EXPERIMENT 2

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SUBJECT: Computer Network (CN) **YEAR: TECO**

AIM:

Use basic networking commands in Linux (ping, traceroute, nslookup, netstat, ARP, RARP, ip, ifconfig, dig, route)

THEORY:

Networking commands

Every computer is connected to some other computer through a network whether internally or externally to exchange some information. This network can be small as some computers connected in your home or office, or can be large or complicated as in large University or the entire Internet.

Command	Description
ping	To check connectivity between two nodes.
traceroute	Network troubleshooting utility.
nslookup	Find DNS related query.
netstat	Display connection information.
arp	View or add contents of the kernel's ARP table.
rarp	To convert ethernet addresses to IP addresses.
ip	It is a replacement of ifconfig command.
ifconfig	Display and manipulate route and network interfaces.
dig	Query DNS related information.
route	Shows and manipulate IP routing table.

Ping

Linux ping command stands for (Packet Internet Groper). It checks connectivity between two nodes to see if a server is available. It sends ICMP ECHO_REQUEST packets to network hosts and displays the data on the remote server's response. It checks if a remote host is up, or that network interfaces can be reached. Further, it is used to check if a network connection is available between two devices. It is also handy tool for checking your network connection and verifying network issues.

Traceroute

Linux traceroute command is a network troubleshooting utility that helps us determine the number of hops and packets traveling path required to reach a destination. It is used to display how the data transmitted from a local machine to a remote machine. Loading a web page is one of the common examples of the traceroute. A web page loading transfers data through a network and routers. The traceroute can display the routes, IP addresses, and hostnames of routers over a network. It can be useful for diagnosing network issues.

Nslookup

This command is also used to find DNS related query.

Netstat

Linux netstat command stands for Network statistics. It displays information about different interface statistics, including open sockets, routing tables, and connection information. Further, it can be used to displays all the socket connections (including TCP, UDP). Apart from connected sockets, it also displays the sockets that are pending for connections. It is a handy tool for network and system administrators.

Arp

The command arp stands for Address Resolution Protocol. It allows us to view or add content into kernel's ARP table.

Rarp

RARP provides the opposite service to ARP in that it is used when only the ethernet address is known and the IP address is needed.

Ip

Linux IP command is the newer version of the ifconfig command. It is a handy tool for configuring the network interfaces for Linux administrators. It can be used to assign and remove addresses, take the interfaces up or down, and much more useful tasks.

Ifconfig

The command ifconfig stands for interface configurator. This command enables us to initialize an interface, assign IP address, enable or disable an interface. It displays route and network interface.

Dig

Linux dig command stands for Domain Information Groper. This command is used for tasks related to DNS lookup to query DNS name servers. It mainly deals with troubleshooting DNS related problems. It is a flexible utility for examining the DNS (Domain Name Servers). It is used to perform the DNS lookups and returns the queried answers from the name server. Usually, it is used by most DNS administrators to troubleshoot the DNS problems. It is a straightforward tool and provides a clear output. It is more functional than other lookups tools.

Route

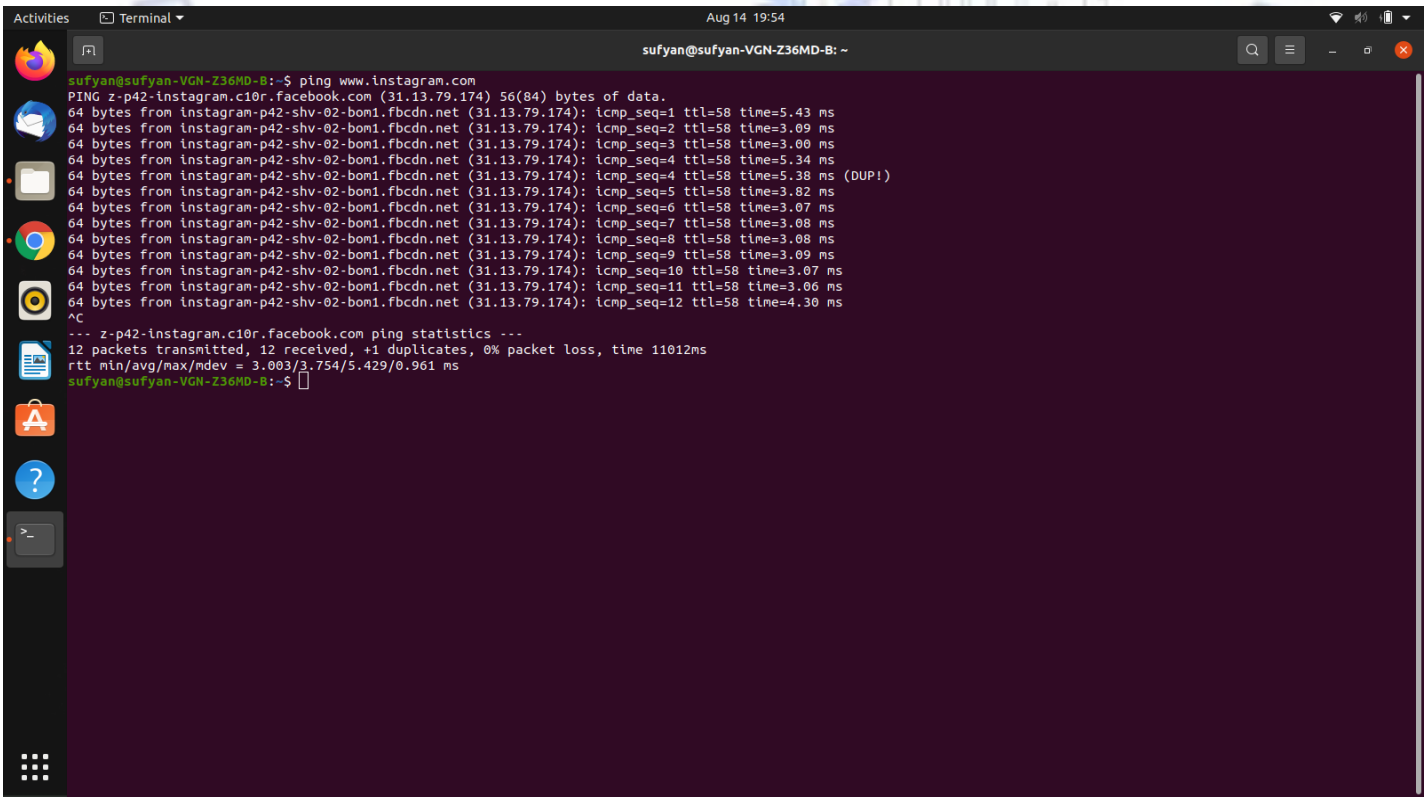
The route command displays and manipulate IP routing table for your system.

SYNTAX

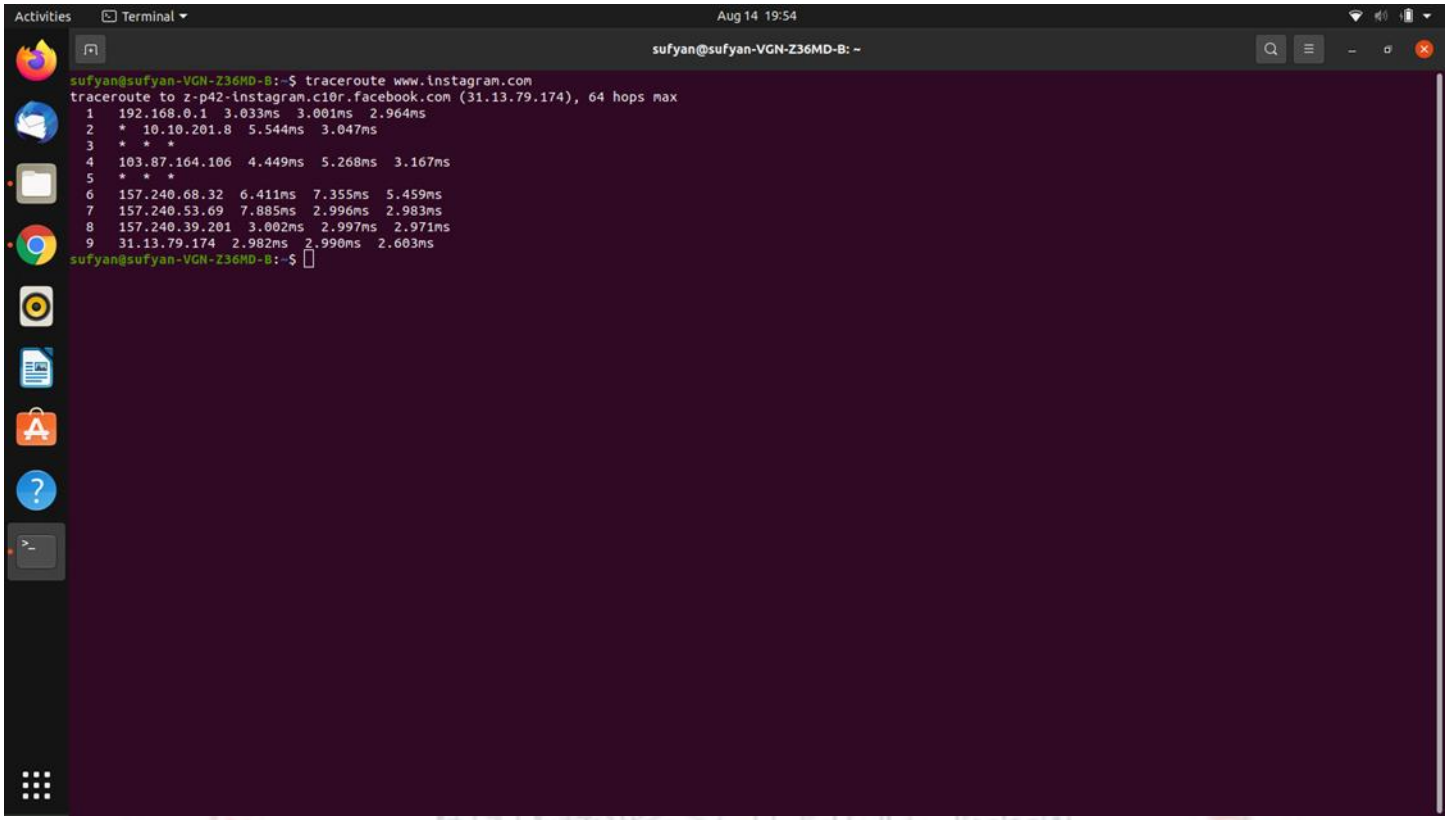
1. Ping: ping <domain name>
2. Traceroute: traceroute <domain name>
3. Nslookup: nslookup <domain name>
4. Netstat: netstat -a
5. Arp: arp -a
6. Rarp: rarp -a
7. Ip: ip -a
8. Ifconfig: ifconfig -a
9. Dig: dig <domain name>
10. Route: route

APPLICATION

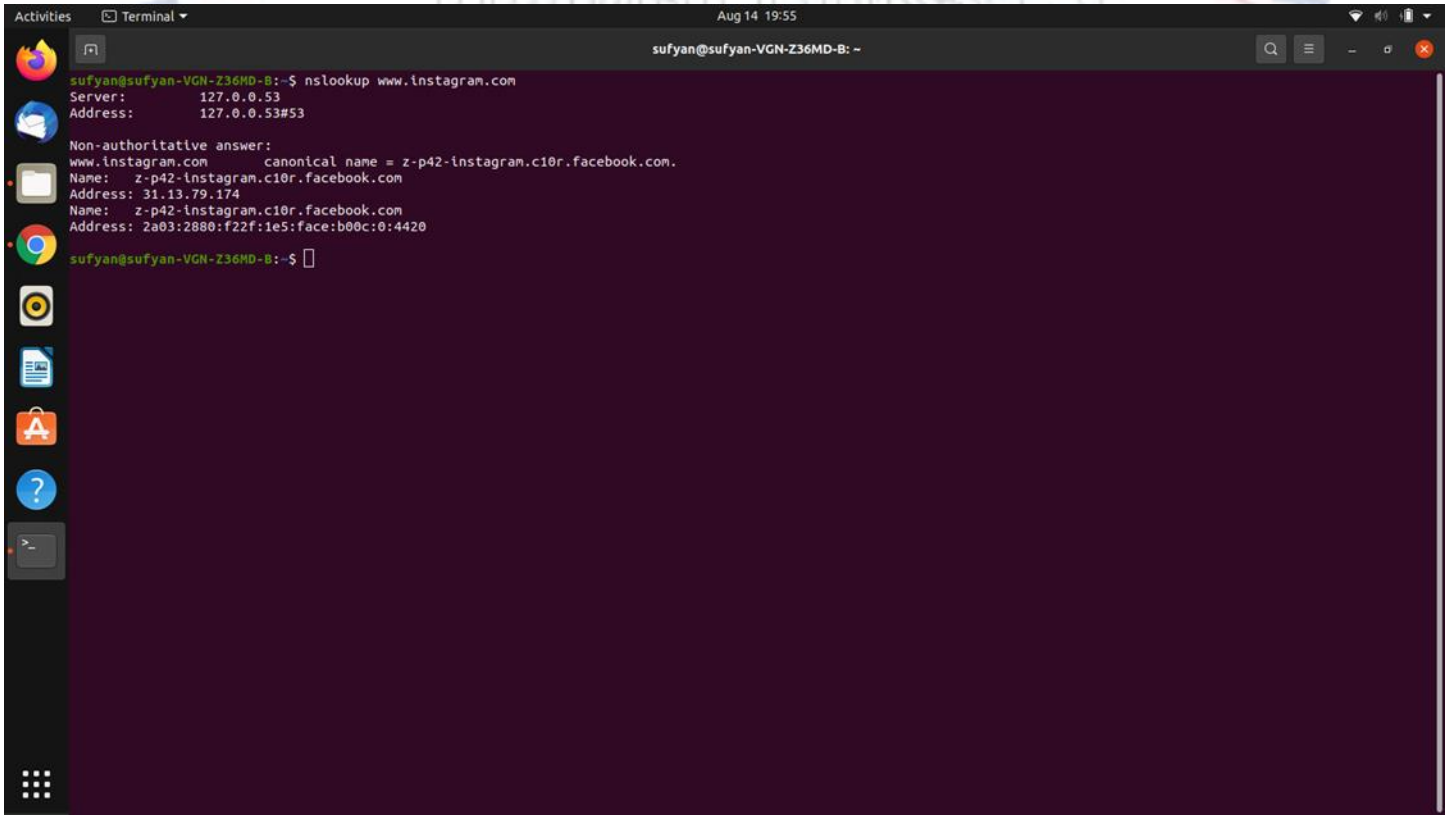
1. Ping



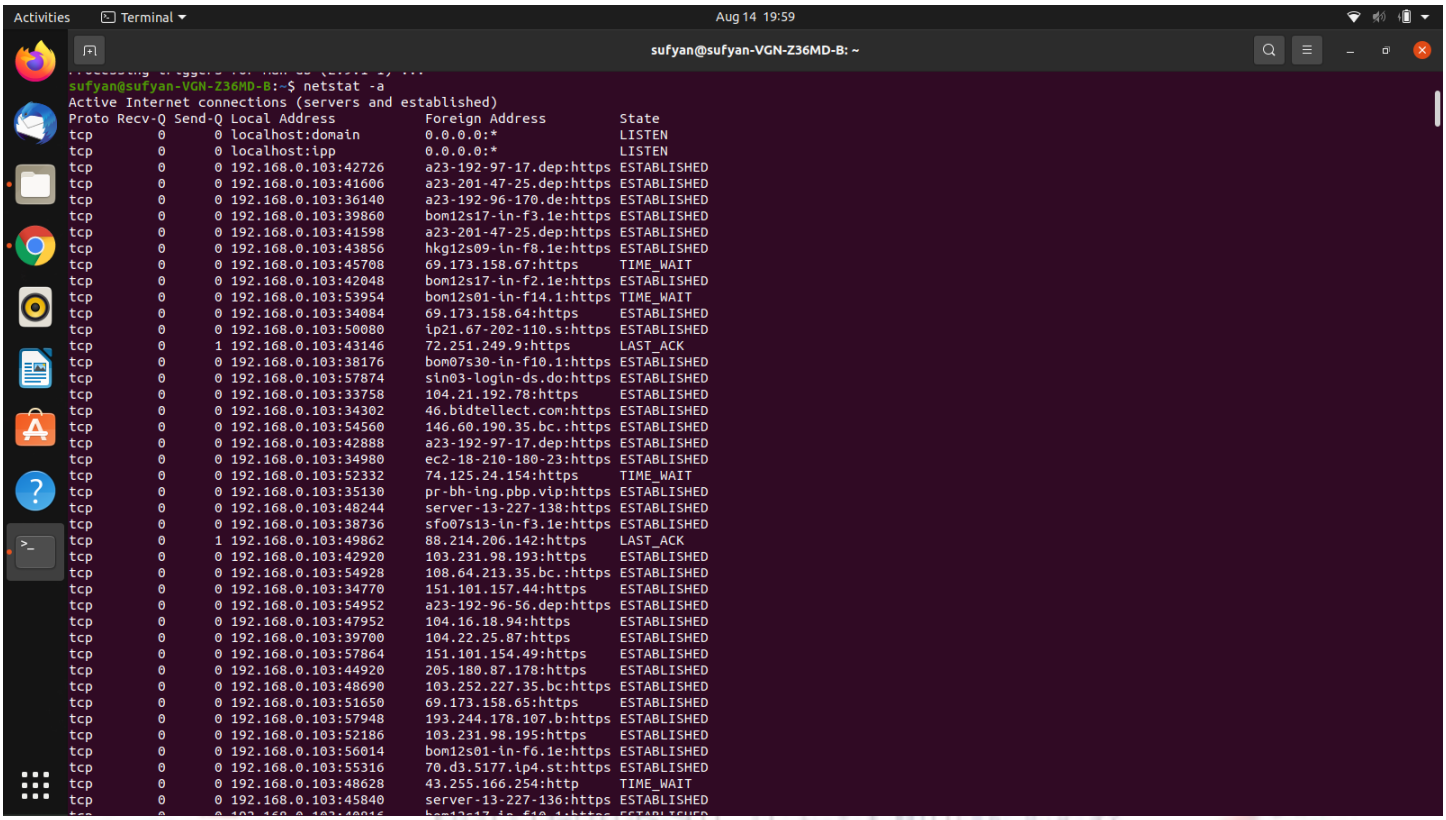
2. Traceroute

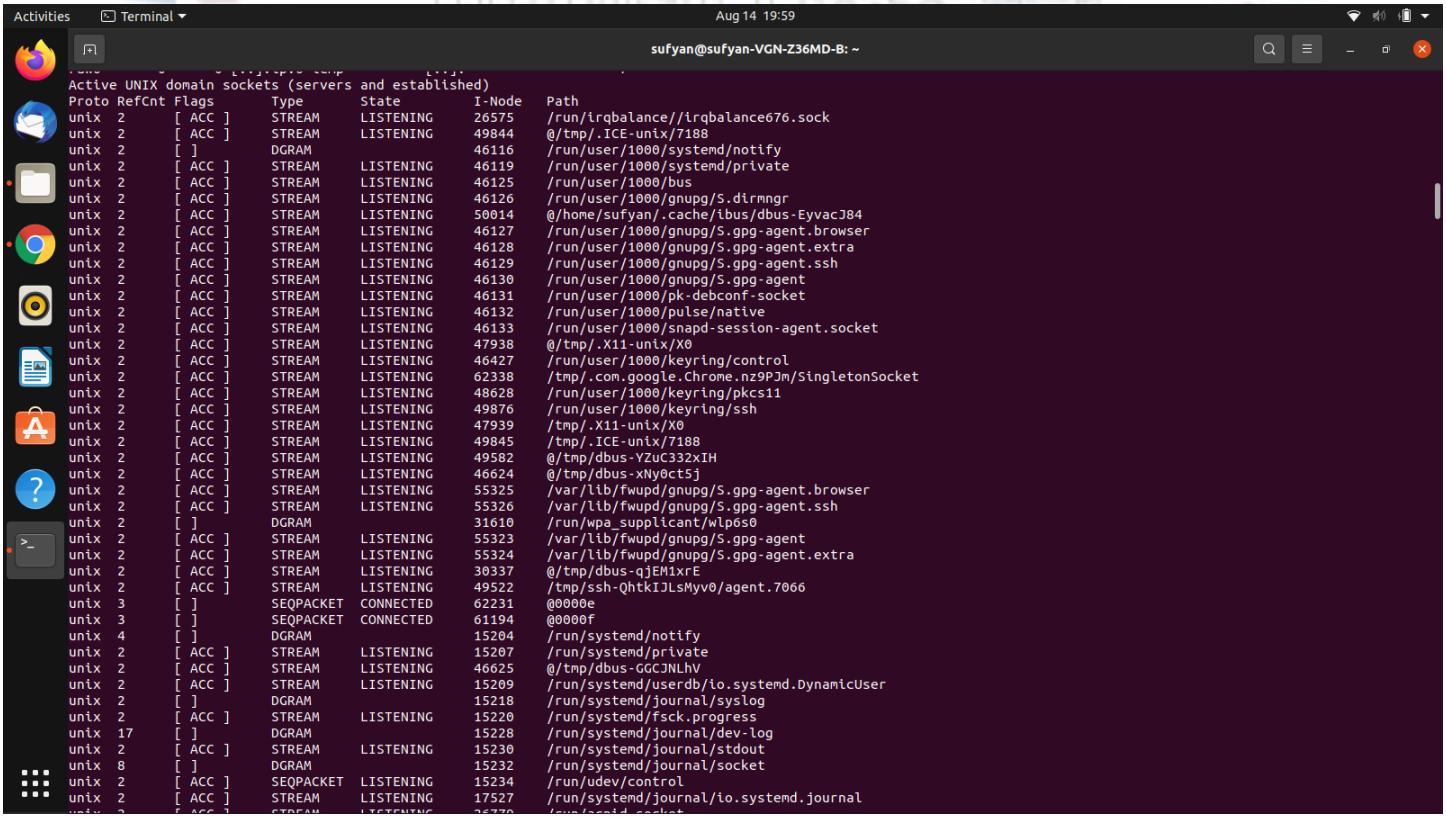


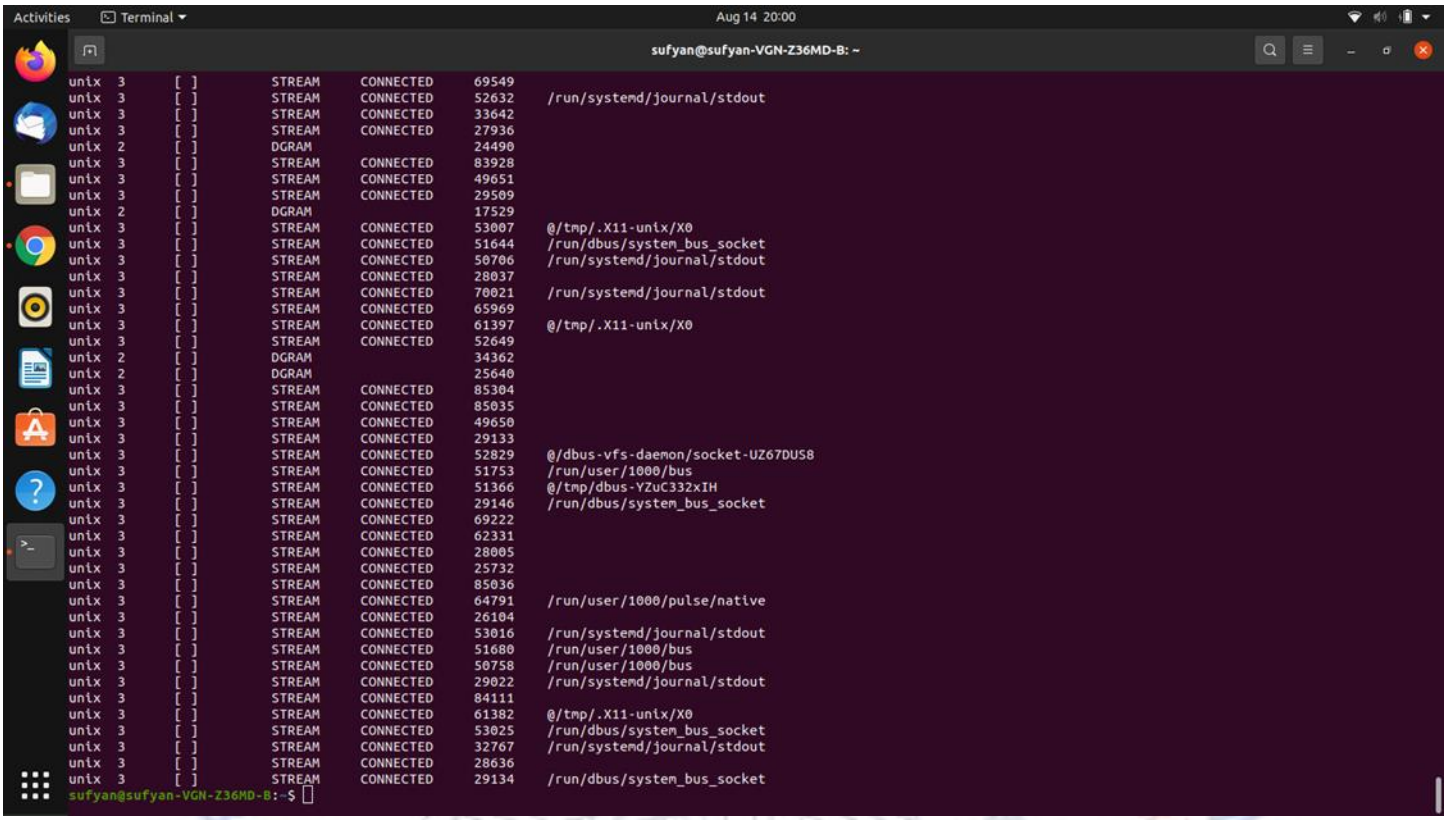
3. Nslookup



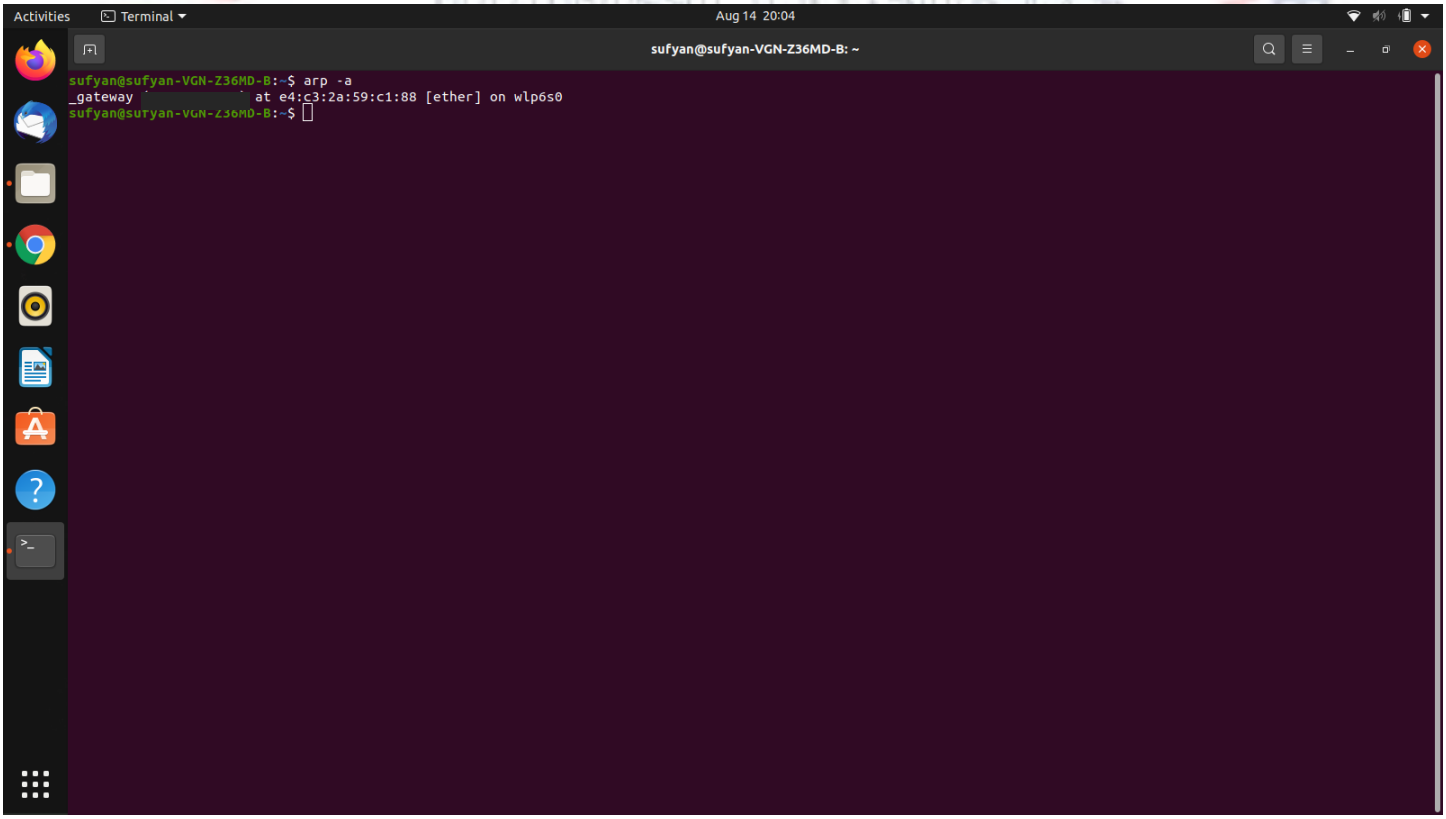
4. Netstat


Activities
Terminal
Aug 14 19:59
sufyan@sufyan-VGN-Z36MD-B: ~
sufyan@sufyan-VGN-Z36MD-B:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address Foreign Address State
tcp 0 0 localhost:domain 0.0.0.0:* LISTEN
tcp 0 0 localhost:ipp 0.0.0.0:* LISTEN
tcp 0 0 192.168.0.103:42726 a23-192-97-17.dep:https ESTABLISHED
tcp 0 0 192.168.0.103:41606 a23-201-47-25.dep:https ESTABLISHED
tcp 0 0 192.168.0.103:36140 a23-192-96-170.de:https ESTABLISHED
tcp 0 0 192.168.0.103:39860 bom12s17-in-f3.1e:https ESTABLISHED
tcp 0 0 192.168.0.103:41598 a23-201-47-25.dep:https ESTABLISHED
tcp 0 0 192.168.0.103:43856 hkg12s09-in-f8.1e:https ESTABLISHED
tcp 0 0 192.168.0.103:45708 69.173.158.67:https TIME_WAIT
tcp 0 0 192.168.0.103:42048 bom12s17-in-f2.1e:https ESTABLISHED
tcp 0 0 192.168.0.103:53954 bom12s01-in-f14.1:https TIME_WAIT
tcp 0 0 192.168.0.103:34084 69.173.158.64:https ESTABLISHED
tcp 0 0 192.168.0.103:50080 ip21.67-202-110.s:https ESTABLISHED
tcp 0 1 192.168.0.103:43146 72.251.249.9:https LAST_ACK
tcp 0 0 192.168.0.103:38176 bom07s30-in-f10.1:https ESTABLISHED
tcp 0 0 192.168.0.103:57874 sin03-login-ds.do:https ESTABLISHED
tcp 0 0 192.168.0.103:33758 104.21.192.78:https ESTABLISHED
tcp 0 0 192.168.0.103:34302 46.bidtellect.com:https ESTABLISHED
tcp 0 0 192.168.0.103:54560 146.60.190.35.bc.:https ESTABLISHED
tcp 0 0 192.168.0.103:42888 a23-192-97-17.dep:https ESTABLISHED
tcp 0 0 192.168.0.103:34980 ec2-18-210-180-23:https ESTABLISHED
tcp 0 0 192.168.0.103:52332 74.125.24.154:https TIME_WAIT
tcp 0 0 192.168.0.103:35130 pr-bh-ing.pbp.vip:https ESTABLISHED
tcp 0 0 192.168.0.103:48244 server-13-227-138:https ESTABLISHED
tcp 0 0 192.168.0.103:38736 sfo07s13-in-f3.1e:https ESTABLISHED
tcp 0 1 192.168.0.103:49862 88.214.206.142:https LAST_ACK
tcp 0 0 192.168.0.103:42920 103.231.98.193:https ESTABLISHED
tcp 0 0 192.168.0.103:54928 108.64.213.35.bc.:https ESTABLISHED
tcp 0 0 192.168.0.103:34770 151.101.157.44:https ESTABLISHED
tcp 0 0 192.168.0.103:54952 a23-192-96-56.dep:https ESTABLISHED
tcp 0 0 192.168.0.103:47952 104.16.18.94:https ESTABLISHED
tcp 0 0 192.168.0.103:39700 104.22.25.87:https ESTABLISHED
tcp 0 0 192.168.0.103:57864 151.101.154.49:https ESTABLISHED
tcp 0 0 192.168.0.103:44920 205.180.87.178:https ESTABLISHED
tcp 0 0 192.168.0.103:48690 103.252.227.35.bc:https ESTABLISHED
tcp 0 0 192.168.0.103:51650 69.173.158.65:https ESTABLISHED
tcp 0 0 192.168.0.103:57948 193.244.178.107.b:https ESTABLISHED
tcp 0 0 192.168.0.103:52186 103.231.98.195:https ESTABLISHED
tcp 0 0 192.168.0.103:56014 bom12s01-in-f6.1e:https ESTABLISHED
tcp 0 0 192.168.0.103:55316 70.d3.5177.ip4.st:https ESTABLISHED
tcp 0 0 192.168.0.103:48628 43.255.166.254:http TIME_WAIT
tcp 0 0 192.168.0.103:45840 server-13-227-136:https ESTABLISHED

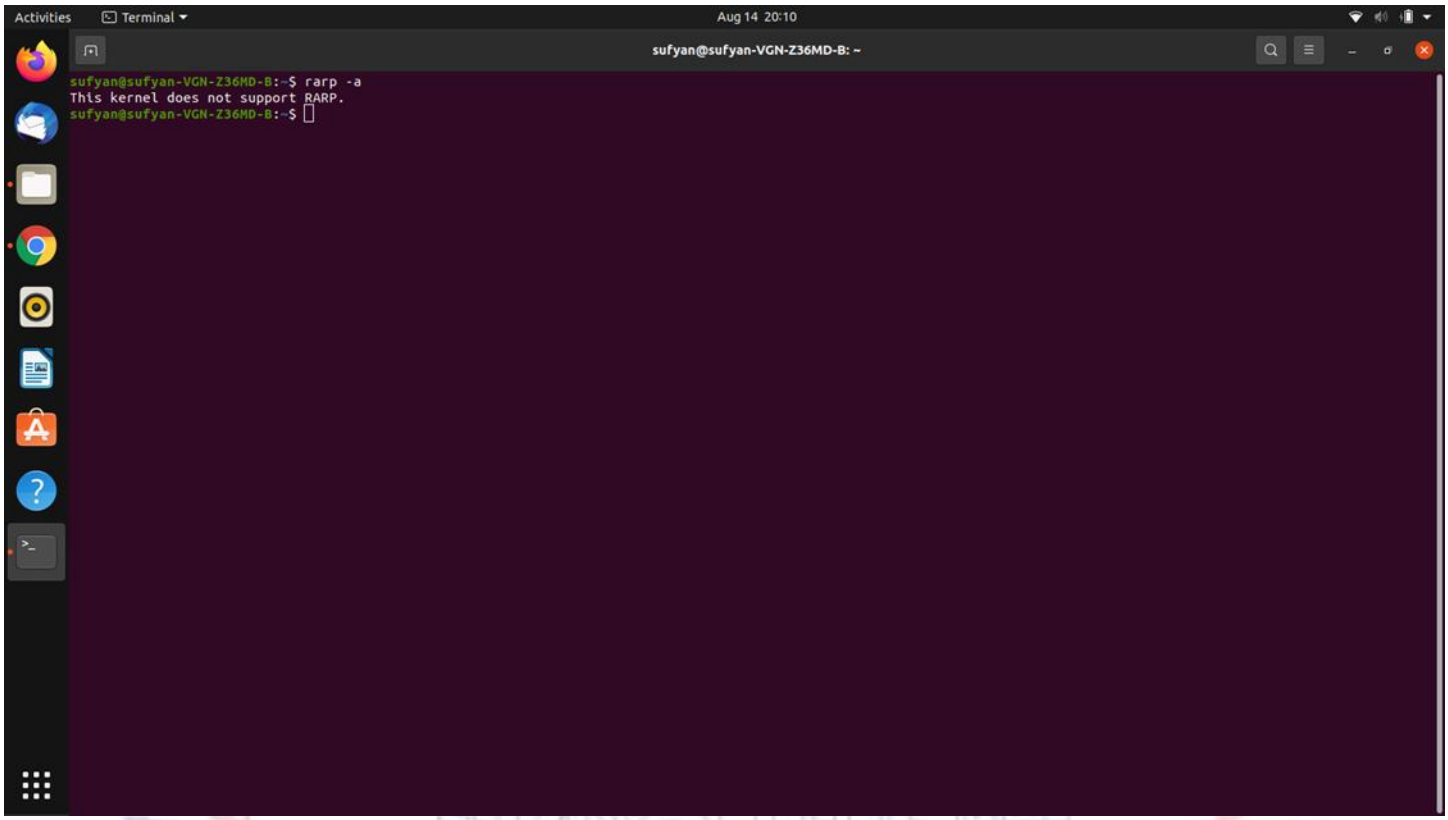

Activities
Terminal
Aug 14 19:59
sufyan@sufyan-VGN-Z36MD-B: ~
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags Type State I-Node Path
unix 2 [ACC] STREAM LISTENING 26575 /run/irqbalance//irqbalance676.sock
unix 2 [ACC] STREAM LISTENING 49844 @/tmp/.ICE-unix/7188
unix 2 [ ] DGRAM 46116 /run/user/1000/systemd/notify
unix 2 [ACC] STREAM LISTENING 46119 /run/user/1000/systemd/private
unix 2 [ACC] STREAM LISTENING 46125 /run/user/1000/bus
unix 2 [ACC] STREAM LISTENING 46126 /run/user/1000/gnupg/S.dirmngr
unix 2 [ACC] STREAM LISTENING 50014 @/home/sufyan/.cache/ibus/dbus-EyvacJ84
unix 2 [ACC] STREAM LISTENING 46127 /run/user/1000/gnupg/S.gpg-agent.browser
unix 2 [ACC] STREAM LISTENING 46128 /run/user/1000/gnupg/S.gpg-agent.extra
unix 2 [ACC] STREAM LISTENING 46129 /run/user/1000/gnupg/S.gpg-agent.ssh
unix 2 [ACC] STREAM LISTENING 46130 /run/user/1000/gnupg/S.gpg-agent
unix 2 [ACC] STREAM LISTENING 46131 /run/user/1000/pk-debconf-socket
unix 2 [ACC] STREAM LISTENING 46132 /run/user/1000/pulse/native
unix 2 [ACC] STREAM LISTENING 46133 /run/user/1000/snapd-session-agent.socket
unix 2 [ACC] STREAM LISTENING 47938 @/tmp/.X11-unix/X0
unix 2 [ACC] STREAM LISTENING 46427 /run/user/1000/keyring/control
unix 2 [ACC] STREAM LISTENING 62338 /tmp/.com.google.Chrome.nz9PJm/SingletonSocket
unix 2 [ACC] STREAM LISTENING 48628 /run/user/1000/keyring/pkcs11
unix 2 [ACC] STREAM LISTENING 49876 /run/user/1000/keyring/ssh
unix 2 [ACC] STREAM LISTENING 47939 /tmp/.X11-unix/X0
unix 2 [ACC] STREAM LISTENING 49845 /tmp/.ICE-unix/7188
unix 2 [ACC] STREAM LISTENING 49582 @/tmp/dbus-YZuC332xIH
unix 2 [ACC] STREAM LISTENING 46624 @/tmp/dbus-xNy0ct5j
unix 2 [ACC] STREAM LISTENING 55325 /var/lib/fwupd/gnupg/S.gpg-agent.browser
unix 2 [ACC] STREAM LISTENING 55326 /var/lib/fwupd/gnupg/S.gpg-agent.ssh
unix 2 [ ] DGRAM 31610 /run/wpa_supplicant/wlp6s0
unix 2 [ACC] STREAM LISTENING 55323 /var/lib/fwupd/gnupg/S.gpg-agent
unix 2 [ACC] STREAM LISTENING 55324 /var/lib/fwupd/gnupg/S.gpg-agent.extra
unix 2 [ACC] STREAM LISTENING 30337 @/tmp/dbus-qjEM1xrE
unix 2 [ACC] STREAM LISTENING 49522 /tmp/ssh-QhtkIJLsMyv0/agent.7066
unix 3 [ ] SEQPACKET CONNECTED 62231 @0000e
unix 3 [ ] SEQPACKET CONNECTED 61194 @0000f
unix 4 [ ] DGRAM 15204 /run/systemd/notify
unix 2 [ACC] STREAM LISTENING 15207 /run/systemd/private
unix 2 [ACC] STREAM LISTENING 46625 @/tmp/dbus-GGCJNLhV
unix 2 [ACC] STREAM LISTENING 15209 /run/systemd/userdb/io.systemd.DynamicUser
unix 2 [ ] DGRAM 15218 /run/systemd/journal/syslog
unix 2 [ACC] STREAM LISTENING 15220 /run/systemd/fsck.progress
unix 17 [ ] DGRAM 15228 /run/systemd/journal/dev-log
unix 2 [ACC] STREAM LISTENING 15230 /run/systemd/journal/stdout
unix 8 [ ] DGRAM 15232 /run/systemd/journal/socket
unix 2 [ACC] SEQPACKET LISTENING 15234 /run/udev/control
unix 2 [ACC] STREAM LISTENING 17527 /run/systemd/journal/io.systemd.journal


Activities
Terminal
Aug 14 20:00
sufyan@sufyan-VGN-Z36MD-B: ~
unix 3 [ ] STREAM CONNECTED 69549
unix 3 [ ] STREAM CONNECTED 52632 /run/systemd/journal/stdout
unix 3 [ ] STREAM CONNECTED 33642
unix 3 [ ] STREAM CONNECTED 27936
unix 2 [ ] DGRAM 24490
unix 3 [ ] STREAM CONNECTED 83928
unix 3 [ ] STREAM CONNECTED 49651
unix 3 [ ] STREAM CONNECTED 29509
unix 2 [ ] DGRAM 17529
unix 3 [ ] STREAM CONNECTED 53007 @/tmp/.X11-unix/X0
unix 3 [ ] STREAM CONNECTED 51644 /run/dbus/system_bus_socket
unix 3 [ ] STREAM CONNECTED 50706 /run/systemd/journal/stdout
unix 3 [ ] STREAM CONNECTED 28037
unix 3 [ ] STREAM CONNECTED 70021 /run/systemd/journal/stdout
unix 3 [ ] STREAM CONNECTED 65969
unix 3 [ ] STREAM CONNECTED 61397 @/tmp/.X11-unix/X0
unix 3 [ ] STREAM CONNECTED 52649
unix 2 [ ] DGRAM 34362
unix 2 [ ] DGRAM 25640
unix 3 [ ] STREAM CONNECTED 85304
unix 3 [ ] STREAM CONNECTED 85035
unix 3 [ ] STREAM CONNECTED 49650
unix 3 [ ] STREAM CONNECTED 29133
unix 3 [ ] STREAM CONNECTED 52829 @/dbus-vfs-daemon/socket-UZ67DUS8
unix 3 [ ] STREAM CONNECTED 51753 /run/user/1000/bus
unix 3 [ ] STREAM CONNECTED 51366 @/tmp/dbus-YZuC332xIH
unix 3 [ ] STREAM CONNECTED 29146 /run/dbus/system_bus_socket
unix 3 [ ] STREAM CONNECTED 69222
unix 3 [ ] STREAM CONNECTED 62331
unix 3 [ ] STREAM CONNECTED 28005
unix 3 [ ] STREAM CONNECTED 25732
unix 3 [ ] STREAM CONNECTED 85036
unix 3 [ ] STREAM CONNECTED 64791 /run/user/1000/pulse/native
unix 3 [ ] STREAM CONNECTED 26104
unix 3 [ ] STREAM CONNECTED 53016 /run/systemd/journal/stdout
unix 3 [ ] STREAM CONNECTED 51680 /run/user/1000/bus
unix 3 [ ] STREAM CONNECTED 50758 /run/user/1000/bus
unix 3 [ ] STREAM CONNECTED 29022 /run/systemd/journal/stdout
unix 3 [ ] STREAM CONNECTED 84111
unix 3 [ ] STREAM CONNECTED 61382 @/tmp/.X11-unix/X0
unix 3 [ ] STREAM CONNECTED 53025 /run/dbus/system_bus_socket
unix 3 [ ] STREAM CONNECTED 32767 /run/systemd/journal/stdout
unix 3 [ ] STREAM CONNECTED 28636
unix 3 [ ] STREAM CONNECTED 29134 /run/dbus/system_bus_socket
sufyan@sufyan-VGN-Z36MD-B:~$

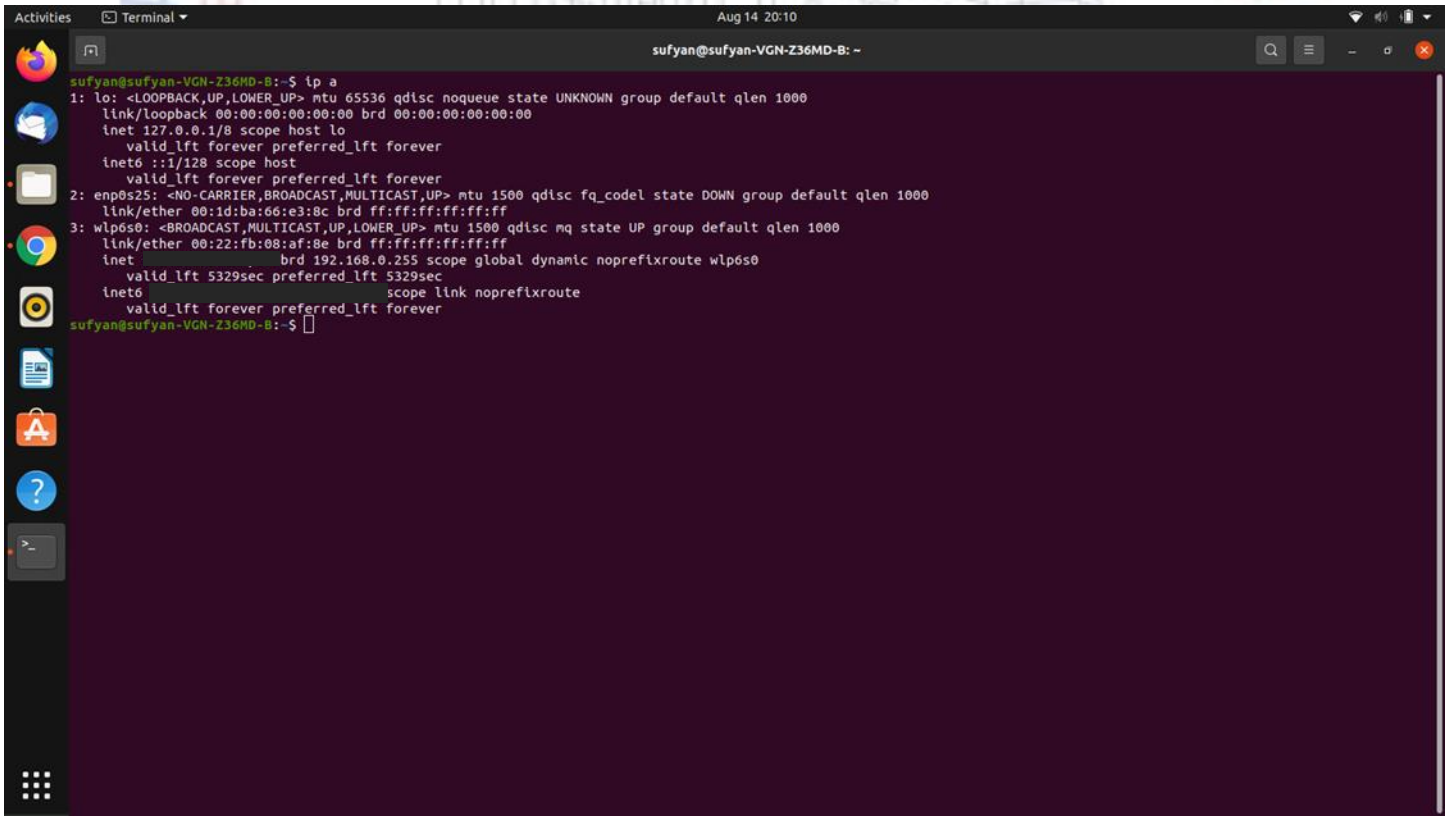
5. Arp


Activities
Terminal
Aug 14 20:04
sufyan@sufyan-VGN-Z36MD-B: ~
sufyan@sufyan-VGN-Z36MD-B:~$ arp -a
_gateway at e4:c3:2a:59:c1:88 [ether] on wlp6s0
sufyan@sufyan-VGN-Z36MD-B:~$

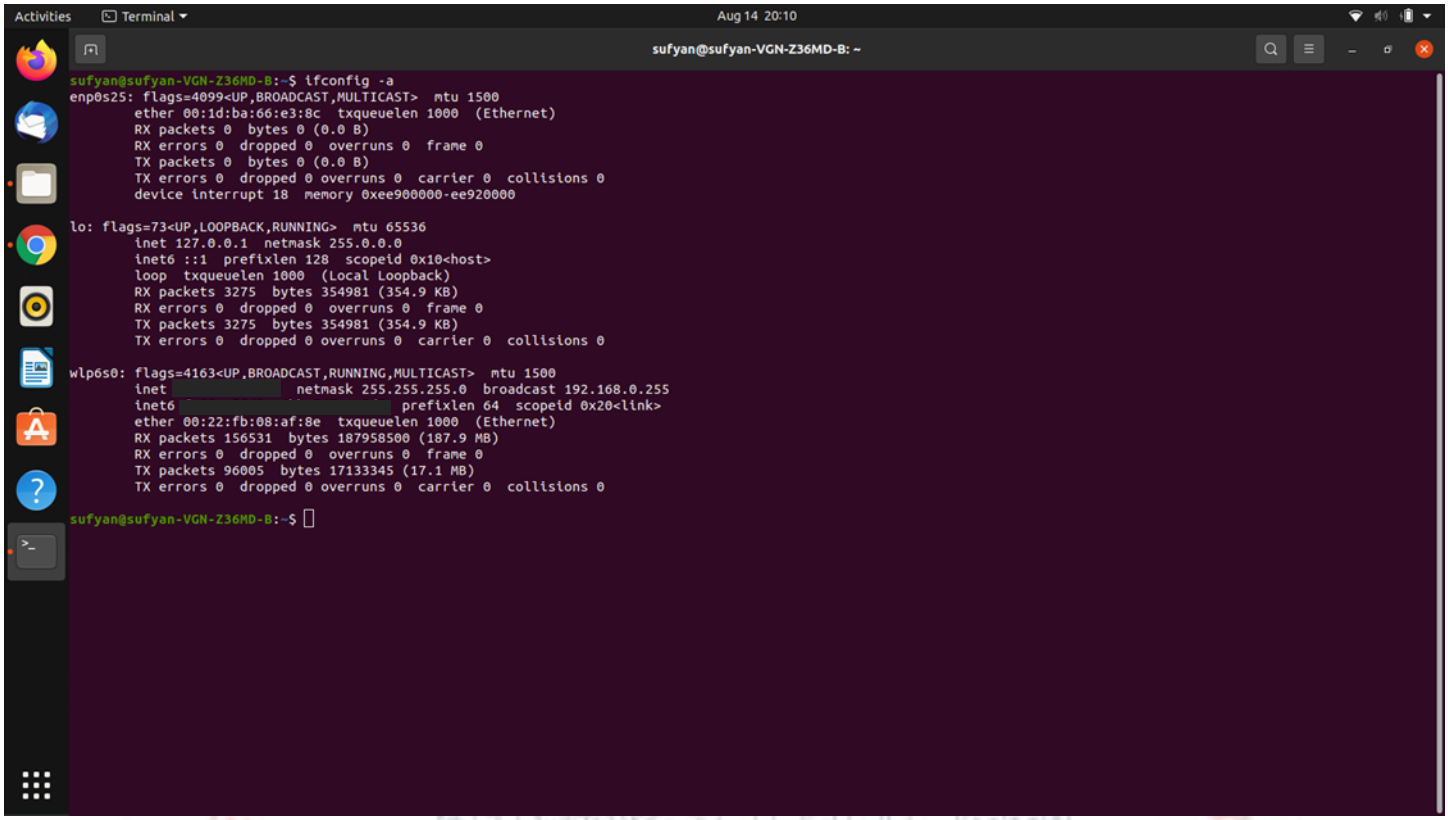
6. Rarp


Activities
Terminal
Aug 14 20:10
sufyan@sufyan-VGN-Z36MD-B: ~
sufyan@sufyan-VGN-Z36MD-B:~$ rarp -a
This kernel does not support RARP.
sufyan@sufyan-VGN-Z36MD-B:~$

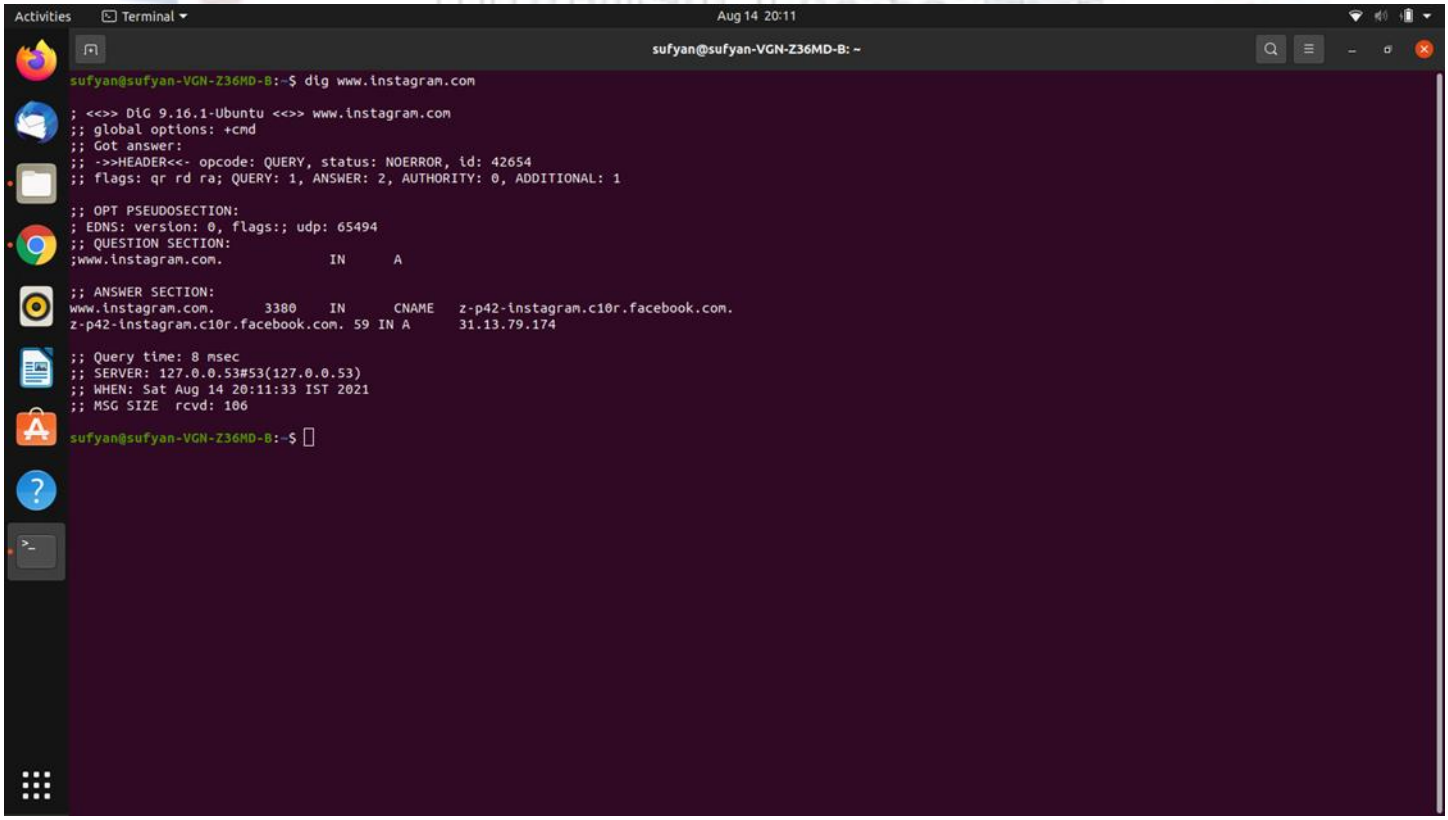
7. Ip


Activities
Terminal
Aug 14 20:10
sufyan@sufyan-VGN-Z36MD-B: ~
sufyan@sufyan-VGN-Z36MD-B:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
valid_lft forever preferred_lft forever
inet6 ::1/128 scope host
valid_lft forever preferred_lft forever
2: enp0s25: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000
link/ether 00:1d:ba:66:e3:8c brd ff:ff:ff:ff:ff:ff
3: wlp6s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
link/ether 00:22:fb:08:af:8e brd ff:ff:ff:ff:ff:ff
inet brd 192.168.0.255 scope global dynamic noprefixroute wlp6s0
valid_lft 5329sec preferred_lft 5329sec
inet6 scope link noprefixroute
valid_lft forever preferred_lft forever
sufyan@sufyan-VGN-Z36MD-B:~$

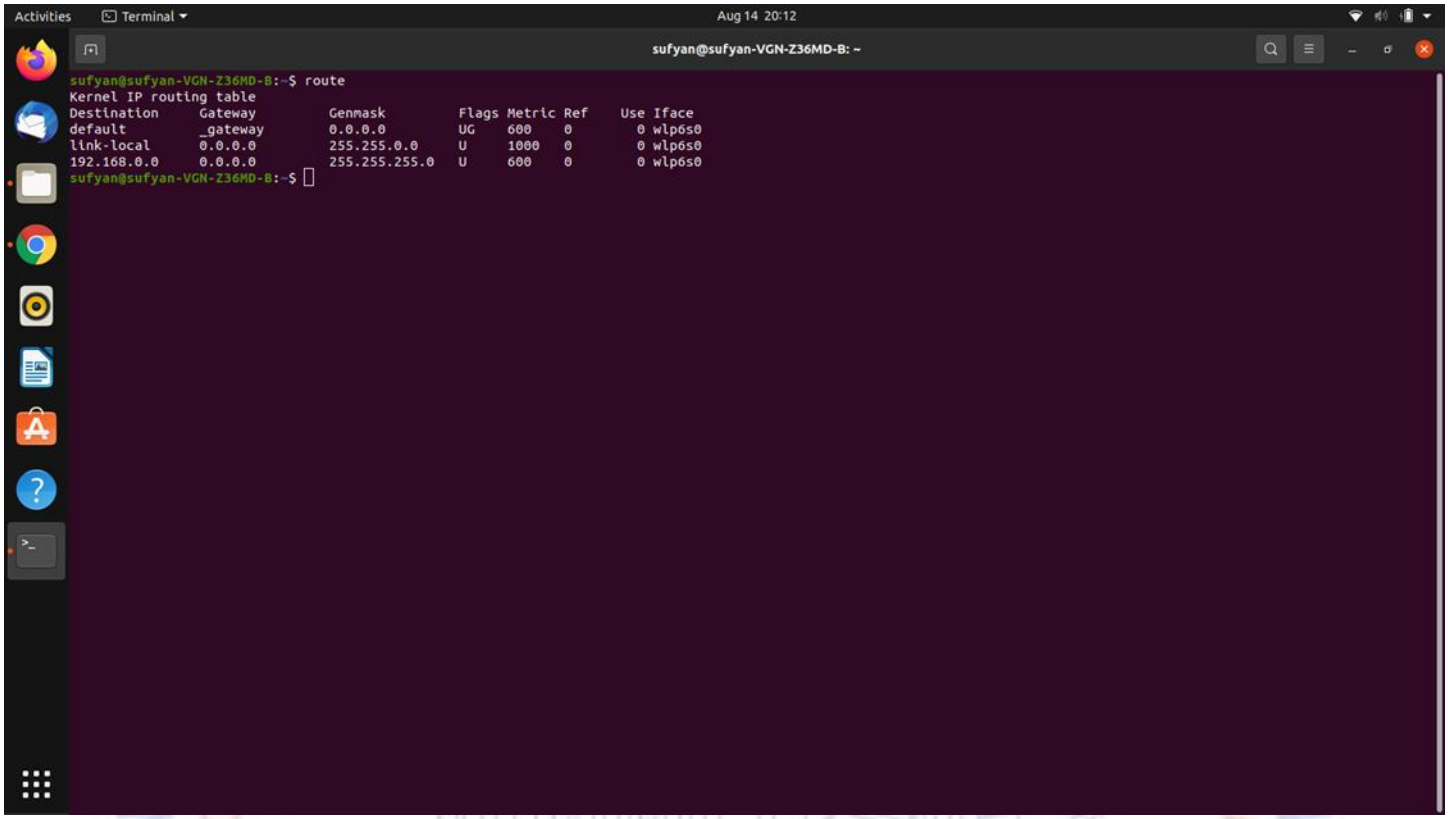
8. Ifconfig



9. Dig



10. Route



CONCLUSION

Thus, we have studied the basic networking commands of Linux and successfully implemented it.