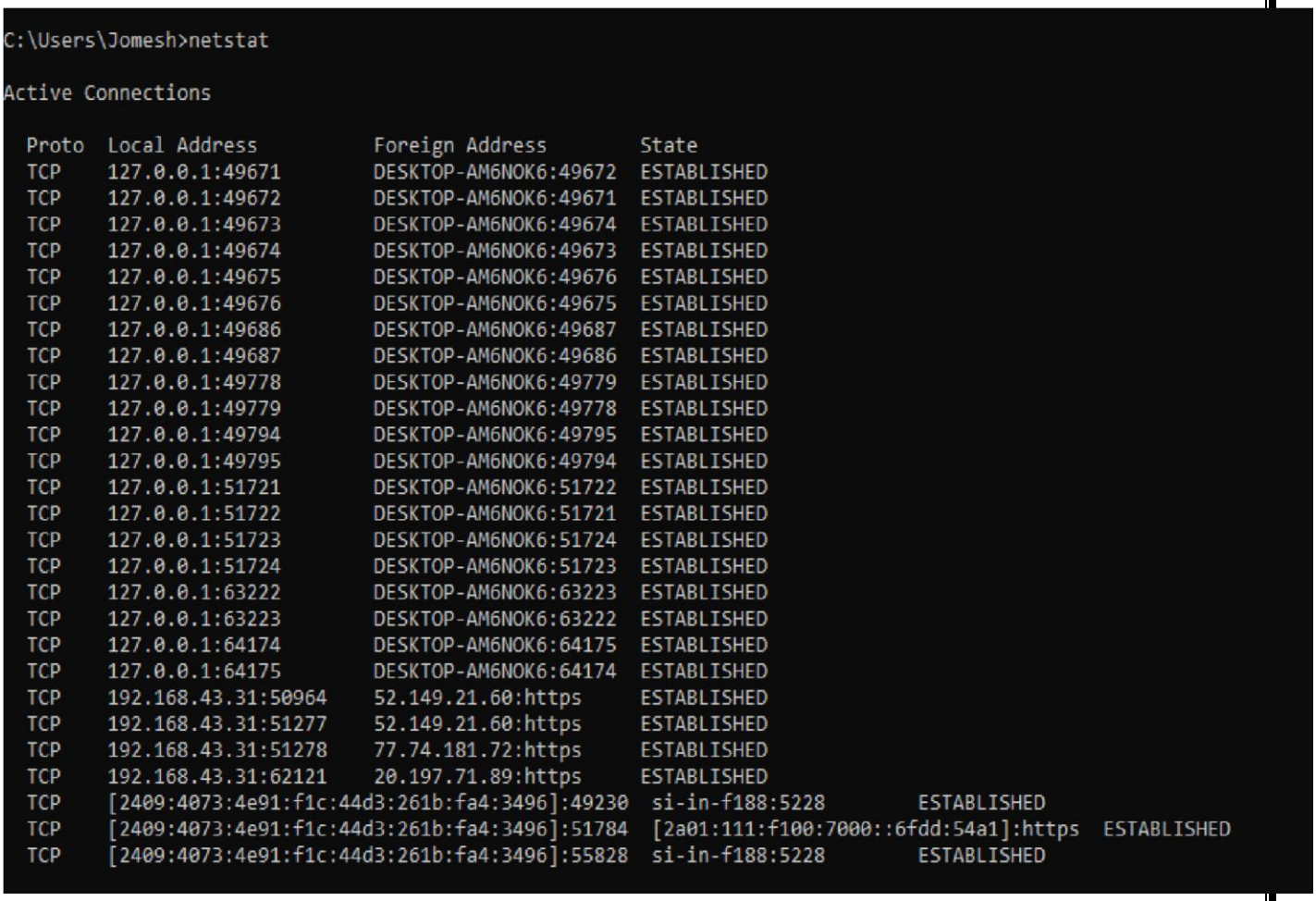
```
C:\Users\Jomesh>nslookup -type=ns aesajce.in
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
aesajce.in      nameserver = ns1.aessas.com
aesajce.in      nameserver = ns1.ajcemca.in
aesajce.in      nameserver = ns2.aessas.com
aesajce.in      nameserver = ns2.ajcemca.in
```

- To use **nslookup** as a troubleshooting tool, you can set the specific type of record to lookup for a domain by using the **-type=record_type** where **record_type** is A, CNAME, MX, PTR, NS, ANY.
  Type **nslookup -type=ns domain_name** where domain_name is the domain for your query and hit **Enter.** Now the tool will display the name servers for the domain you specified.

```
C:\Users\Jomesh>nslookup -q=MX aesajce.in
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
aesajce.in      MX preference = 5, mail exchanger = alt1.aspmx.l.google.com
aesajce.in      MX preference = 10, mail exchanger = aspmx2.googlemail.com
aesajce.in      MX preference = 1, mail exchanger = aspmx.l.google.com
aesajce.in      MX preference = 5, mail exchanger = alt2.aspmx.l.google.com
aesajce.in      MX preference = 10, mail exchanger = aspmx3.googlemail.com
```

2. Netstat

On Windows 10, netstat (network statistics) has been around for a long time, and it's a command-line tool that you can use in Command Prompt to display statistics for all network connections. It allows you to understand open and connected ports to monitor and troubleshoot networking problems for system or applications.



```
C:\Users\Jomesh>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49671        DESKTOP-AM6NOK6:49672  ESTABLISHED
  TCP    127.0.0.1:49672        DESKTOP-AM6NOK6:49671  ESTABLISHED
  TCP    127.0.0.1:49673        DESKTOP-AM6NOK6:49674  ESTABLISHED
  TCP    127.0.0.1:49674        DESKTOP-AM6NOK6:49673  ESTABLISHED
  TCP    127.0.0.1:49675        DESKTOP-AM6NOK6:49676  ESTABLISHED
  TCP    127.0.0.1:49676        DESKTOP-AM6NOK6:49675  ESTABLISHED
  TCP    127.0.0.1:49686        DESKTOP-AM6NOK6:49687  ESTABLISHED
  TCP    127.0.0.1:49687        DESKTOP-AM6NOK6:49686  ESTABLISHED
  TCP    127.0.0.1:49778        DESKTOP-AM6NOK6:49779  ESTABLISHED
  TCP    127.0.0.1:49779        DESKTOP-AM6NOK6:49778  ESTABLISHED
  TCP    127.0.0.1:49794        DESKTOP-AM6NOK6:49795  ESTABLISHED
  TCP    127.0.0.1:49795        DESKTOP-AM6NOK6:49794  ESTABLISHED
  TCP    127.0.0.1:51721        DESKTOP-AM6NOK6:51722  ESTABLISHED
  TCP    127.0.0.1:51722        DESKTOP-AM6NOK6:51721  ESTABLISHED
  TCP    127.0.0.1:51723        DESKTOP-AM6NOK6:51724  ESTABLISHED
  TCP    127.0.0.1:51724        DESKTOP-AM6NOK6:51723  ESTABLISHED
  TCP    127.0.0.1:63222        DESKTOP-AM6NOK6:63223  ESTABLISHED
  TCP    127.0.0.1:63223        DESKTOP-AM6NOK6:63222  ESTABLISHED
  TCP    127.0.0.1:64174        DESKTOP-AM6NOK6:64175  ESTABLISHED
  TCP    127.0.0.1:64175        DESKTOP-AM6NOK6:64174  ESTABLISHED
  TCP    192.168.43.31:50964    52.149.21.60:https     ESTABLISHED
  TCP    192.168.43.31:51277    52.149.21.60:https     ESTABLISHED
  TCP    192.168.43.31:51278    77.74.181.72:https     ESTABLISHED
  TCP    192.168.43.31:62121    20.197.71.89:https     ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:49230  si-in-f188:5228        ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:51784  [2a01:111:f100:7000::6fdd:54a1]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:55828  si-in-f188:5228        ESTABLISHED
```

netstat –n

command to display active connections showing numeric IP address and port number instead of trying to determine the names .

netstat -n INTERVAL

In the command, make sure to replace INTERVAL for the number (in seconds) you want to redisplay the information.

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

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49671        127.0.0.1:49672        ESTABLISHED
  TCP    127.0.0.1:49672        127.0.0.1:49671        ESTABLISHED
  TCP    127.0.0.1:49673        127.0.0.1:49674        ESTABLISHED
  TCP    127.0.0.1:49674        127.0.0.1:49673        ESTABLISHED
  TCP    127.0.0.1:49675        127.0.0.1:49676        ESTABLISHED
  TCP    127.0.0.1:49676        127.0.0.1:49675        ESTABLISHED
  TCP    127.0.0.1:49686        127.0.0.1:49687        ESTABLISHED
  TCP    127.0.0.1:49687        127.0.0.1:49686        ESTABLISHED
  TCP    127.0.0.1:49778        127.0.0.1:49779        ESTABLISHED
  TCP    127.0.0.1:49779        127.0.0.1:49778        ESTABLISHED
  TCP    127.0.0.1:49794        127.0.0.1:49795        ESTABLISHED
  TCP    127.0.0.1:49795        127.0.0.1:49794        ESTABLISHED
  TCP    127.0.0.1:51721        127.0.0.1:51722        ESTABLISHED
  TCP    127.0.0.1:51722        127.0.0.1:51721        ESTABLISHED
  TCP    127.0.0.1:51723        127.0.0.1:51724        ESTABLISHED
  TCP    127.0.0.1:51724        127.0.0.1:51723        ESTABLISHED
  TCP    127.0.0.1:63222        127.0.0.1:63223        ESTABLISHED
  TCP    127.0.0.1:63223        127.0.0.1:63222        ESTABLISHED
  TCP    127.0.0.1:64174        127.0.0.1:64175        ESTABLISHED
  TCP    127.0.0.1:64175        127.0.0.1:64174        ESTABLISHED
  TCP    192.168.43.31:50964    52.149.21.60:443       ESTABLISHED
  TCP    192.168.43.31:51277    52.149.21.60:443       ESTABLISHED
  TCP    192.168.43.31:51278    77.74.181.72:443       ESTABLISHED
  TCP    192.168.43.31:51306    20.48.31.18:443        ESTABLISHED
  TCP    192.168.43.31:51307    20.48.31.18:443        ESTABLISHED
  TCP    192.168.43.31:62121    20.197.71.89:443       ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:49230  [2404:6800:4003:c04::bc]:5228  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:51308  [2606:2800:147:ff8:129b:22eb:20b:1347]:443  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:51784  [2a01:111:f100:7000::6fdd:54a1]:443  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:55828  [2404:6800:4003:c04::bc]:5228  ESTABLISHED
```

netstat -a

The netstat -a command displays all active and inactive connections, and the TCP and UDP ports the device is currently listening.

```
C:\Users\Jomesh>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:445            DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:808            DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:3306           DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:5040           DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:33060          DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:49664          DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:49665          DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:49666          DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:49667          DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:49668          DESKTOP-AM6NOK6:0      LISTENING
  TCP    0.0.0.0:49670          DESKTOP-AM6NOK6:0      LISTENING
  TCP    127.0.0.1:5354         DESKTOP-AM6NOK6:0      LISTENING
  TCP    127.0.0.1:5939         DESKTOP-AM6NOK6:0      LISTENING
  TCP    127.0.0.1:10000        DESKTOP-AM6NOK6:0      LISTENING
  TCP    127.0.0.1:49671        DESKTOP-AM6NOK6:49672  ESTABLISHED
  TCP    127.0.0.1:49672        DESKTOP-AM6NOK6:49671  ESTABLISHED
  TCP    127.0.0.1:49673        DESKTOP-AM6NOK6:49674  ESTABLISHED
  TCP    127.0.0.1:49674        DESKTOP-AM6NOK6:49673  ESTABLISHED
  TCP    127.0.0.1:49675        DESKTOP-AM6NOK6:49676  ESTABLISHED
  TCP    127.0.0.1:49676        DESKTOP-AM6NOK6:49675  ESTABLISHED
  TCP    127.0.0.1:49679        DESKTOP-AM6NOK6:0      LISTENING
  TCP    127.0.0.1:49686        DESKTOP-AM6NOK6:49687  ESTABLISHED
  TCP    127.0.0.1:49687        DESKTOP-AM6NOK6:49686  ESTABLISHED
  TCP    127.0.0.1:49778        DESKTOP-AM6NOK6:49779  ESTABLISHED
  TCP    127.0.0.1:49779        DESKTOP-AM6NOK6:49778  ESTABLISHED
  TCP    127.0.0.1:49794        DESKTOP-AM6NOK6:49795  ESTABLISHED
  TCP    127.0.0.1:49795        DESKTOP-AM6NOK6:49794  ESTABLISHED
  TCP    127.0.0.1:51721        DESKTOP-AM6NOK6:51722  ESTABLISHED
  TCP    127.0.0.1:51722        DESKTOP-AM6NOK6:51721  ESTABLISHED
  TCP    127.0.0.1:51723        DESKTOP-AM6NOK6:51724  ESTABLISHED
  TCP    127.0.0.1:51724        DESKTOP-AM6NOK6:51723  ESTABLISHED
  TCP    127.0.0.1:63222        DESKTOP-AM6NOK6:63223  ESTABLISHED
  TCP    127.0.0.1:63223        DESKTOP-AM6NOK6:63222  ESTABLISHED
  TCP    127.0.0.1:63627        DESKTOP-AM6NOK6:63628  ESTABLISHED
  TCP    127.0.0.1:63628        DESKTOP-AM6NOK6:63627  ESTABLISHED
  TCP    127.0.0.1:64174        DESKTOP-AM6NOK6:64175  ESTABLISHED
  TCP    127.0.0.1:64175        DESKTOP-AM6NOK6:64174  ESTABLISHED
  TCP    192.168.43.31:139      DESKTOP-AM6NOK6:0      LISTENING
  TCP    192.168.43.31:50964    52.149.21.60:https     ESTABLISHED
  TCP    192.168.43.31:51277    52.149.21.60:https     ESTABLISHED
```

```
  TCP    192.168.43.31:63082    40.115.154.222:https   ESTABLISHED
  TCP    192.168.43.31:63088    204.79.197.222:https   ESTABLISHED
  TCP    192.168.43.31:63091    13.107.6.254:https     ESTABLISHED
  TCP    192.168.43.31:63092    77.74.181.72:https     ESTABLISHED
  TCP    192.168.56.1:139       DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:135               DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:445               DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:808               DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:3306              DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:33060             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:49664             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:49665             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:49666             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:49667             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:49668             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::]:49670             DESKTOP-AM6NOK6:0      LISTENING
  TCP    [::1]:49669            DESKTOP-AM6NOK6:0      LISTENING
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:49230  si-in-f188:5228        ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:51309  [2a01:111:f100:7000::6fdd:54a1]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:55828  si-in-f188:5228        ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63083  [2606:2800:147:ff8:129b:22eb:20b:1347]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63084  [2620:1ec:c11::200]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63085  [2620:1ec:c11::200]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63086  [2603:1046:900::2]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63087  [2620:1ec:c11::200]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63089  [2620:1ec:8f8::254]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63090  [2620:1ec:bdf::254]:https  ESTABLISHED
  TCP    [2409:4073:4e91:f1c:44d3:261b:fa4:3496]:63382  whatsapp-cdn6-shv-01-tir2:https  ESTABLISHED
  UDP    0.0.0.0:5050           *:*
  UDP    0.0.0.0:5353           *:*
  UDP    0.0.0.0:5353           *:*
  UDP    0.0.0.0:5353           *:*
  UDP    0.0.0.0:5353           *:*
  UDP    0.0.0.0:5353           *:*
  UDP    0.0.0.0:5355           *:*
  UDP    0.0.0.0:57439          *:*
  UDP    0.0.0.0:57441          *:*
  UDP    0.0.0.0:58540          *:*
  UDP    127.0.0.1:1900         *:*
  UDP    127.0.0.1:54541        *:*
  UDP    127.0.0.1:57438        *:*
  UDP    192.168.43.31:137      *:*
  UDP    192.168.43.31:138      *:*
  UDP    192.168.43.31:1900     *:*
  UDP    192.168.43.31:5353     *:*
  UDP    192.168.43.31:54540    *:*
```

```
  UDP    192.168.56.1:137       *:*
  UDP    192.168.56.1:138       *:*
  UDP    192.168.56.1:1900      *:*
  UDP    192.168.56.1:5353      *:*
  UDP    192.168.56.1:5353      *:*
  UDP    192.168.56.1:54539     *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5355              *:*
  UDP    [::]:57440             *:*
  UDP    [::]:57442             *:*
  UDP    [::]:58540             *:*
  UDP    [::1]:1900             *:*
  UDP    [::1]:5353             *:*
  UDP    [::1]:54538            *:*
  UDP    [fe80::441b:55b6:1e0e:10d%21]:1900  *:*
  UDP    [fe80::441b:55b6:1e0e:10d%21]:54537  *:*
  UDP    [fe80::49f1:33a8:2aed:21ef%11]:1900  *:*
  UDP    [fe80::49f1:33a8:2aed:21ef%11]:54536  *:*

C:\Users\Jomesh>
```

netstat -b

The netstat -b command lists all the executables (applications) associated with each connection. Sometimes, applications may open multiple connections.

```
C:\Users\Jomesh>netstat -b
The requested operation requires elevation.
```

netstat -e

The netstat -e command generates a statistic of the network interface, which shows information like the number of bytes, unicast and non-unicast sent and received packets. You can also see discarded packets and errors and unknown protocols, which can you troubleshoot networking problems.

```
C:\Users\Jomesh>netstat -e
Interface Statistics

                           Received            Sent

Bytes                     328111048        47070496
Unicast packets              322232          166592
Non-unicast packets             248            6896
Discards                          0               0
Errors                            0               0
Unknown protocols                 0

C:\Users\Jomesh>
```

3. ipconfig

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. Used without parameters, ipconfig displays Internet Protocol version 4 (IPv4) and IPv6 addresses, subnet mask, and default gateway for all adapters.

PARAMETERS:

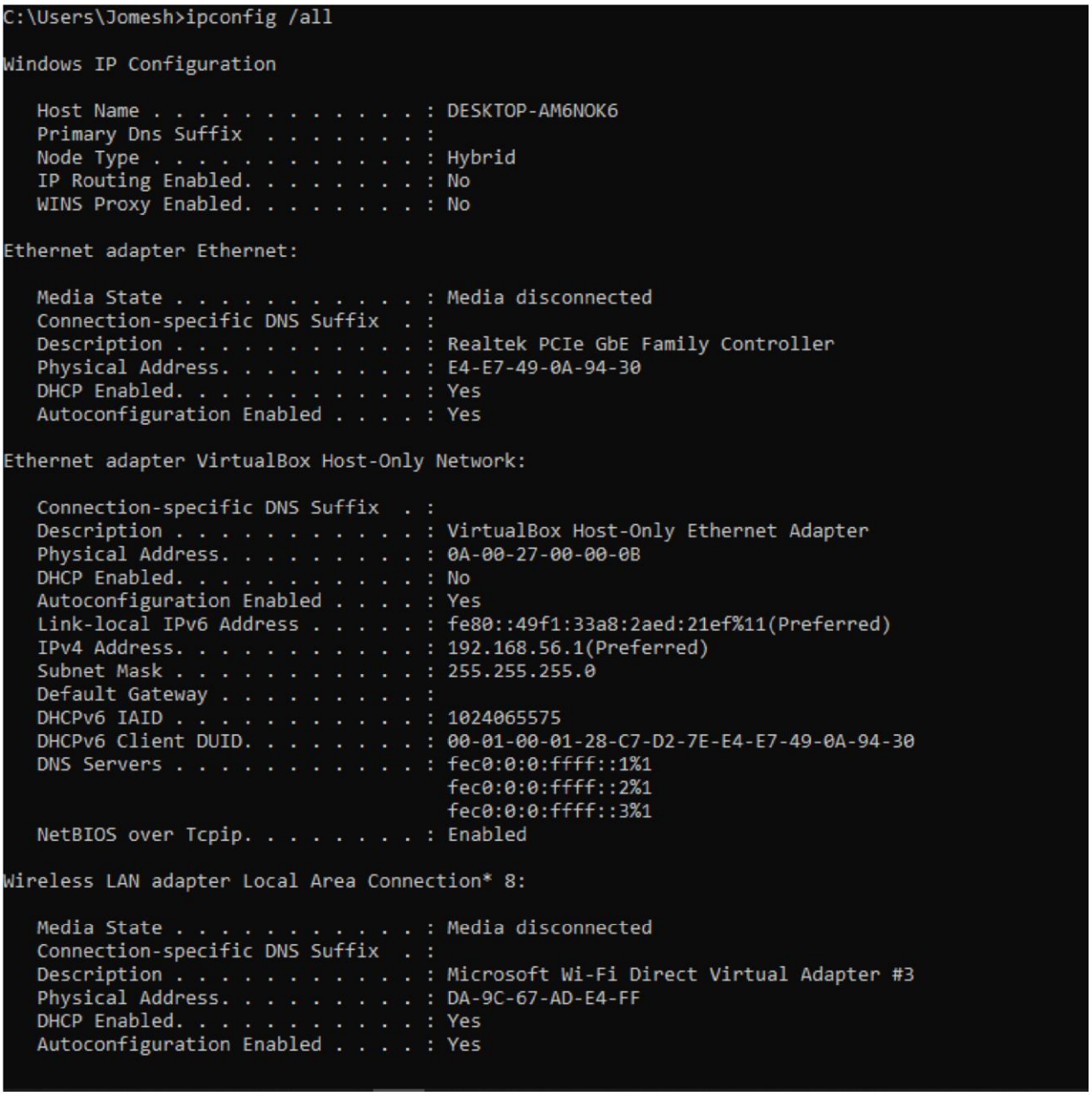
/all: Displays the full TCP/IP configuration for all adapters. Adapters can represent physical interfaces, such as installed network adapters, or logical interfaces, such as dial-up connections.

/displaydns: Displays the contents of the DNS client resolver cache, which includes both entries preloaded from the local Hosts file and any recently obtained resource records for name queries resolved by the computer. The DNS Client

service uses this information to resolve frequently queried names quickly, before querying its configured DNS servers.

/flushdns: Flushes and resets the contents of the DNS client resolver cache. During DNS troubleshooting, you can use this procedure to discard negative cache entries from the cache, as well as any other entries that have been added dynamically.

/registerdns: Initiates manual dynamic registration for the DNS names and IP addresses that are configured at a computer. You can use this parameter to troubleshoot a failed DNS name registration or resolve a dynamic update problem between a client and the DNS server without rebooting the client computer. The DNS settings in the advanced properties of the TCP/IP protocol determine which names are registered in DNS.


C:\Users\Jomesh>ipconfig /all
Windows IP Configuration
Host Name . . . . . : DESKTOP-AM6NOK6
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
Ethernet adapter Ethernet:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Realtek PCIe GbE Family Controller
Physical Address. . . . . : E4-E7-49-0A-94-30
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Ethernet adapter VirtualBox Host-Only Network:
Connection-specific DNS Suffix . :
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-0B
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::49f1:33a8:2aed:21ef%11(Preferred)
IPv4 Address. . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 1024065575
DHCPv6 Client DUID. . . . . : 00-01-00-01-28-C7-D2-7E-E4-E7-49-0A-94-30
DNS Servers . . . . . : fec0:0:0:ffff::1%1
fec0:0:0:ffff::2%1
fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled
Wireless LAN adapter Local Area Connection* 8:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #3
Physical Address. . . . . : DA-9C-67-AD-E4-FF
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

```
Wireless LAN adapter Local Area Connection* 12:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #4
   Physical Address. . . . . . . . . : D8-9C-67-AD-E4-FF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Kaspersky Security Data Escort Adapter
   Physical Address. . . . . . . . . : 00-FF-79-1D-DF-07
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek RTL8723DE 802.11b/g/n PCIe Adapter
   Physical Address. . . . . . . . . : D8-9C-67-AD-E4-FF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   IPv6 Address. . . . . . . . . . . : 2409:4073:4e91:f1c:441b:55b6:1e0e:10d(Preferred)
   Temporary IPv6 Address. . . . . . : 2409:4073:4e91:f1c:44d3:261b:fa4:3496(Preferred)
   Link-local IPv6 Address . . . . . : fe80::441b:55b6:1e0e:10d%21(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.43.31(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Monday, September 13, 2021 10:51:20 PM
   Lease Expires . . . . . . . . . . : Tuesday, September 14, 2021 1:17:02 AM
   Default Gateway . . . . . . . . . : fe80::866f:ceff:fe77:9443%21
                                       192.168.43.1
   DHCP Server . . . . . . . . . . . : 192.168.43.1
   DHCPv6 IAID . . . . . . . . . . . : 517512295
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-28-C7-D2-7E-E4-E7-49-0A-94-30
   DNS Servers . . . . . . . . . . . : 192.168.43.1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

```
C:\Users\Jomesh>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::49f1:33a8:2aed:21ef%11
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 8:

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

Wireless LAN adapter Local Area Connection* 12:

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

Ethernet adapter Ethernet 2:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4073:4e91:f1c:441b:55b6:1e0e:10d
   Temporary IPv6 Address. . . . . . : 2409:4073:4e91:f1c:44d3:261b:fa4:3496
   Link-local IPv6 Address . . . . . : fe80::441b:55b6:1e0e:10d%21
   IPv4 Address. . . . . . . . . . . : 192.168.43.31
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::866f:ceff:fe77:9443%21
                                       192.168.43.1

C:\Users\Jomesh>
```

Other Networking Commands

1. Hostname Command

A very simple command that displays the host name of your machine. This is much quicker than going to the control **panel>system** route.

2. getmac Command

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

3.arp Command

This is used for showing the address resolution cache. This command must be used with a command line switch arp -a is the most common.

4. Nbtstat

Diagnostic tool for troubleshooting netBIOS problems.

5. Net Command

Used for managing users,service,shares etc..

```
C:\Users\Jomesh>net
The syntax of this command is:

NET
    [ ACCOUNTS | COMPUTER | CONFIG | CONTINUE | FILE | GROUP | HELP |
      HELPMSG | LOCALGROUP | PAUSE | SESSION | SHARE | START |
      STATISTICS | STOP | TIME | USE | USER | VIEW ]

C:\Users\Jomesh>hostname
DESKTOP-AM6NOK6
```

```
C:\Users\Jomesh>nbtstat

Displays protocol statistics and current TCP/IP connections using NBT
(NetBIOS over TCP/IP).

NBTSTAT [ [-a RemoteName] [-A IP address] [-c] [-n]
        [-r] [-R] [-RR] [-s] [-S] [interval] ]

  -a   (adapter status) Lists the remote machine's name table given its name
  -A   (Adapter status) Lists the remote machine's name table given its
                        IP address.
  -c   (cache)          Lists NBT's cache of remote [machine] names and their IP addresses
```

```
C:\Users\Jomesh>getmac

Physical Address    Transport Name
=================== ==========================================================
00-FF-79-1D-DF-07   Media disconnected
E4-E7-49-0A-94-30   Media disconnected
D8-9C-67-AD-E4-FF   \Device\Tcpip_{E60C01C2-A7B0-43EA-9E43-92132DE3EE3A}
0A-00-27-00-00-0B   \Device\Tcpip_{77EA1EF7-8E1F-47DA-AEDB-E1DF5B641A09}

C:\Users\Jomesh>arp -a

Interface: 192.168.56.1 --- 0xb
  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

Interface: 192.168.43.31 --- 0x15
  Internet Address      Physical Address      Type
  192.168.43.1          84-6f-ce-77-94-43     dynamic
  192.168.43.255        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

C:\Users\Jomesh>
```

LINUX

Ifconfig: ifconfig is used to configure, or view the configuration of, a network interface.

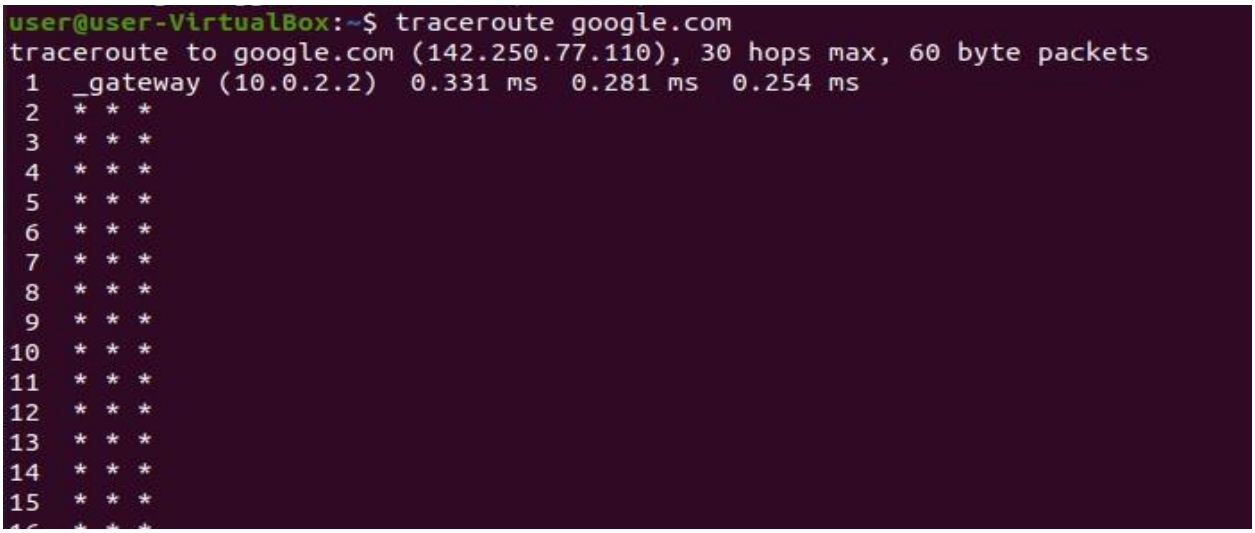
```
user@user-VirtualBox:~$ ifconfig -s
Iface      MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500     8937      0      0 0          3079      0      0      0 BMRU
lo       65536      280      0      0 0           280      0      0      0 LRU
```

```
user@user-VirtualBox:~$ 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::5272:a3a:18e0:6bad  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:f1:ba:b3  txqueuelen 1000  (Ethernet)
        RX packets 8937  bytes 12344821 (12.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3079  bytes 252253 (252.2 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 280  bytes 25208 (25.2 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 280  bytes 25208 (25.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
user@user-VirtualBox:~$ 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::5272:a3a:18e0:6bad  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:f1:ba:b3  txqueuelen 1000  (Ethernet)
        RX packets 9068  bytes 12400537 (12.4 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3299  bytes 269260 (269.2 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 353  bytes 31368 (31.3 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 353  bytes 31368 (31.3 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Traceroute:

traceroute command in Linux prints the route that a packet takes to reach the host.



Netstat:

The network statistics (netstat) command is a networking tool used for troubleshooting and configuration, that can also serve as a monitoring tool for connections over the network.

```
user@user-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 user-VirtualBox:44278   17.111.232.35.bc.g:http TIME_WAIT
udp        0      0 user-VirtualBox:bootpc  _gateway:bootps         ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    26569    /run/user/1000/syste
md/notify
unix  2      [ ]         DGRAM                    15157    /run/systemd/journal
/syslog
unix  16     [ ]         DGRAM                    15167    /run/systemd/journal
/dev-log
unix  8      [ ]         DGRAM                    15171    /run/systemd/journal
/socket
unix  3      [ ]         DGRAM                    15143    /run/systemd/notify
unix  3      [ ]         STREAM     CONNECTED     28193
unix  3      [ ]         STREAM     CONNECTED     32393    /run/dbus/system_bus
_socket
unix  3      [ ]         STREAM     CONNECTED     20715    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     27661    /run/dbus/system_bus
_socket
unix  3      [ ]         STREAM     CONNECTED     31622    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     31175
unix  3      [ ]         STREAM     CONNECTED     28019
unix  3      [ ]         STREAM     CONNECTED     32390
unix  3      [ ]         STREAM     CONNECTED     27536    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     31892    /run/dbus/system_bus
```

```
_socket
unix  3      [ ]         STREAM     CONNECTED     31128
unix  3      [ ]         STREAM     CONNECTED     29958    @/home/user/.cache/i
bus/dbus-PUnhv0ER
unix  3      [ ]         STREAM     CONNECTED     33553    @/tmp/dbus-gm7tLbCen
C
unix  3      [ ]         STREAM     CONNECTED     27660
unix  2      [ ]         DGRAM                    22447
unix  3      [ ]         STREAM     CONNECTED     32003    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     31039    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     28021    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     33625    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     26892
unix  3      [ ]         STREAM     CONNECTED     27647
unix  3      [ ]         STREAM     CONNECTED     31900
unix  3      [ ]         STREAM     CONNECTED     31084    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     28058
unix  3      [ ]         STREAM     CONNECTED     30527    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     32392
unix  2      [ ]         DGRAM                    15894
unix  3      [ ]         STREAM     CONNECTED     27535
unix  3      [ ]         STREAM     CONNECTED     31618    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     31083
unix  3      [ ]         STREAM     CONNECTED     28059    /run/user/1000/bus
```

```
user@user-VirtualBox:~$ netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 0.0.0.0:37205           0.0.0.0:*
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 user-VirtualBox:bootpc  _gateway:bootps         ESTABLISHED
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:37558              [::]:*
user@user-VirtualBox:~$ 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
tcp        0      0 user-VirtualBox:44278   17.111.232.35.bc.g:http TIME_WAIT
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 0.0.0.0:37205           0.0.0.0:*
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 user-VirtualBox:bootpc  _gateway:bootps         ESTABLISHED
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:37558              [::]:*
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (servers and established)
```

```
user@user-VirtualBox:~$ netstat -at
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
```

Nslookup: Nslookup (stands for “Name Server Lookup”) is a useful command for getting information from DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record.

```
user@user-VirtualBox:~$ nslookup
> google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.77.110
Name:   google.com
Address: 2404:6800:4007:816::200e
```

```
user@user-VirtualBox:~$ nslookup -type=any google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.77.174
Name:   google.com
Address: 2404:6800:4007:816::200e
google.com
        origin = ns1.google.com
        mail addr = dns-admin.google.com
        serial = 396553081
        refresh = 900
        retry = 900
        expire = 1800
        minimum = 60
google.com      nameserver = ns1.google.com.
google.com      nameserver = ns3.google.com.
google.com      nameserver = ns4.google.com.
google.com      nameserver = ns2.google.com.

Authoritative answers can be found from:
```

Ping:

PING (Packet Internet Groper) command is used to check the network connectivity between host and server/host.

```
user@user-VirtualBox:~$ ping aesajce.in
PING aesajce.in (103.120.179.46) 56(84) bytes of data.
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=1 ttl=49 tim
e=112 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=2 ttl=49 tim
e=113 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=3 ttl=49 tim
e=96.7 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=4 ttl=49 tim
e=96.2 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=5 ttl=49 tim
e=97.2 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=6 ttl=49 tim
e=85.9 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=7 ttl=49 tim
e=107 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=8 ttl=49 tim
e=107 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=9 ttl=49 tim
e=113 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=10 ttl=49 ti
me=86.3 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=11 ttl=49 ti
me=88.5 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=12 ttl=49 ti
me=126 ms
64 bytes from newvps.greenmatrimony.com (103.120.179.46): icmp_seq=13 ttl=49 ti
me=91.8 ms
```

Other Networking Commands

ip route

Use the IP route to print or display the routing table. The following command displays the contents of the routing table:

```
user@user-VirtualBox:~$ ip route show
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
```

nmap:

nmap (“Network Mapper”) is a powerful utility used for network discovery, security auditing, and administration. Many system admins use it to determine which of their systems are online, and also for OS detection and service detection.

```
user@user-VirtualBox:~$ nmap 10.0.0.05
Starting Nmap 7.92 ( https://nmap.org ) at 2021-09-14 21:42 IST
Note: Host seems down. If it is really up, but blocking our ping probes, try -P
n
Nmap done: 1 IP address (0 hosts up) scanned in 3.25 seconds
```

ipref:

While ping verifies the availability of a host, iPerf helps analyze and measure network performance between two hosts. With iPerf, you open a connection between two hosts and send some data. iPerf then shows the bandwidth available between the two hosts.

```
user@user-VirtualBox:~$ iperf -s
------------------------------------------------------------
Server listening on TCP port 5001
TCP window size:  128 KByte (default)
------------------------------------------------------------
```

dig: dig (Domain Information Groper) is a flexible tool for interrogating DNS name servers. It performs DNS lookups and displays the answers that are returned from the name servers.

```
user@user-VirtualBox:~$ dig aesajce.in

; <<>> DiG 9.16.1-Ubuntu <<>> aesajce.in
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52853
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;aesajce.in.                    IN      A

;; ANSWER SECTION:
aesajce.in.             6327    IN      A       103.120.179.46

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Tue Sep 14 21:48:42 IST 2021
;; MSG SIZE  rcvd: 55
```

telnet: telnet connect destination's host and port via a telnet protocol if a connection establishes means connectivity between two hosts is working fine.

```
user@user-VirtualBox:~$ telnet aesajce.in 443
Trying 103.120.179.46...
Connected to aesajce.in.
Escape character is '^]'.
Connection closed by foreign host.
```

Install Apache

.Update your system

sudo apt update

. Install Apache using apt:

sudo apt install apache2

```
user@user-VirtualBox:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
     Active: active (running) since Wed 2021-09-29 12:41:39 IST; 4min 43s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3464 (apache2)
      Tasks: 6 (limit: 1124)
     Memory: 15.2M
     CGroup: /system.slice/apache2.service
             ├─3464 /usr/sbin/apache2 -k start
             ├─3496 /usr/sbin/apache2 -k start
             ├─3497 /usr/sbin/apache2 -k start
             ├─3498 /usr/sbin/apache2 -k start
             ├─3499 /usr/sbin/apache2 -k start
             └─3500 /usr/sbin/apache2 -k start

Sep 29 12:41:38 user-VirtualBox systemd[1]: Starting The Apache HTTP Server...
Sep 29 12:41:39 user-VirtualBox apachectl[3463]: AH00558: apache2: Could not r>
Sep 29 12:41:39 user-VirtualBox systemd[1]: Started The Apache HTTP Server.
lines 1-18/18 (END)
```

. Confirm that Apache is now running with the following command:

sudo systemctl status apache2

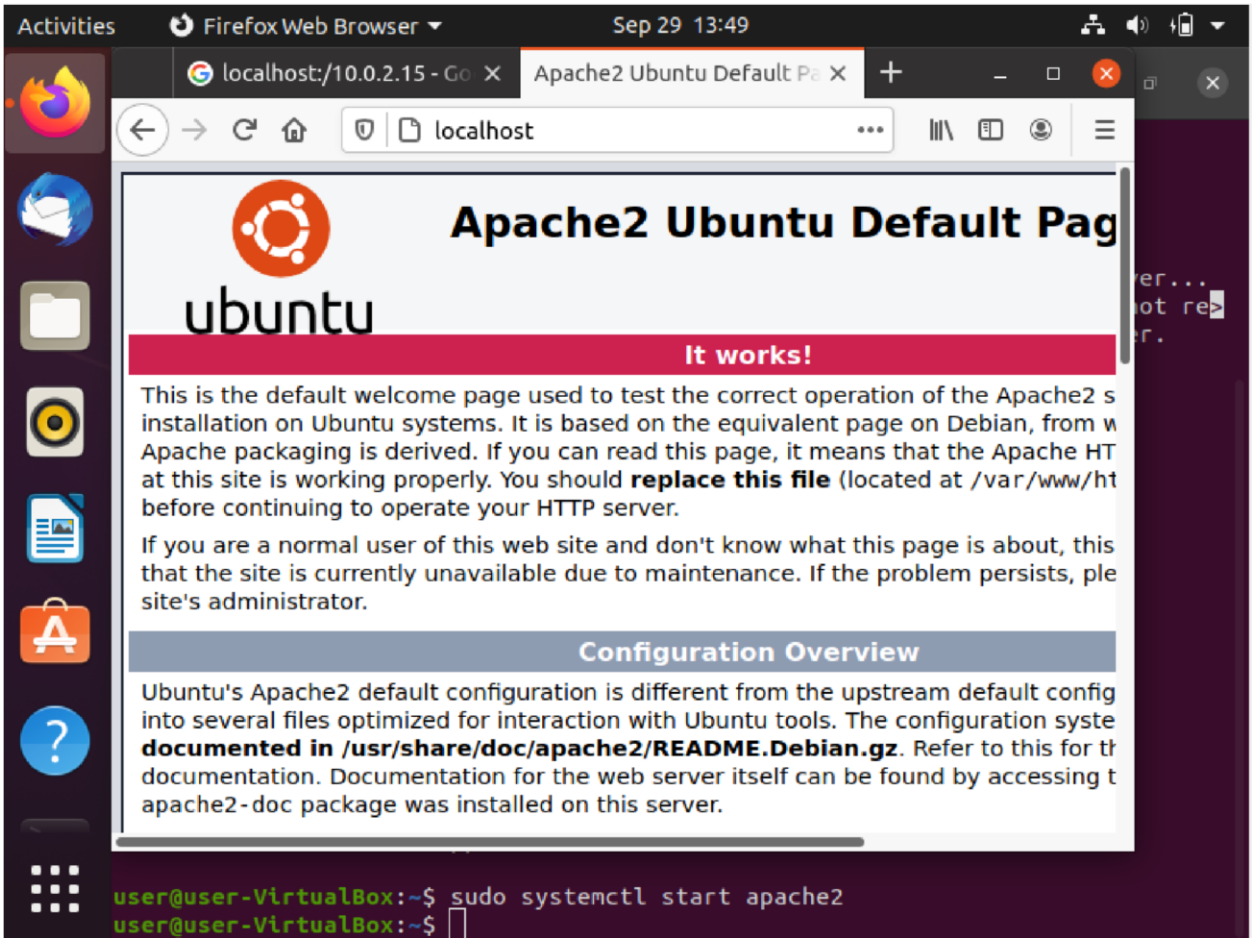
if it is not working sudo

systemctl start apache2

Once installed, test by accessing your server's IP in your browser:

http://youripaddress

(find out your ipaddress using iffconfig)

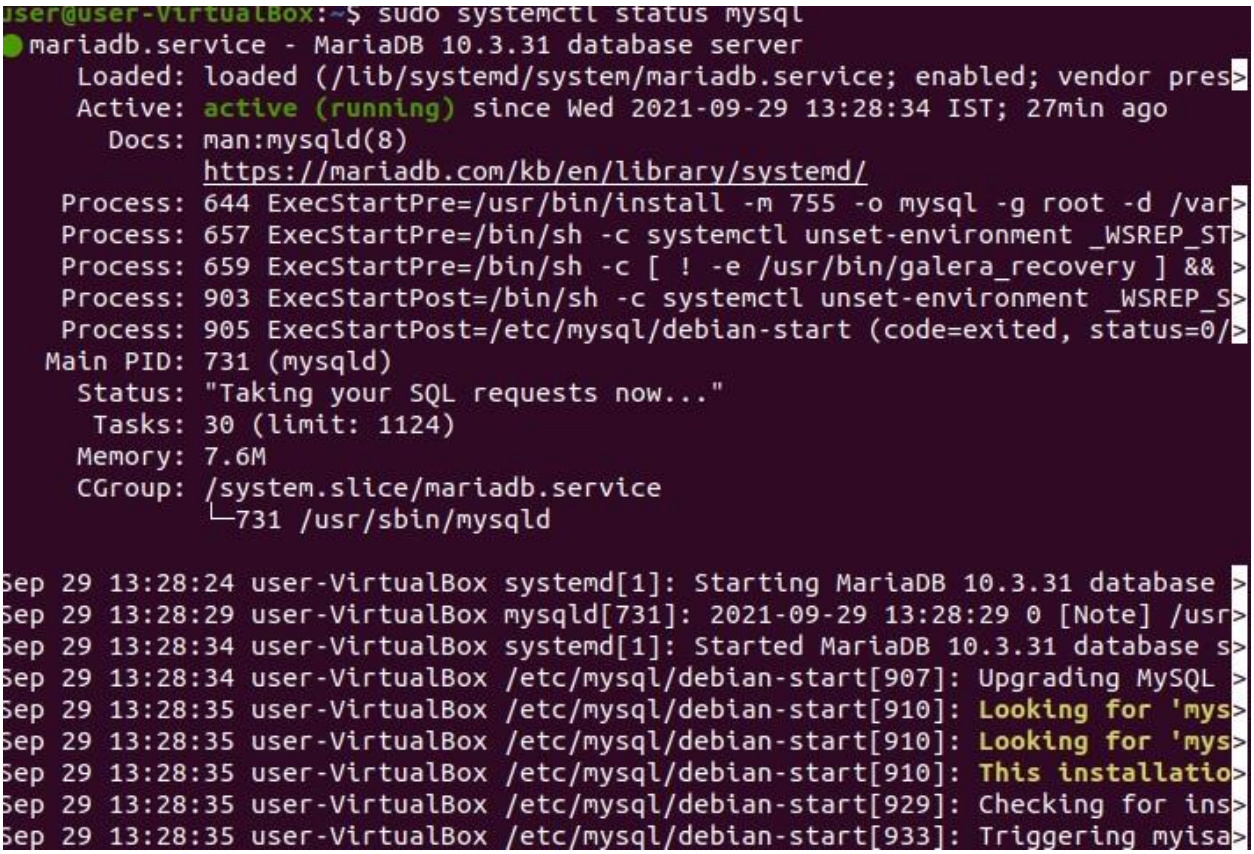


2.Install mariaDB sudo apt install mariadb-

server mariadb-client **Check mariadb**

Installation sudo systemctl status mysql

(if it is not working sudo systemctl start mysql)



3.Install PHP and commonly used modules sudo

apt install php libapache2-mod-php php-opcache php-

cli php-gd php-curl php-mysql **Restart apache2**

sudo systemctl restart apache2

Now you can check php installation sudo echo

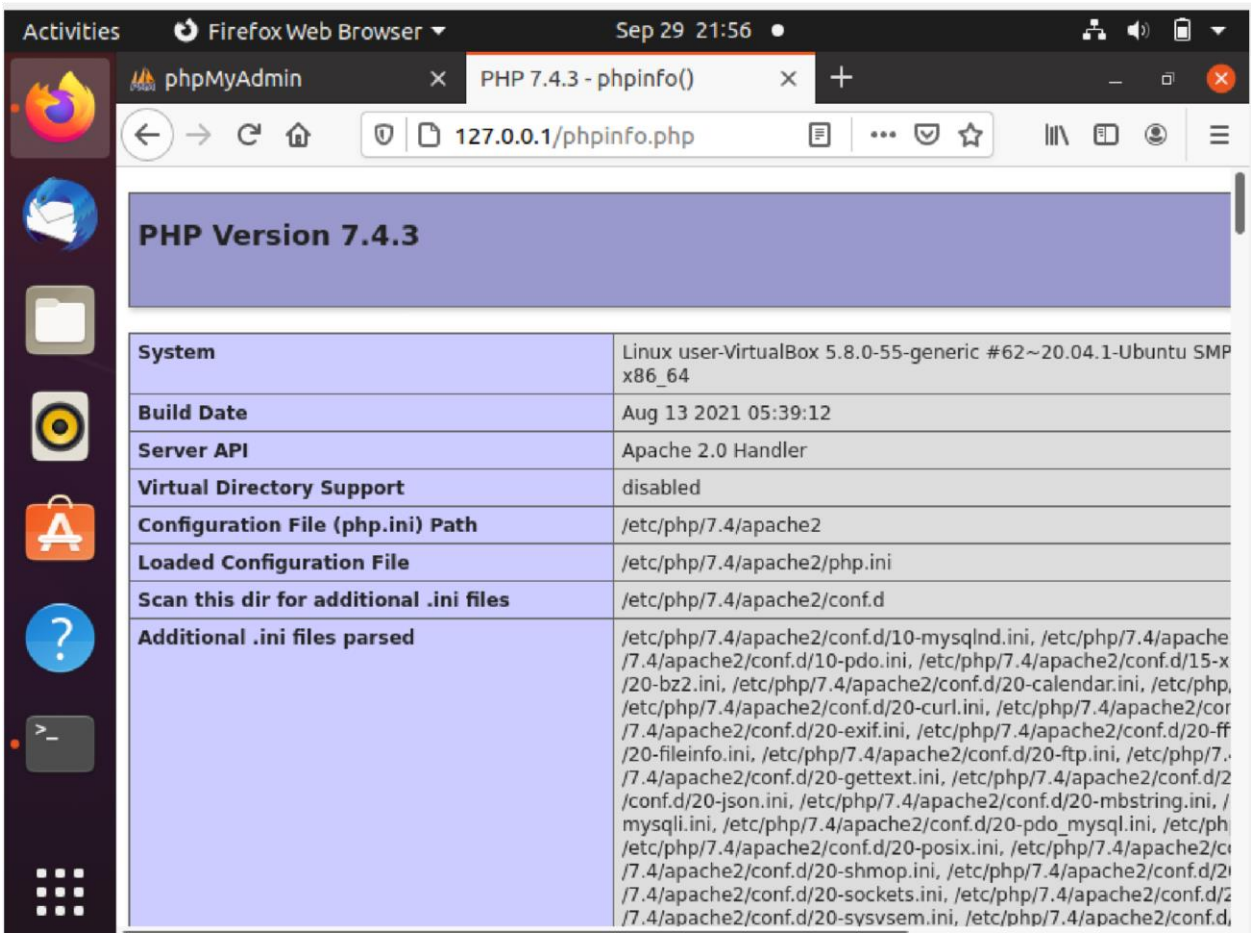
“<?php phpinfo(); ?>” | sudo tee -a

/var/www/html/phpinfo.php > /dev/null

```
user@user-VirtualBox:~$ sudo echo "<?php phpinfo();" ?>|sudo tee -a /var/www/ht
ml/phpinfo.php> /dev/null
user@user-VirtualBox:~$
```

Open a browser

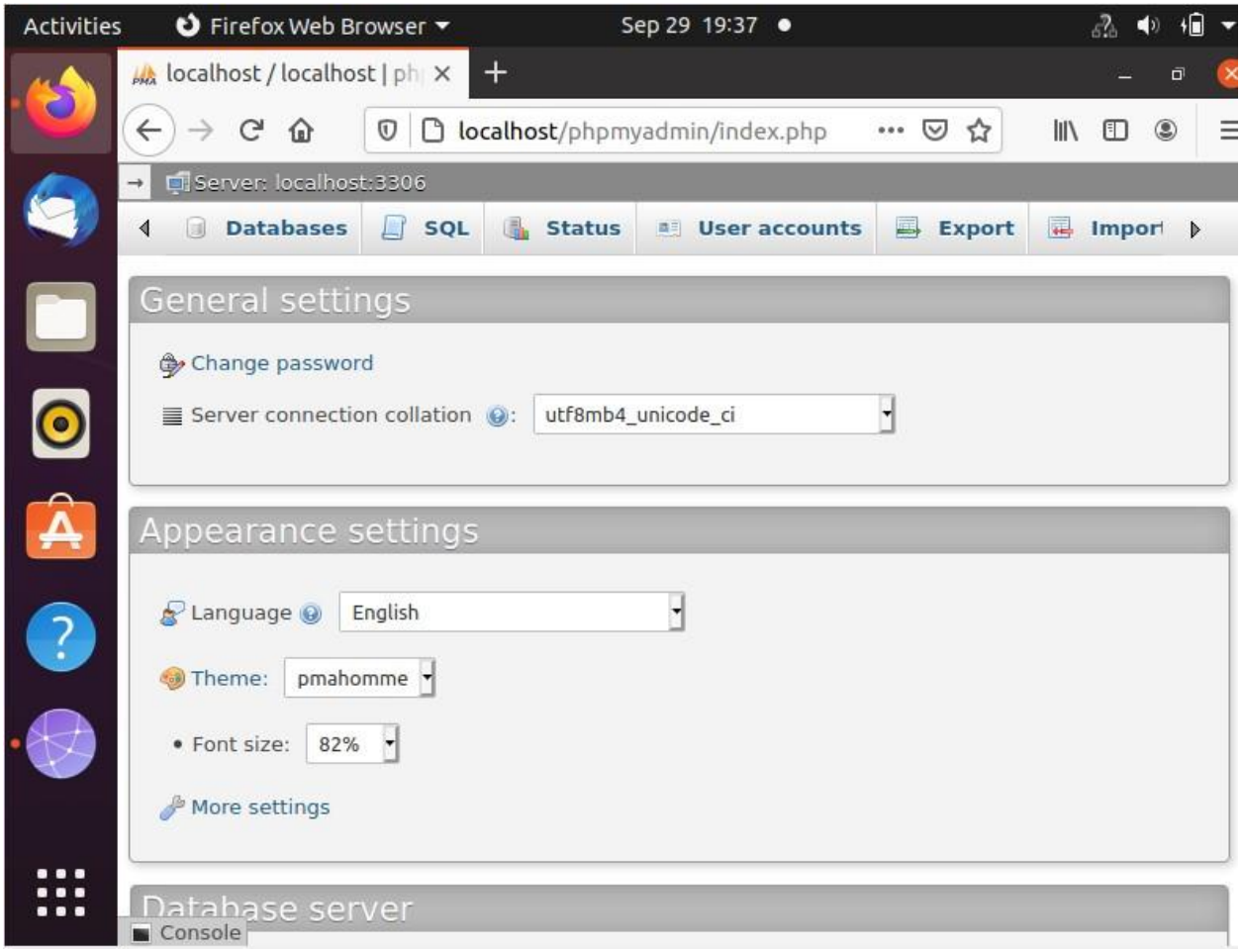
http://127.0.0.1/phpinfo.php



Check phpmyadmin

Open a browser

http://localhost/phpmyadmi



n username : root password :

yourpassword

Ansible installation

- sudo apt install ansible

```
user@user-VirtualBox:~$ sudo apt install ansible
[sudo] password for user:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-lib2to3 python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmltodict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
The following NEW packages will be installed:
  ansible ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmltodict
```

Check the version

- ansible --version

```
user@user-VirtualBox:~$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/user/.ansible/plugins/modules', '/usr
/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.5 (default, Jul 28 2020, 12:59:40) [GCC 9.3.0]
```

Tcpdump Installation

On Debian based distributions tcpdump can be installed with the APT command: **Sudo apt install tcpdump**

```
jomeesh@jomeesh-VirtualBox:~$ sudo apt install tcpdump
[sudo] password for jomeesh:
Sorry, try again.
[sudo] password for jomeesh:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tcpdump is already the newest version (4.9.3-0ubuntu0.18.04.1).
tcpdump set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 14 not upgraded.
```

tcpdump command options

You need to be root to run tcpdump. It includes manyoptions and filters. Running tcpdump without any options will capture all packets flowing through the default interface. To see the list of network interfaces available on the system and on which tcpdump can capture packets.

sudo tcpdump -D

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -D
1.enp0s3 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.nflog (Linux netfilter log (NFLOG) interface)
5.nfqueue (Linux netfilter queue (NFQUEUE) interface)
6.usbmon1 (USB bus number 1)
```

host filter

To capture all

packets arriving at or

leaving from the host

with IP address of

10.0.2.15:

Sudo tcpdump host 10.0.2.15

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump host 10.0.2.15
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
23:49:16.984098 IP jomeesh-VirtualBox.56924 > maa05s23-in-f3.1e100.net.https: F
lags [P.], seq 3584982814:3584982853, ack 157595358, win 63020, length 39
23:49:16.985332 IP maa05s23-in-f3.1e100.net.https > jomeesh-VirtualBox.56924: F
lags [.], ack 39, win 65535, length 0
23:49:17.006757 IP jomeesh-VirtualBox.59750 > 192.168.43.1.domain: 2301+ PTR? 2
27.183.250.142.in-addr.arpa. (46)
23:49:17.083424 IP maa05s23-in-f3.1e100.net.https > jomeesh-VirtualBox.56924: F
lags [P.], seq 1:40, ack 39, win 65535, length 39
23:49:17.083448 IP jomeesh-VirtualBox.56924 > maa05s23-in-f3.1e100.net.https: F
lags [.], ack 40, win 63020, length 0
23:49:17.108073 IP 192.168.43.1.domain > jomeesh-VirtualBox.59750: 2301 1/0/0 P
TR maa05s23-in-f3.1e100.net. (84)
23:49:17.109249 IP jomeesh-VirtualBox.52086 > 192.168.43.1.domain: 10715+ PTR?
15.2.0.10.in-addr.arpa. (40)
23:49:17.199503 IP jomeesh-VirtualBox.57852 > 192.168.43.1.domain: 19944+ PTR?
1.43.168.192.in-addr.arpa. (43)
23:49:17.299899 IP 192.168.43.1.domain > jomeesh-VirtualBox.57852: 19944 NXDoma
in* 0/1/0 (102)
^C
9 packets captured
10 packets received by filter
1 packet dropped by kernel
```

sudo tcpdump –I enp0s3 –c 5 port 80

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -i enp0s3 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
23:53:47.055282 IP jomeesh-VirtualBox.59472 > maa05s21-in-f3.1e100.net.http: Fl
ags [S], seq 1456252255, win 64240, options [mss 1460,sackOK,TS val 2718275823
ecr 0,nop,wscale 7], length 0
23:53:47.058737 IP jomeesh-VirtualBox.59474 > maa05s21-in-f3.1e100.net.http: Fl
ags [S], seq 4170340090, win 64240, options [mss 1460,sackOK,TS val 2718275827
ecr 0,nop,wscale 7], length 0
23:53:47.185788 IP maa05s21-in-f3.1e100.net.http > jomeesh-VirtualBox.59472: Fl
ags [S.], seq 201344001, ack 1456252256, win 65535, options [mss 1460], length
0
23:53:47.185844 IP jomeesh-VirtualBox.59472 > maa05s21-in-f3.1e100.net.http: Fl
ags [.], ack 1, win 64240, length 0
23:53:47.188189 IP jomeesh-VirtualBox.59472 > maa05s21-in-f3.1e100.net.http: Fl
ags [P.], seq 1:425, ack 1, win 64240, length 424: HTTP: POST /gts1c3 HTTP/1.1
5 packets captured
12 packets received by filter
5 packets dropped by kernel
```

Sudo tcpdump –n net 10.0

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -n net 10.0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
23:56:41.904760 IP 142.250.77.98.443 > 10.0.2.15.45406: Flags [F.], seq 2018633
70, ack 3666071224, win 65535, length 0
23:56:41.904801 IP 10.0.2.15.45406 > 142.250.77.98.443: Flags [.], ack 1, win 6
2780, length 0
23:56:42.630367 IP 10.0.2.15.33310 > 142.250.196.2.443: Flags [P.], seq 3465633
382:3465633421, ack 202053044, win 63020, length 39
23:56:42.631436 IP 142.250.196.2.443 > 10.0.2.15.33310: Flags [.], ack 39, win
65535, length 0
23:56:42.633244 IP 10.0.2.15.33310 > 142.250.196.2.443: Flags [P.], seq 39:63,
ack 1, win 63020, length 24
23:56:42.633837 IP 142.250.196.2.443 > 10.0.2.15.33310: Flags [.], ack 63, win
65535, length 0
23:56:42.635213 IP 10.0.2.15.33310 > 142.250.196.2.443: Flags [F.], seq 63, ack
 1, win 63020, length 0
23:56:42.636404 IP 142.250.196.2.443 > 10.0.2.15.33310: Flags [.], ack 64, win
65535, length 0
23:56:42.812978 IP 142.250.196.2.443 > 10.0.2.15.33310: Flags [F.], seq 1, ack
64, win 65535, length 0
23:56:42.813020 IP 10.0.2.15.33310 > 142.250.196.2.443: Flags [.], ack 2, win 6
3020, length 0
^C
10 packets captured
12 packets received by filter
0 packets dropped by kernel
jomeesh@jomeesh-VirtualBox:~$
```

Sudo tcpdump –n –I enp0s3 src 10.0.2.15 and dst port 80

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -n -i enp0s3 src 10.0.2.15 and dst p
ort 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
00:01:05.774991 IP 10.0.2.15.59516 > 142.250.182.99.80: Flags [S], seq 75374147
1, win 64240, options [mss 1460,sackOK,TS val 2718714543 ecr 0,nop,wscale 7], l
ength 0
00:01:05.776307 IP 10.0.2.15.59518 > 142.250.182.99.80: Flags [S], seq 24370261
75, win 64240, options [mss 1460,sackOK,TS val 2718714544 ecr 0,nop,wscale 7],
length 0
00:01:06.026012 IP 10.0.2.15.59520 > 142.250.182.99.80: Flags [S], seq 12158807
64, win 64240, options [mss 1460,sackOK,TS val 2718714794 ecr 0,nop,wscale 7],
length 0
00:01:06.026838 IP 10.0.2.15.59522 > 142.250.182.99.80: Flags [S], seq 42796846
80, win 64240, options [mss 1460,sackOK,TS val 2718714795 ecr 0,nop,wscale 7],
length 0
00:01:06.047786 IP 10.0.2.15.59516 > 142.250.182.99.80: Flags [.], ack 25708800
2, win 64240, length 0
00:01:06.048800 IP 10.0.2.15.59516 > 142.250.182.99.80: Flags [P.], seq 0:425,
ack 1, win 64240, length 425: HTTP: POST /gts1c3 HTTP/1.1
00:01:06.049314 IP 10.0.2.15.59518 > 142.250.182.99.80: Flags [.], ack 25715200
2, win 64240, length 0
```

Sudo tcpdump –n –I enp0s3 src 10.0.2.15 or dst port 80

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -n -i enp0s3 src 10.0.2.15 or dst po
rt 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
00:04:12.654506 IP 10.0.2.15.50136 > 34.218.33.26.443: Flags [P.], seq 39643984
3:396439880, ack 53187903, win 62780, length 37
00:04:13.027435 IP 10.0.2.15.50136 > 34.218.33.26.443: Flags [.], ack 34, win 6
2780, length 0
00:04:13.441926 IP 10.0.2.15.36076 > 192.168.43.1.53: 31949+ [1au] A? connectiv
ity-check.ubuntu.com. (58)
00:04:13.443369 IP 10.0.2.15.39780 > 192.168.43.1.53: 60807+ [1au] AAAA? connec
tivity-check.ubuntu.com. (58)
00:04:13.452807 IP 10.0.2.15.39780 > 192.168.43.1.53: 54667+ AAAA? connectivity
-check.ubuntu.com. (47)
00:04:13.553677 IP 10.0.2.15.36076 > 192.168.43.1.53: 63736+ A? connectivity-ch
eck.ubuntu.com. (47)
^C
6 packets captured
6 packets received by filter
0 packets dropped by kernel
jomeesh@jomeesh-VirtualBox:~$
```

Sudo tcpdump –I enp0s3 –c 10 –w icmp.pcap

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -i enp0s3 -c 10 -w icmp.pcap
tcpdump: listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144
bytes
10 packets captured
10 packets received by filter
0 packets dropped by kernel
```

Sudo tcpdump –r icmp.pcap

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
00:08:11.689778 IP jomeesh-VirtualBox.51454 > 239.237.117.34.bc.googleuserconte
nt.com.https: Flags [P.], seq 1904521350:1904521389, ack 289153760, win 64028,
length 39
00:08:11.692178 IP 239.237.117.34.bc.googleusercontent.com.https > jomeesh-Virt
ualBox.51454: Flags [.], ack 39, win 65535, length 0
00:08:11.693549 IP jomeesh-VirtualBox.51454 > 239.237.117.34.bc.googleuserconte
nt.com.https: Flags [P.], seq 39:63, ack 1, win 64028, length 24
00:08:11.694179 IP 239.237.117.34.bc.googleusercontent.com.https > jomeesh-Virt
ualBox.51454: Flags [.], ack 63, win 65535, length 0
00:08:11.694993 IP jomeesh-VirtualBox.51454 > 239.237.117.34.bc.googleuserconte
nt.com.https: Flags [F.], seq 63, ack 1, win 64028, length 0
00:08:11.695969 IP 239.237.117.34.bc.googleusercontent.com.https > jomeesh-Virt
ualBox.51454: Flags [.], ack 64, win 65535, length 0
00:08:11.810761 IP 239.237.117.34.bc.googleusercontent.com.https > jomeesh-Virt
ualBox.51454: Flags [F.], seq 1, ack 64, win 65535, length 0
00:08:11.810789 IP jomeesh-VirtualBox.51454 > 239.237.117.34.bc.googleuserconte
nt.com.https: Flags [.], ack 2, win 64028, length 0
00:08:16.851318 ARP, Request who-has _gateway tell jomeesh-VirtualBox, length 2
8
00:08:16.851833 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), leng
th 46
jomeesh@jomeesh-VirtualBox:~$
```

sudo tcpdump -c10 -i enp0s3 -n -A port 80

```
jomeesh@jomeesh-VirtualBox:~$ sudo tcpdump -c 10 -i enp0s3 -n -A port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
00:13:43.441743 IP 10.0.2.15.49296 > 117.18.237.29.80: Flags [S], seq 293433937
1, win 64240, options [mss 1460,sackOK,TS val 2505976566 ecr 0,nop,wscale 7], l
ength 0
E..<..@.@...
...u......P..w+........nm.........
.^*.........
00:13:43.495162 IP 117.18.237.29.80 > 10.0.2.15.49296: Flags [S.], seq 35315200
1, ack 2934339372, win 65535, options [mss 1460], length 0
E..,u...@...u...
....P........w,`.............
00:13:43.495200 IP 10.0.2.15.49296 > 117.18.237.29.80: Flags [.], ack 1, win 64
240, length 0
E..(..@.@...
...u......P..w,....P...nY..
00:13:43.497214 IP 10.0.2.15.49296 > 117.18.237.29.80: Flags [P.], seq 1:423, a
ck 1, win 64240, length 422: HTTP: POST / HTTP/1.1
E.....@.@..O
...u......P..w,....P...o...POST / HTTP/1.1
Host: ocsp.digicert.com
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:92.0) Gecko/20100101 Fir
efox/92.0
Accept: */*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: application/ocsp-request
```

Shell Scripting Lab Assignments

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

screen.

```
#!/bin/bash
echo "enter your name :"
read a
echo "enter college :"
read b
echo "****************"
echo "name is :" $a
echo "college name is :" $b
~
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 1.sh
enter your name :
jomeesh jose
enter college :
Amal jyothi college of engineering kanjirappally
****************
name is : jomeesh jose
college name is : Amal jyothi college of engineering kanjirappally
```

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

line interface.

```
#!/bin/bash
a=10
echo "Display the value "
echo "************"
echo $a
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 2.sh
Display the value
************
10
```

3. Write a shell script to perform addition, substation, multiplication, division

with two numbers that is accepted from user.

```
#!/bin/bash
echo "ARITHMETIC OPERATION"
echo "---------------------"
echo "enter the first number"
read a
echo "enter the second number"
read b
echo "\n1.addition\n2.substraction\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
~
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 3.sh
ARITHMETIC OPERATION
--------------------
enter the first number
2
enter the second number
7
\n1.addition\n2.substraction\n3.multiplication\n4.division
2
a-b =-5
jomeesh@jomeesh-VirtualBox:~$ bash 3.sh
ARITHMETIC OPERATION
--------------------
enter the first number
5
enter the second number
5
\n1.addition\n2.substraction\n3.multiplication\n4.division
1
a+b =10
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 3.sh
ARITHMETIC OPERATION
--------------------
enter the first number
5
enter the second number
5
\n1.addition\n2.substraction\n3.multiplication\n4.division
3
a*b =25
jomeesh@jomeesh-VirtualBox:~$ bash 3.sh
ARITHMETIC OPERATION
--------------------
enter the first number
5
enter the second number
5
\n1.addition\n2.substraction\n3.multiplication\n4.division
4
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.

```
#!/bin/bash
echo "enter the number"
read a
if [ $a == 11 ]
then
  echo "****value is found***"
else
  echo "***value not found***"
fi
~
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 4.sh
enter the number
3
***value not found***
jomeesh@jomeesh-VirtualBox:~$ bash 4.sh
enter the number
11
****value is found***
```

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

```
#!/bin/bash
echo "time and calender"
echo "******************"
echo "today is $(date)"
echo "calender"
cal
~
```

```
jomeesh@jomeesh-VirtualBox:~$ vi 5.sh
jomeesh@jomeesh-VirtualBox:~$ bash 5.sh
time and calender
*****************
today is Sun Oct  3 09:19:24 IST 2021
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
jomeesh@jomeesh-VirtualBox:~$
```

6. Write a shell script to check a number is even or odd.

```
#!/bin/bash
echo "even or odd"
echo "************"
echo "enter the number :"
read a
if [ $(($a%2)) == 0 ]
then
echo "even number"
else
echo "odd number"
fi
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 6.sh
even or odd
************
enter the number :
3
odd number
jomeesh@jomeesh-VirtualBox:~$ bash 6.sh
even or odd
************
enter the number :
4
even number
jomeesh@jomeesh-VirtualBox:~$
```

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

```
#!/bin/bash
echo "enter the number"
read a
echo "enter next number"
read b
if [ $a -gt $b ]
then
echo "$a is greater"
elif [ $a -lt $b ]
then
echo "$b is greater"
else
echo "both are equal"
fi
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 7.sh
enter the number
2
enter next number
2
both are equal
jomeesh@jomeesh-VirtualBox:~$ bash 7.sh
enter the number
3
enter next number
2
3 is greater
jomeesh@jomeesh-VirtualBox:~$
jomeesh@jomeesh-VirtualBox:~$ bash 7.sh
enter the number
2
enter next number
8
8 is greater
```

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

```
#!/bin/bash
echo "sum of 10 numbers"
echo "*****************"
s=0
for (( i=1;i<=10;i++ ))
do
s=`expr $s + $i`
done
echo "sum of 10 digit is $s"
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 8.sh
sum of 10 numbers
*****************
sum of 10 digit is 55
```

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

```
#!/bin/bash
echo "enter the first number"
read a
echo "enter the second number"
read b
echo "enter the third number"
read c
echo "enter the forth number"
read d
sum=$(($a+$b+$c+$d))
avg=$(echo $sum/4|bc -l)
mul=$(($a*$b*$c*$d))
echo "sum is $sum"
echo "average is $avg"
echo "product of number is $mul"
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 9.sh
enter the first number
2
enter the second number
2
enter the third number
2
enter the forth number
2
sum is 8
average is 2.00000000000000000000
product of number is 16
```

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

```
#!/bin/bash
echo "enter the first number"
read a
echo "enter the second number"
read b
echo "enter the third number"
read c
if [ $a -lt $b ]
then
if [ $a -lt $c ]
then
echo "$a is small"
else
echo "$c is small"
fi
elif [ $b -lt $c ]
then
echo "$b is small"
else
echo "$c is small"
fi
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 10.sh
enter the first number
5
enter the second number
2
enter the third number
8
2 is small
```

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

```
#!/bin/bash
echo "enter the number"
read a
fact=1
for ((i=2;i<=a;i++))
do
fact=$((fact* i))
done
echo "factorial is $fact"
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 11.sh
enter the number
3
factorial is 6
```

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

```
#!/bin/bash
echo "enter the number"
read a
rev=$(echo $a | rev)
if [ $a -eq $rev ]
then
echo "it is a palindrome number"
else
echo "not a palindrome"
fi
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 12.sh
enter the number
12
not a palindrome
jomeesh@jomeesh-VirtualBox:~$ bash 12.sh
enter the number
22
it is a palindrome number
```

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

```
#!/bin/bash
sum=$(($1 + $2))
avg=$(echo $sum / 2 | bc -l)
echo $avg
~
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 13.sh 2 3
2.50000000000000000000
```

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

```
#!/bin/bash
echo "enter the number"
read num
sum=0
while [ $num -gt 0 ]
do
mod=$((num % 10))
sum=$((sum + mod))
num=$((num / 10))
done
echo "sum of digits is $sum"
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 14.sh
enter the number
22
sum of digits is 4
```

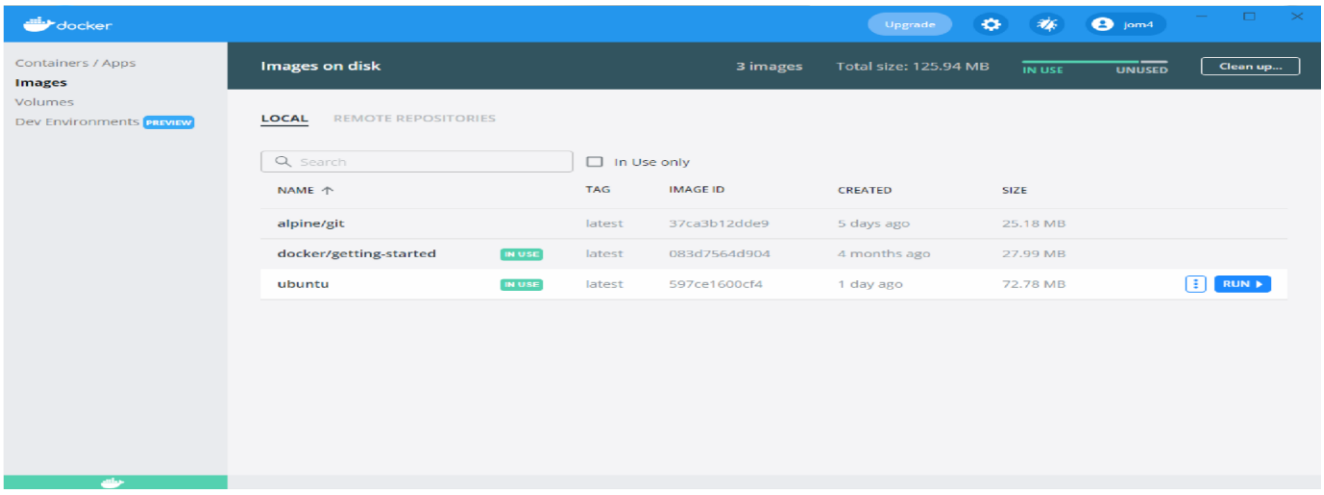
15.Write a shell Script to check whether given year is leap year or not.

```
#!/bin/bash
echo "enter the year"
read y
a=`expr $y % 4`
b=`expr $y % 100`
c=`expr $y % 400`
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ]
then
echo "$y ids leap year"
else
echo "$y is not leap year"
fi
```

```
jomeesh@jomeesh-VirtualBox:~$ bash 15.sh
enter the year
2000
2000 ids leap year
jomeesh@jomeesh-VirtualBox:~$ bash 15.sh
enter the year
2001
2001 is not leap year
jomeesh@jomeesh-VirtualBox:~$
```

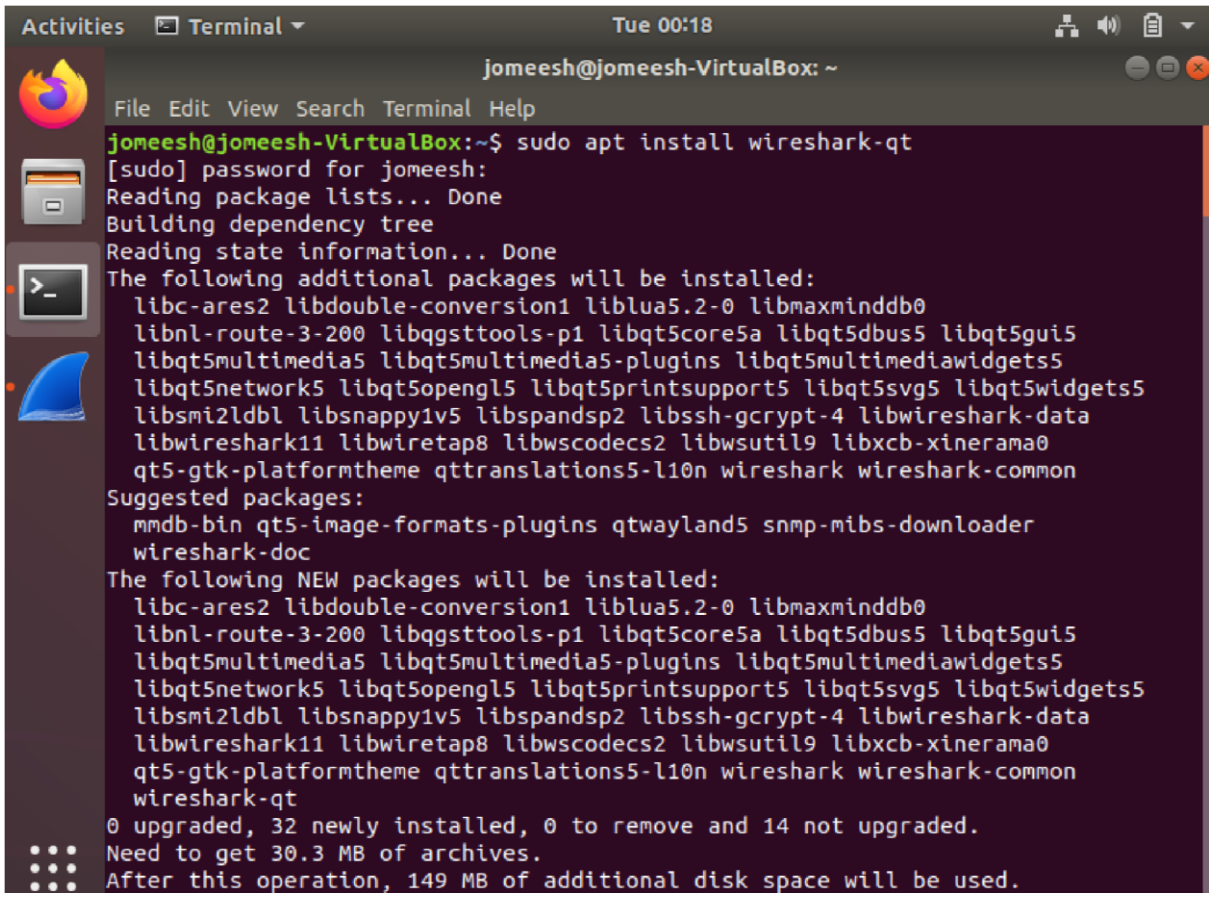
Docker installation

```
Unable to find image 'docker/getting-started:latest' locally
latest: Pulling from docker/getting-started
540db60ca938: Pull complete
0ae30075c5da: Pull complete
9da81141e74e: Pull complete
b2e41dd2ded0: Pull complete
7f40e809fb2d: Pull complete
758848c48411: Pull complete
23ded5c3e3fe: Pull complete
38a847d4d941: Pull complete
Digest: sha256:10555bb0c50e13fc4dd965ddb5f00e948ffa53c13ff15dcdc85b7ab65e1f240b
Status: Downloaded newer image for docker/getting-started:latest
2a97506b67be55fe5b41f4b3e3095c4c7cd00385008dafd6a841868524a2d6c5

C:\WINDOWS\system32>docker pull ubantu
Using default tag: latest
Error response from daemon: pull access denied for ubantu, repository does not exist or may require 'docker login': denied: requested access to the resource is denied

C:\WINDOWS\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:44ab2c3b26363823dcb965498ab06abf74a1e6af20a732902250743df0d4172d
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\WINDOWS\system32>docker run -it ubuntu
root@71088bdbf9af:/# echo hello
hello
root@71088bdbf9af:/#
```

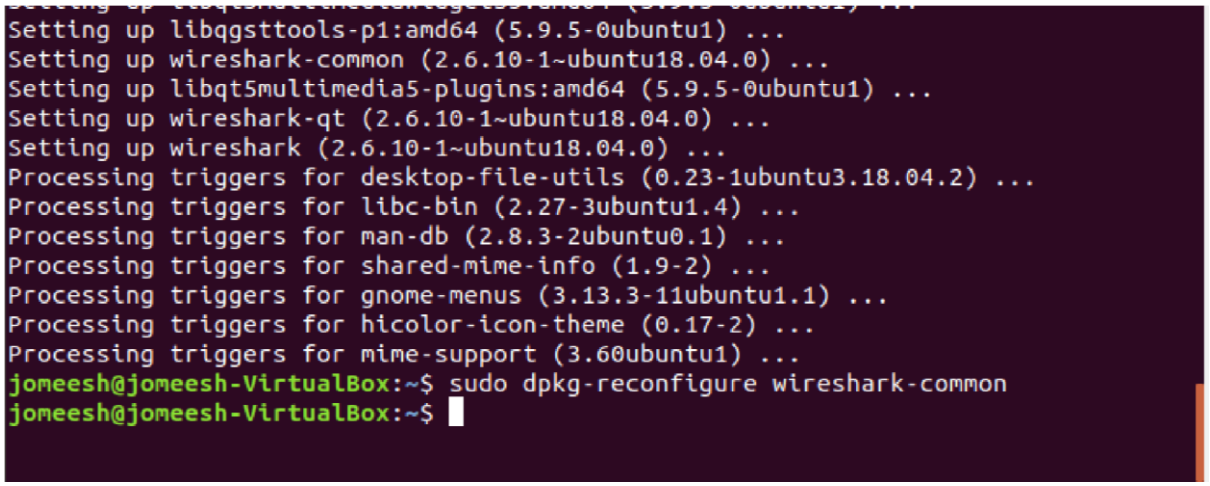


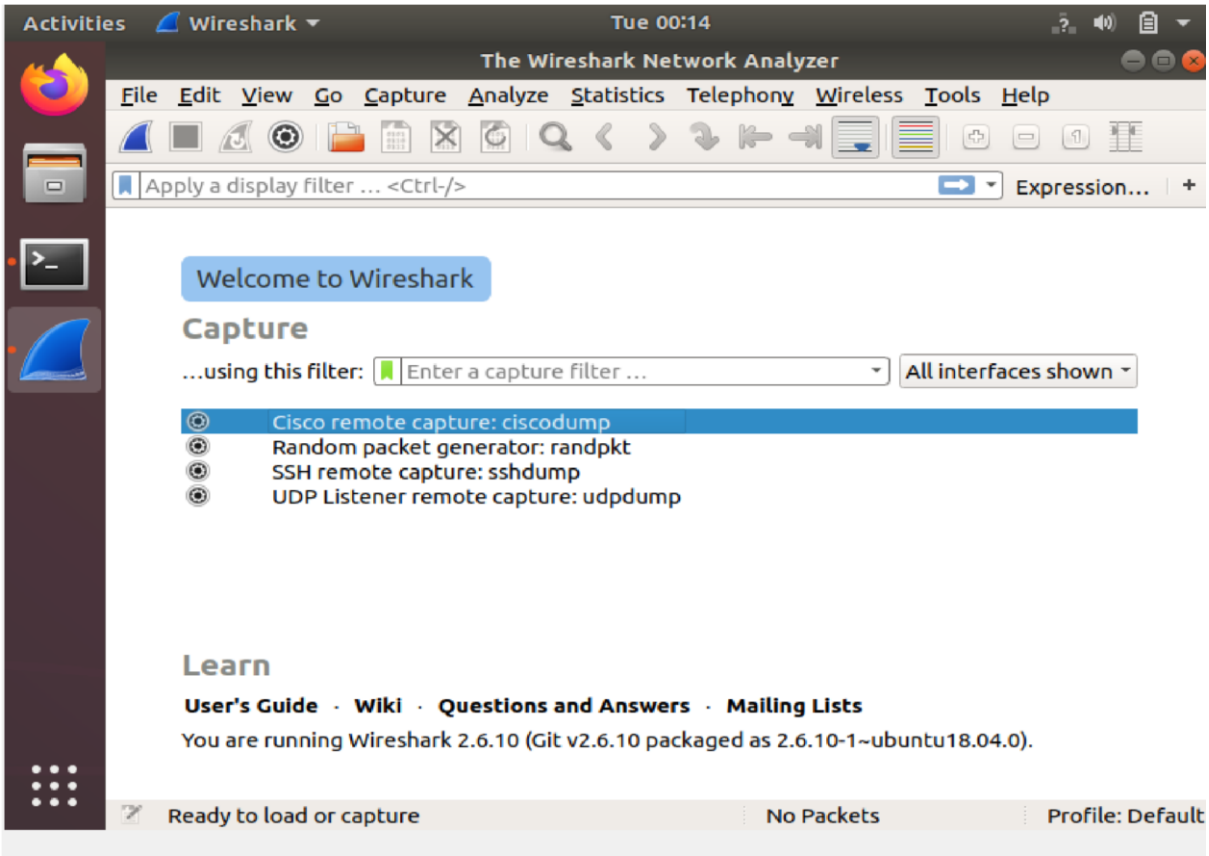
WIRESHARK INSTALLATION

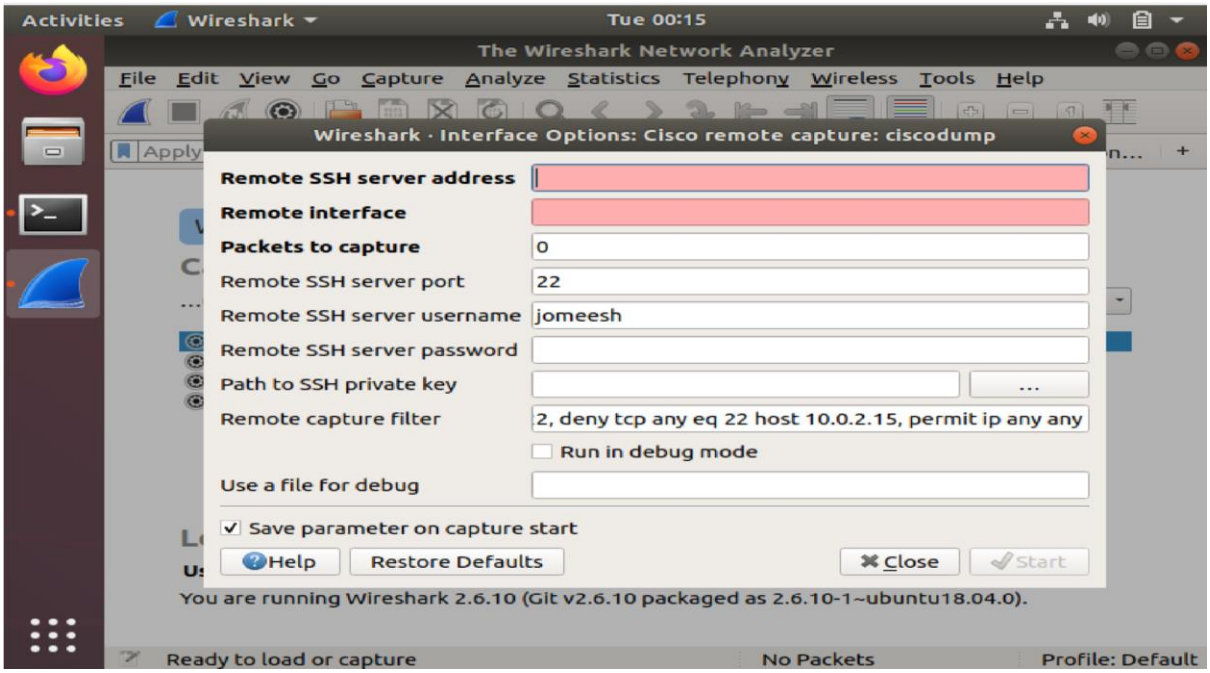
sudo apt-get install wireshark



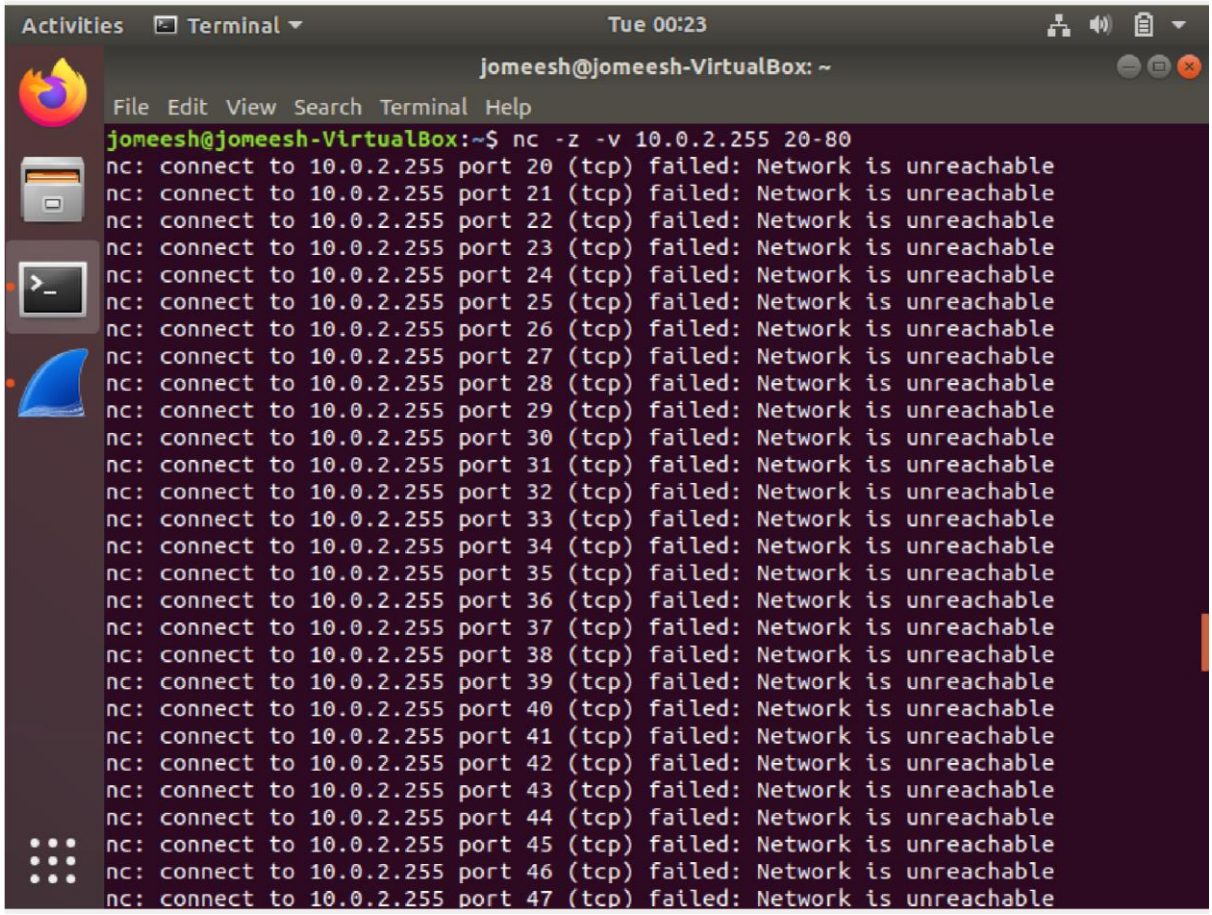
Sudo dpkg-reconfigure wireshark-common




Activities
Wireshark
Tue 00:14
The Wireshark Network Analyzer
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
Expression...
Welcome to Wireshark
Capture
...using this filter:
Enter a capture filter ...
All interfaces shown
Cisco remote capture: ciscodump
Random packet generator: randpkt
SSH remote capture: sshdump
UDP Listener remote capture: udpdump
Learn
User's Guide · Wiki · Questions and Answers · Mailing Lists
You are running Wireshark 2.6.10 (Git v2.6.10 packaged as 2.6.10-1~ubuntu18.04.0).
Ready to load or capture
No Packets
Profile: Default


Activities
Wireshark
Tue 00:15
The Wireshark Network Analyzer
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Wireshark · Interface Options: Cisco remote capture: ciscodump
Remote SSH server address
Remote interface
Packets to capture
0
Remote SSH server port
22
Remote SSH server username
jomeesh
Remote SSH server password
Path to SSH private key
...
Remote capture filter
2, deny tcp any eq 22 host 10.0.2.15, permit ip any any
Run in debug mode
Use a file for debug
Save parameter on capture start
Help
Restore Defaults
Close
Start
You are running Wireshark 2.6.10 (Git v2.6.10 packaged as 2.6.10-1~ubuntu18.04.0).
Ready to load or capture
No Packets
Profile: Default

Netcat


Activities
Terminal
Tue 00:23
jomeesh@jomeesh-VirtualBox: ~
File Edit View Search Terminal Help
jomeesh@jomeesh-VirtualBox:~$ 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
nc: connect to 10.0.2.255 port 43 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 44 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 45 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 46 (tcp) failed: Network is unreachable
nc: connect to 10.0.2.255 port 47 (tcp) failed: Network is unreachable