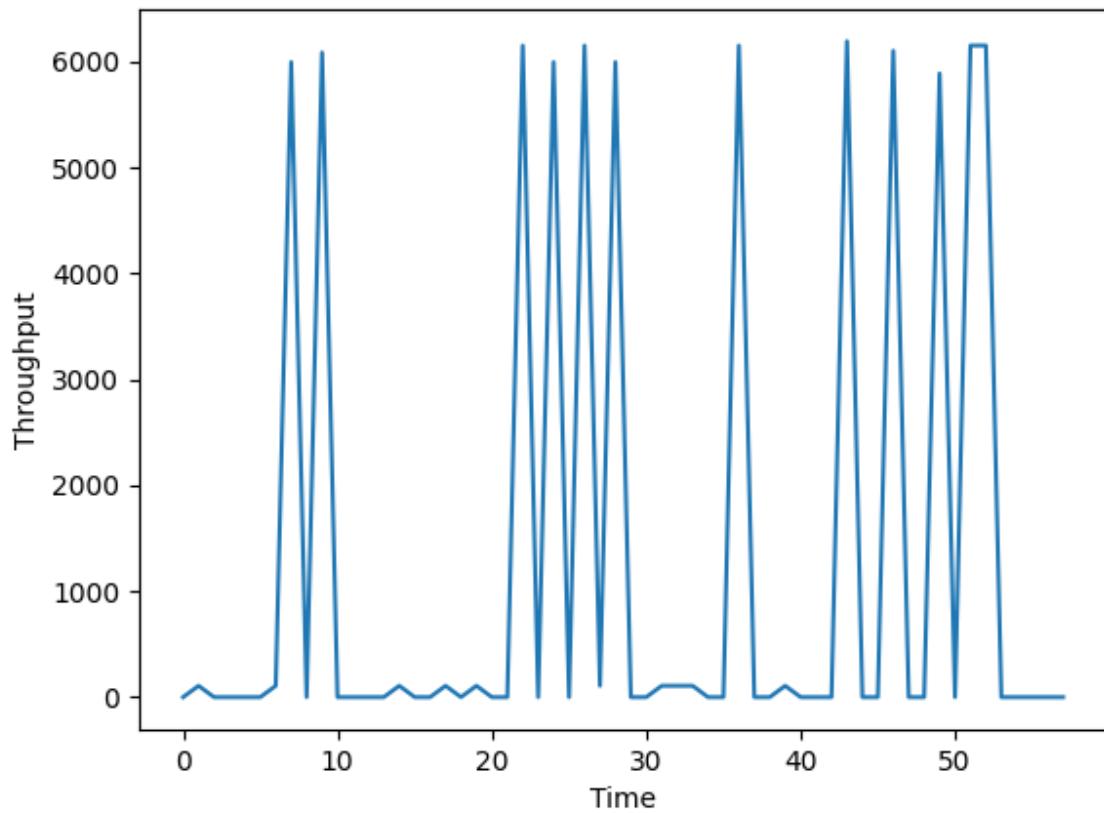
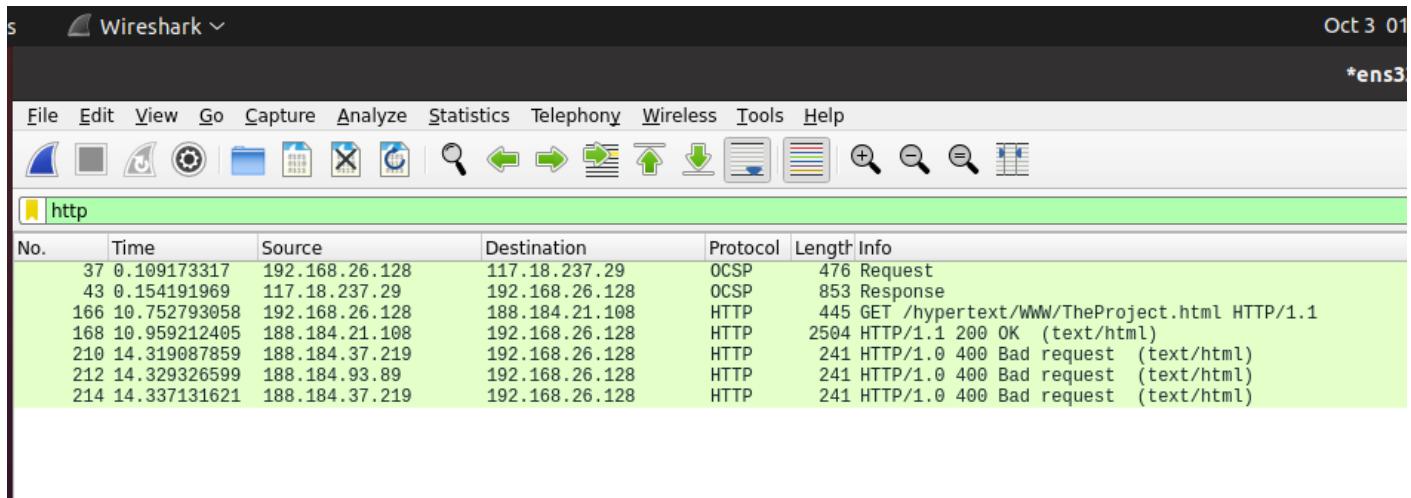


## Computer Network Command Line Utilities

1.



2.

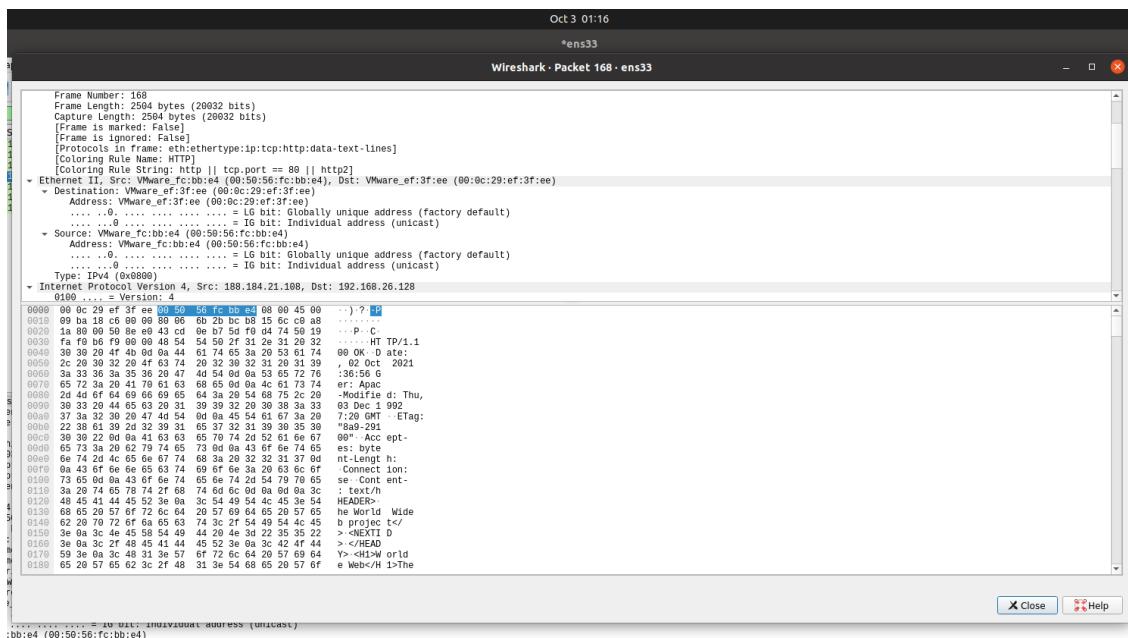


### HTTP request Packet

- HTTP request type → GET
- HTTP user agent type → Mozilla/5.0
- HTTP request packet's URL → /hypertext/WWW/TheProject.html HTTP/1.1
- Name and version of the webserver → Apache

### HTTP response Packet

- HTTP Response Code→ 200 OK
- HTTP response Description →



3.

The screenshot shows two windows side-by-side. On the left is a terminal window titled 'vasu@vasu-virtual-machine: ~/Desktop' displaying the output of the 'ifconfig' command. The output shows network interfaces 'ens33' and 'lo'. 'ens33' has an IP of 192.168.26.128 and 'lo' has an IP of 127.0.0.1. On the right is a web browser window titled 'My IP Information' showing the result of a query to 'whatismyip.com'. It displays 'My Public IPv4 is: 49.36.190.61' and 'Your IPv6 is: Not Detected'. Below this is an advertisement for NordVPN with the text 'Stay safe, browse fast.' and a 'Get Special Deal' button.

```
vasu@vasu-virtual-machine: ~/Desktop$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 192.168.26.128 netmask 255.255.255.0 broadcast 192.168.26.255
        ether 00:0c:29:ef:f1:1e txqueuelen 1000 (Ethernet)
        RX packets 106945 bytes 149387874 (149.3 MB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 14508 bytes 8987471 (8.9 MB)
        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 2135 bytes 200386 (200.3 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 2135 bytes 200386 (200.3 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vasu@vasu-virtual-machine: ~/Desktop$
```

Result: Both IP addresses found through ifconfig and whatismyip.org are different.

Reason: This is due to the reason that the IP address shown by the whatismyip.org is that which is provided by the ISP's and not of our pc. It can be noted that if we check the ip on various machines that are smartphones, laptops connected to the same network they will be shown the same IP on the whatismyip.org. This is due to the reason that Common IP is provided by our ISP to manage the number of IPs, as there is only a finite number of IPs in the world.

4.

a)

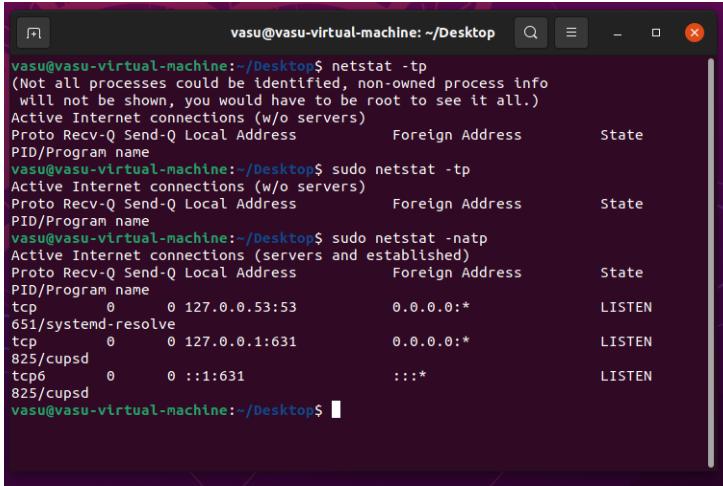
Command: ping [www.iiitd.ac.in](http://www.iiitd.ac.in) -c 10 -M do -s 3000

The reason test fails is due to the fact that the maximum allowed value of mtu is 1500 bytes, and we are sending data packets with size 3000.if the data is greater than 1500 bytes then data is fragmented into smaller frames , such that max mtu of 1500 is followed.

The screenshot shows a terminal window titled 'vasu@vasu-virtual-machine: ~/Desktop' executing a ping command. The command is 'ping www.iiitd.ac.in -c 10 -M do -s 3000'. The output shows several 'ping: local error: message too long, mtu=1500' messages, indicating that the packet size is larger than the MTU of 1500 bytes. Finally, it shows the statistics: 3 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2026ms.

```
vasu@vasu-virtual-machine:~/Desktop$ ping www.iiitd.ac.in -c 10 -M do -s 3000
PING iiitd.ac.in (103.25.231.30) 3000(3028) bytes of data.
ping: local error: message too long, mtu=1500
ping: local error: message too long, mtu=1500
ping: local error: message too long, mtu=1500
^C
--- iiitd.ac.in ping statistics ---
3 packets transmitted, 0 received, +3 errors, 100% packet loss, time 2026ms
```

b)



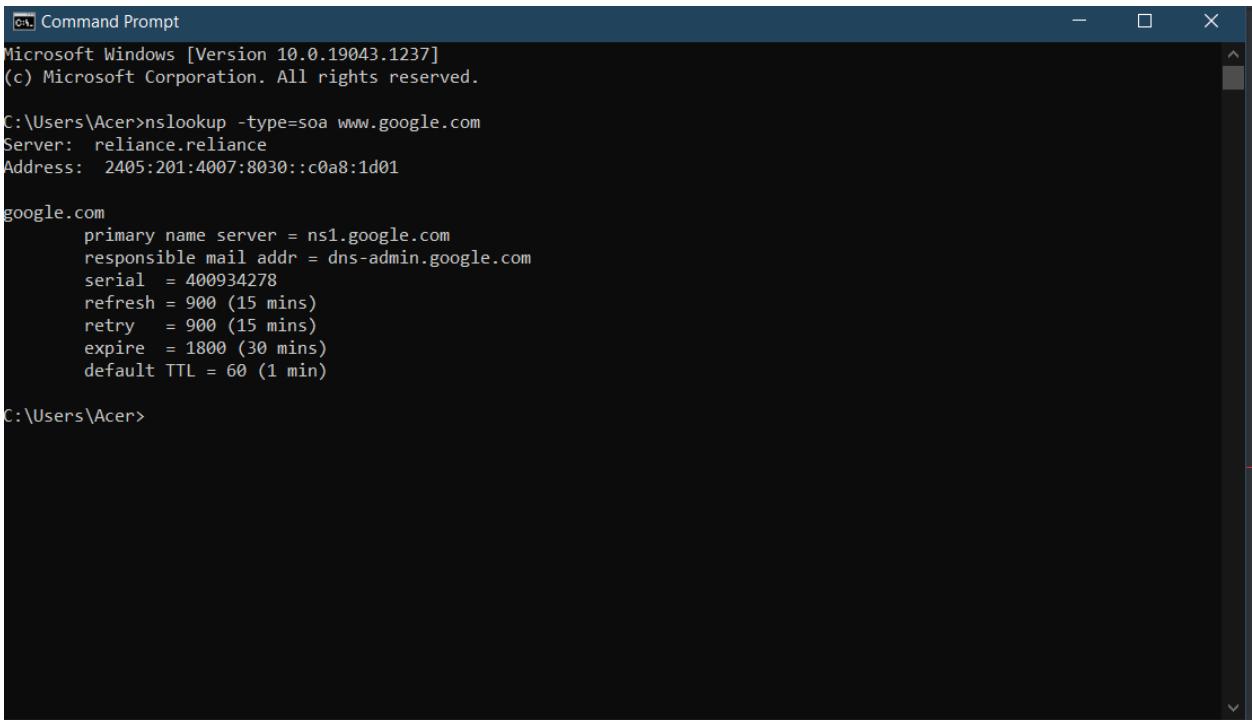
```
vasu@vasu-virtual-machine:~/Desktop$ netstat -tp
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
PID/Program name

vasu@vasu-virtual-machine:~/Desktop$ sudo netstat -tp
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
PID/Program name

vasu@vasu-virtual-machine:~/Desktop$ sudo netstat -natp
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
PID/Program name
tcp        0      0 127.0.0.53:53           0.0.0.0:*              LISTEN
651/systemd-resolve
tcp        0      0 127.0.0.1:631          0.0.0.0:*              LISTEN
825/cupsd
tcp6       0      0 ::1:631                ::*:*                 LISTEN
825/cupsd
vasu@vasu-virtual-machine:~/Desktop$
```

Q5.

a)



```
Command Prompt
Microsoft Windows [Version 10.0.19043.1237]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Acer>nslookup -type=soa www.google.com
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

google.com
    primary name server = ns1.google.com
    responsible mail addr = dns-admin.google.com
    serial = 400934278
    refresh = 900 (15 mins)
    retry = 900 (15 mins)
    expire = 1800 (30 mins)
    default TTL = 60 (1 min)

C:\Users\Acer>
```

b)

TTL is a value in an Internet Protocol (IP) packet that tells a network router when the packet has been in the network too long and should be discarded. In our case, we got a ttl of 4 secs for the url [www.iiith.ac.in](http://www.iiith.ac.in) which means packet older than 4secs will be discarded.

Activities Terminal

```
vasu@vasu-virtual-machine:~$ nslookup -debug www.iiith.ac.in
Server:      127.0.0.53
Address:     127.0.0.53#53

-----
QUESTIONS:
    www.iiith.ac.in, type = A, class = IN
ANSWERS:
->  www.iiith.ac.in
    canonical name = www.iiit.ac.in.
    ttl = 5
->  www.iiit.ac.in
    internet address = 196.12.53.50
    ttl = 4
AUTHORITY RECORDS:
ADDITIONAL RECORDS:
-----
Non-authoritative answer:
www.iiith.ac.in canonical name = www.iiit.ac.in.
Name:  www.iiit.ac.in
Address: 196.12.53.50
-----
QUESTIONS:
    www.iiit.ac.in, type = AAAA, class = IN
ANSWERS:
AUTHORITY RECORDS:
ADDITIONAL RECORDS:
-----
vasu@vasu-virtual-machine:~$
```

6.

a)

```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\WINDOWS\system32> tracert iiith.ac.in

Tracing route to iiith.ac.in [121.242.23.195]
over a maximum of 30 hops:

 1    2 ms      6 ms      3 ms  reliance.reliance [192.168.29.1]
 2    5 ms      4 ms      3 ms  10.3.192.1
 3    6 ms     11 ms      9 ms  172.16.18.1
 4    6 ms      6 ms      4 ms  192.168.128.140
 5    6 ms      6 ms      6 ms  172.27.248.53
 6    5 ms      6 ms      4 ms  172.27.248.35
 7    5 ms      7 ms      7 ms  192.168.44.26
 8    *          *          * Request timed out.
 9    *          *          * Request timed out.
10   *          *          * Request timed out.
11   *          *          * Request timed out.
12   *          *          * Request timed out.
13   9 ms      9 ms      9 ms  115.110.210.37.static-Delhi.vsnl.net.in [115.110.210.37]
14   *          *          * Request timed out.
15   *          *          * Request timed out.
16   *          *          * Request timed out.
17   *          *          * Request timed out.
18   *          *          * Request timed out.
19   *          *          * Request timed out.
20   *          *          * Request timed out.
21   *          *          * Request timed out.
22   *          *          * Request timed out.
23   *          *          * Request timed out.
24   *          *          * Request timed out.
25   *          *          * Request timed out.
26   *          *          * Request timed out.
27   *          *          * Request timed out.
28   *          *          * Request timed out.
29   *          *          * Request timed out.
30   *          *          * Request timed out.

Trace complete.
PS C:\WINDOWS\system32>
```

b)

```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> ping -n 100 www.iiith.ac.in

Pinging www.iiith.ac.in [196.12.53.50] with 32 bytes of data:
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=60ms TTL=49
Reply from 196.12.53.50: bytes=32 time=60ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=64ms TTL=49
Reply from 196.12.53.50: bytes=32 time=56ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=64ms TTL=49
Reply from 196.12.53.50: bytes=32 time=87ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=60ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=61ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=62ms TTL=49
Reply from 196.12.53.50: bytes=32 time=66ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
```

```
Administrator: Windows PowerShell
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=63ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=73ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=63ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=61ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=60ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=78ms TTL=49
Reply from 196.12.53.50: bytes=32 time=65ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=57ms TTL=49
Reply from 196.12.53.50: bytes=32 time=59ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Reply from 196.12.53.50: bytes=32 time=58ms TTL=49
Ping statistics for 196.12.53.50:
    Packets: Sent = 100, Received = 100, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 56ms, Maximum = 88ms, Average = 60ms
PS C:\WINDOWS\system32>
```

Average Latency: 60ms

c)

No the sum of all the avg latency of intermediate host does not match the avg latency in (b), and it is actually very less i.e 21 as compared to 60ms , this might due to reason that while pinging IPs i got in traceroute many didnt return any value while pinging, so this might be reason for a error.

d)

When calculated this value came out to be 32ms which is still far away from 60ms, again ping failure at many intermediate IPs might be reason for the same. As theoretically this value should be almost equal or close to the average value we got during ping in b but as ping failures occurring we cannot provide accurate results.

e)

```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> nslookup
Default Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

> 192.168.29.1
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

Name:   reliance.reliance
Address: 192.168.29.1

> 10.3.192.1
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

*** reliance.reliance can't find 10.3.192.1: Non-existent domain
> 192.168.128.140
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

*** reliance.reliance can't find 192.168.128.140: Non-existent domain
> 172.27.248.53
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

*** reliance.reliance can't find 172.27.248.53: Non-existent domain
> 172.27.248.35
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

*** reliance.reliance can't find 172.27.248.35: Non-existent domain
> 192.168.44.26
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

*** reliance.reliance can't find 192.168.44.26: Non-existent domain
> 115.110.210.37
Server: reliance.reliance
Address: 2405:201:4007:8030::c0a8:1d01

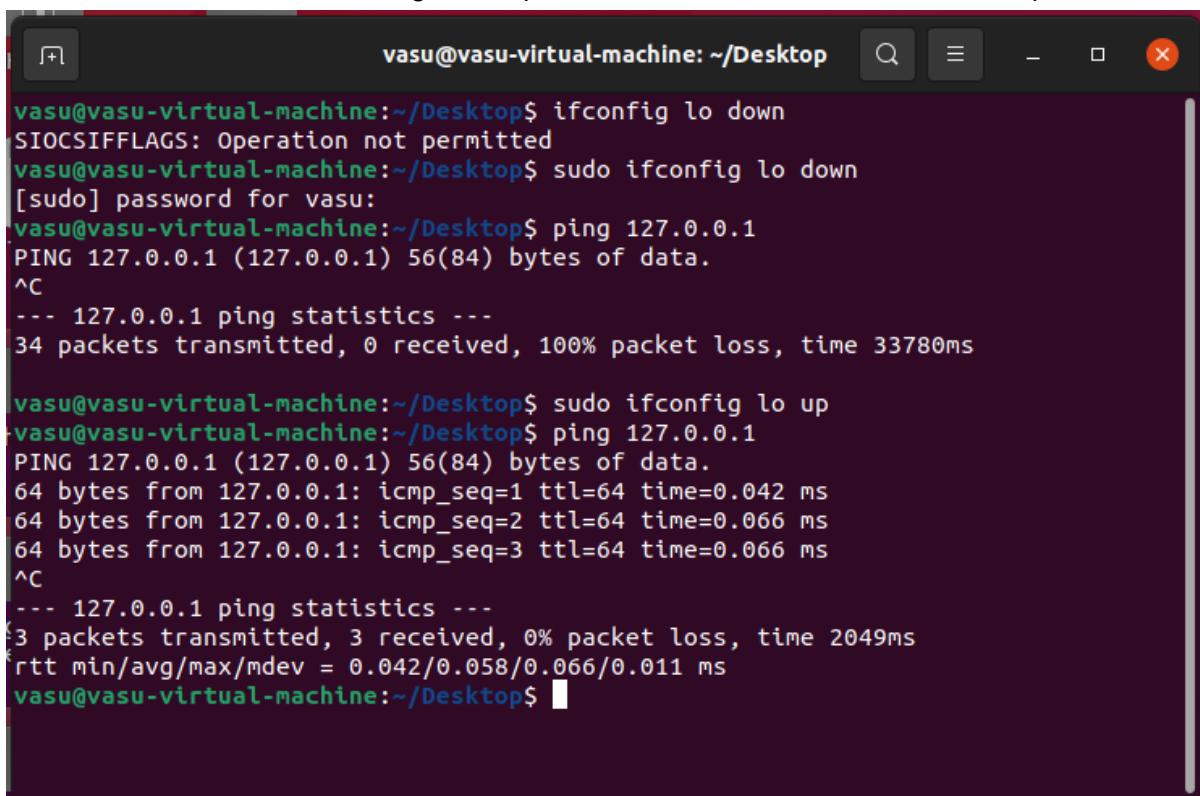
Name:   115.110.210.37.static-Delhi.vsnl.net.in
Address: 115.110.210.37

>
```

7.

Command used: sudo ifconfig lo down

This command disables the loopback interface and as loopback interface is used by local services , so they wouldnt be able to work until we enable it again. So when we ping local address 127.0.0.1 after disabling the loopback interface it would result in 100% packet loss.



The screenshot shows a terminal window titled "vasu@vasu-virtual-machine: ~/Desktop". The terminal output is as follows:

```
vasu@vasu-virtual-machine:~/Desktop$ ifconfig lo down
SIOCSIFFLAGS: Operation not permitted
vasu@vasu-virtual-machine:~/Desktop$ sudo ifconfig lo down
[sudo] password for vasu:
vasu@vasu-virtual-machine:~/Desktop$ ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
^C
--- 127.0.0.1 ping statistics ---
34 packets transmitted, 0 received, 100% packet loss, time 33780ms

vasu@vasu-virtual-machine:~/Desktop$ sudo ifconfig lo up
vasu@vasu-virtual-machine:~/Desktop$ ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.042 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.066 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.066 ms
^C
--- 127.0.0.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2049ms
rtt min/avg/max/mdev = 0.042/0.058/0.066/0.011 ms
vasu@vasu-virtual-machine:~/Desktop$
```