

Computer Networks Assignment-1

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Q1)

a)

Ifconfig:- Interface configuration. It is used to view and change the configuration of the network interface in the system.

IP address = 192.168.168.129

```
vishnu@vishnu-virtual-machine:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.168.129  netmask 255.255.255.0  broadcast 192.168.168.255
    inet6 fe80::8ff4:9668:f75:5b9f  prefixlen 64  scopeid 0x20<link>
    ether 00:0c:29:02:2b:9a  txqueuelen 1000  (Ethernet)
    RX packets 186109  bytes 269547497 (269.5 MB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 26604  bytes 4756312 (4.7 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 2788  bytes 283908 (283.9 KB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 2788  bytes 283908 (283.9 KB)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

b)

IP address shown on the website <https://www.whatismyip.com> is **180.151.15.242**

Both IPs are different. In the first case, it is the network interface IP address and in the second case, it is the IP address of the internet(ISP). In the first case the IP that DHCP (Dynamic host configuration protocol) is provided to us and in the second case the IP which the ISP Provides us, the world recognizes us with this IP.

What Is My IP?

My Public IPv4 is: 180.151.15.242 

My Public IPv6 is: Not Detected

My IP Location is: Ludhiana, PB IN

My ISP is: Shyam Spectra Pvt Ltd

My IP Information

Hide My IP Address

Q2)

```
vishnu@vishnu-virtual-machine:~$ nslookup google.in
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.in
Address: 142.250.192.36
Name:   google.in
Address: 2404:6800:4009:80d::2004
```

To find the authoritative name-server for a domain name. We first need to access the Start of Authority to access the authoritative server.

```
vishnu@vishnu-virtual-machine:~$ nslookup -type=soa google.in
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
google.in
    origin = ns1.google.com
    mail addr = dns-admin.google.com
    serial = 475782946
    refresh = 900
    retry = 900
    expire = 1800
    minimum = 60

Authoritative answers can be found from:
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  has AAAA address 2001:4860:4802:32::a
```

To get the primary server IP address of google.in we can lookup for ns1.google.com. For authoritative results, we have to specify the name of the server the nslookup command.

```
vishnu@vishnu-virtual-machine:~$ nslookup google.in ns1.google.com
Server:          ns1.google.com
Address:         216.239.32.10#53

Name:   google.in
Address: 142.250.194.164
Name:   google.in
Address: 2404:6800:4002:823::2004
```

b)

```
vishnu@vishnu-virtual-machine:~$ dig +noedns google.com

; <<>> DiG 9.18.1-1ubuntu1.2-Ubuntu <<>> +noedns google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 47968
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;google.com.                IN      A

;; ANSWER SECTION:
google.com.                 5       IN      A      142.250.194.206

;; Query time: 8 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Fri Sep 23 18:58:27 IST 2022
;; MSG SIZE rcvd: 44

vishnu@vishnu-virtual-machine:~$ dig +nocmd +noall +answer +ttlid +noedns google.com
google.com.                 5       IN      A      142.250.194.206
vishnu@vishnu-virtual-machine:~$
```

It would expire in 5 seconds.

3)

a)

1	10 ms	18 ms	40 ms	192.168.48.254
2	29 ms	62 ms	84 ms	auth.iiitd.edu.in [192.168.1.99]
3	5 ms	7 ms	28 ms	180.151.15.241.reverse.spectranet.in [180.151.15.241]
4	6 ms	9 ms	8 ms	72.14.194.202
5	124 ms	37 ms	8 ms	74.125.243.99
6	26 ms	41 ms	26 ms	172.253.69.58
7	47 ms	51 ms	86 ms	216.239.48.65
8	25 ms	24 ms	39 ms	108.170.248.209
9	31 ms	26 ms	37 ms	142.251.70.57
10	31 ms	31 ms	39 ms	bom07s35-in-f4.1e100.net [142.250.66.4]

Average latency:-

1. $(10 + 18 + 40)/3 = 22.66/2 = 11.33$
2. $(29+62+84)/3 = 58.333/2 = 29.1665$
3. $(5+7+28)/3 = 13.33/2 = 6.665$
4. $(6+9+8)/3 = 7.66/2 = 3.83$
5. $(124+37+8)/3 = 56.33/2 = 28.165$
6. $(26+41+26)/3 = 31/2 = 15.5$
7. $(47+51+86)/3 = 61.3333/2 = 30.7775$
8. $(25+24+39)/3 = 29.3333/2 = 14.6665$
9. $(31+26+37)/3 = 31.333/2 = 15.665$
10. $(31+31+39)/3 = 33.666/2 = 16.833$

b)

```
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=72 ttl=128 time=3.68 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=73 ttl=128 time=3.42 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=74 ttl=128 time=3.40 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=75 ttl=128 time=3.26 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=76 ttl=128 time=3.64 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=77 ttl=128 time=3.70 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=78 ttl=128 time=3.47 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=79 ttl=128 time=3.24 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=80 ttl=128 time=3.46 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=81 ttl=128 time=3.08 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=82 ttl=128 time=3.35 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=83 ttl=128 time=3.53 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=84 ttl=128 time=3.45 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=85 ttl=128 time=3.33 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=86 ttl=128 time=3.43 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=87 ttl=128 time=3.18 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=88 ttl=128 time=3.26 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=89 ttl=128 time=3.48 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=90 ttl=128 time=3.62 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=91 ttl=128 time=3.43 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=92 ttl=128 time=3.46 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=93 ttl=128 time=3.42 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=94 ttl=128 time=3.36 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=95 ttl=128 time=3.77 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=96 ttl=128 time=3.31 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=97 ttl=128 time=3.28 ms
64 bytes from kul01s10-in-f36.1e100.net (216.58.221.36): icmp_seq=98 ttl=128 time=3.77 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=99 ttl=128 time=3.39 ms
64 bytes from del03s07-in-f4.1e100.net (216.58.221.36): icmp_seq=100 ttl=128 time=3.43 ms

--- google.in ping statistics ---
100 packets transmitted, 100 received, 0% packet loss, time 99172ms
rtt min/avg/max/mdev = 2.617/3.607/5.790/0.484 ms
```

The average latency is **1.8ms**

c)

```
64 bytes from www-ltm.cc.columbia.edu (128.59.105.24): icmp_seq=72 ttl=128 time=245 ms
64 bytes from columbia.edu (128.59.105.24): icmp_seq=73 ttl=128 time=246 ms
64 bytes from p-i-r.org (128.59.105.24): icmp_seq=74 ttl=128 time=245 ms
64 bytes from columbiauniversity.org (128.59.105.24): icmp_seq=75 ttl=128 time=245 ms
64 bytes from teachtechaward.org (128.59.105.24): icmp_seq=76 ttl=128 time=245 ms
64 bytes from columbiauniversity.us (128.59.105.24): icmp_seq=77 ttl=128 time=245 ms
64 bytes from gutenbergs-e.org (128.59.105.24): icmp_seq=78 ttl=128 time=245 ms
64 bytes from columbiauniversity.info (128.59.105.24): icmp_seq=79 ttl=128 time=245 ms
64 bytes from old.columbia.university (128.59.105.24): icmp_seq=80 ttl=128 time=245 ms
64 bytes from p-i-r.org (128.59.105.24): icmp_seq=81 ttl=128 time=245 ms
64 bytes from www.neurotheory.columbia.edu (128.59.105.24): icmp_seq=82 ttl=128 time=248 ms
64 bytes from old.columbia.university (128.59.105.24): icmp_seq=83 ttl=128 time=246 ms
64 bytes from neurotheory.columbia.edu (128.59.105.24): icmp_seq=84 ttl=128 time=246 ms
64 bytes from vii.org (128.59.105.24): icmp_seq=85 ttl=128 time=245 ms
64 bytes from childpolicy.org (128.59.105.24): icmp_seq=86 ttl=128 time=245 ms
64 bytes from teachtechaward.org (128.59.105.24): icmp_seq=87 ttl=128 time=245 ms
64 bytes from neurotheory.columbia.edu (128.59.105.24): icmp_seq=88 ttl=128 time=245 ms
64 bytes from columbiauniversity.info (128.59.105.24): icmp_seq=89 ttl=128 time=246 ms
64 bytes from www-ltm.cc.columbia.edu (128.59.105.24): icmp_seq=90 ttl=128 time=245 ms
64 bytes from columbiauniversity.info (128.59.105.24): icmp_seq=91 ttl=128 time=246 ms
64 bytes from neurotheory.columbia.edu (128.59.105.24): icmp_seq=92 ttl=128 time=245 ms
64 bytes from www.neurotheory.columbia.edu (128.59.105.24): icmp_seq=93 ttl=128 time=245 ms
64 bytes from teachtechaward.org (128.59.105.24): icmp_seq=94 ttl=128 time=245 ms
64 bytes from teachtechaward.org (128.59.105.24): icmp_seq=95 ttl=128 time=245 ms
64 bytes from old.columbia.university (128.59.105.24): icmp_seq=96 ttl=128 time=245 ms
64 bytes from columbiauniversity.org (128.59.105.24): icmp_seq=97 ttl=128 time=245 ms
64 bytes from www-ltm.cc.columbia.edu (128.59.105.24): icmp_seq=98 ttl=128 time=245 ms
64 bytes from p-i-r.org (128.59.105.24): icmp_seq=99 ttl=128 time=246 ms
64 bytes from vii.org (128.59.105.24): icmp_seq=100 ttl=128 time=245 ms

--- columbia.edu ping statistics ---
100 packets transmitted, 100 received, 0% packet loss, time 99154ms
rtt min/avg/max/mdev = 244.790/245.532/252.839/0.869 ms
```

The average latency is **122.766ms**

d)

Sum of the values of the latencies = 172.483ms and the average latency in (b) is 1.8ms. The difference is because when we fetch the path using traceroute it the nodes send the acknowledgement duw to which the delay accors in tracteroute case.

e)

The maximum values of the latencies are 30.665ms and the maximum latency in (b) is 1.8 ms.The difference is because when we fetch the path using traceroute it the nodes send the acknowledgement duw to which the delay accors in tracteroute case.

f)

```
Tracing route to google.in [142.250.66.4]
over a maximum of 30 hops:

  1    10 ms    18 ms    40 ms    192.168.48.254
  2    29 ms    62 ms    84 ms    auth.iiitd.edu.in [192.168.1.99]
  3     5 ms     7 ms    28 ms    180.151.15.241.reverse.spectranet.in [180.151.15.241]
  4     6 ms     9 ms     8 ms    72.14.194.202
  5   124 ms    37 ms     8 ms    74.125.243.99
  6    26 ms    41 ms    26 ms    172.253.69.58
  7    47 ms    51 ms    86 ms    216.239.48.65
  8    25 ms    24 ms    39 ms    108.170.248.209
  9    31 ms    26 ms    37 ms    142.251.70.57
 10    31 ms    31 ms    39 ms    bom07s35-in-f4.1e100.net [142.250.66.4]

Trace complete.

C:\Users\799vi>tracert columbia.edu

Tracing route to columbia.edu [128.59.105.24]
over a maximum of 30 hops:

  1    45 ms    20 ms     2 ms    192.168.64.254
  2     1 ms     1 ms     1 ms    vpn.iiitd.edu.in [192.168.1.99]
  3     2 ms     2 ms     3 ms    180.151.15.241.reverse.spectranet.in [180.151.15.241]
  4     3 ms     3 ms     3 ms    219.65.112.205.static-delhi.vsnl.net.in [219.65.112.205]
  5    24 ms    24 ms    26 ms    172.28.176.253
  6    26 ms    41 ms    26 ms    ix-ae-0-100.tcore1.mlv-mumbai.as6453.net [180.87.38.5]
  7   147 ms     *      *      if-be-6-2.ecore1.emrs2-marseille.as6453.net [195.219.174.16]
  8     *      146 ms   146 ms   if-ae-7-2.tcore1.pye-paris.as6453.net [195.219.174.9]
  9   146 ms   145 ms   146 ms   if-ae-55-4.tcore1.pvu-paris.as6453.net [80.231.153.168]
 10   141 ms   141 ms   142 ms   be6453.agr21.par04.atlas.cogentco.com [130.117.15.69]
 11   148 ms   147 ms   148 ms   be2151.ccr32.par04.atlas.cogentco.com [154.54.61.33]
 12   147 ms   148 ms   149 ms   be2103.ccr42.par01.atlas.cogentco.com [154.54.61.21]
 13   252 ms   238 ms   238 ms   be3628.ccr42.jfk02.atlas.cogentco.com [154.54.27.169]
 14   239 ms   239 ms   239 ms   be2897.rcr24.jfk01.atlas.cogentco.com [154.54.84.214]
 15   237 ms   238 ms   237 ms   38.122.8.210
 16   240 ms   240 ms   240 ms   cc-core-1-x-nyser32-gw-1.net.columbia.edu [128.59.255.5]
 17   239 ms   239 ms   239 ms   cc-conc-1-x-cc-core-1.net.columbia.edu [128.59.255.21]
 18   244 ms   244 ms   244 ms   columbiauniversity.info [128.59.105.24]
```

It is clearly evident from the above image of traceroutes of google.in and columbia.edu that the latencies to reach google.in is less compared to the latencies of columbia.edu. The number of hops to reach the destination in case of google is 9, whereas in case of columbia.edu is 17 hops. The physical location of the sever columbia.edu is with IP 128.59.105.24 is far from the server of google.in with IP 142.250.66.4. Therefore the latency to reach columbia.edu is higher than the latency to reach google.in

4)

```
vishnu@vishnu-virtual-machine:~$ ping -c 7 127.0.0.1
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=0.046 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.046 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.069 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.067 ms
64 bytes from 127.0.0.1: icmp_seq=5 ttl=64 time=0.139 ms
64 bytes from 127.0.0.1: icmp_seq=6 ttl=64 time=0.059 ms
64 bytes from 127.0.0.1: icmp_seq=7 ttl=64 time=0.067 ms

--- 127.0.0.1 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6116ms
rtt min/avg/max/mdev = 0.046/0.070/0.139/0.029 ms
vishnu@vishnu-virtual-machine:~$ sudo ifconfig lo down
[sudo] password for vishnu:
vishnu@vishnu-virtual-machine:~$ ping -c 7 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.

--- 127.0.0.1 ping statistics ---
7 packets transmitted, 0 received, 100% packet loss, time 6137ms

vishnu@vishnu-virtual-machine:~$ sudo ifconfig lo up
vishnu@vishnu-virtual-machine:~$
```

127.0.0.1 is the IP address. With the command **sudo ifconfig lo down** the command will temporarily disable the loopback interface thus ping command fails with the IP 127.0.0.1. Here 7 packets are transmitted and 0 received and hence the packet loss is 100%. This command will check the connectivity of the loopback interface by sending packets to it and receiving the same. We can bring down the IP and then with the command **sudo ifconfig lo up** command we can take the IP address 127.0.0.1 up and running.

5)

The image shows a Wireshark network traffic capture. The top toolbar includes menus like File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. Below the toolbar is a filter bar with the expression 'ip.addr == 188.184.21.108 and http'. The main packet list shows four packets, with packet 123 selected. The packet details pane for packet 123 shows the following structure:

- Frame 123: 398 bytes on wire (3184 bits), 398 bytes captured (3184 bits) on interface ens33, id 0
- Ethernet II, Src: VMware_02:2b:9a (00:0c:29:02:2b:9a), Dst: VMware_e9:c1:5c (00:50:56:e9:c1:5c)
- Internet Protocol Version 4, Src: 192.168.168.129, Dst: 188.184.21.108
- Transmission Control Protocol, Src Port: 53104, Dst Port: 80, Seq: 1, Ack: 1, Len: 344
- Hypertext Transfer Protocol
 - GET / HTTP/1.1
 - [Expert Info (Chat/Sequence): GET / HTTP/1.1\r\n]
 - Request Method: GET
 - Request URI: /
 - Request Version: HTTP/1.1
 - Host: info.cern.ch
 - User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:105.0) Gecko/20100101 Firefox/105.0
 - Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
 - Accept-Language: en-US,en;q=0.5
 - Accept-Encoding: gzip, deflate
 - Connection: keep-alive
 - Upgrade-Insecure-Requests: 1

At the bottom, the packet bytes pane shows the raw data in hexadecimal and ASCII. The status bar at the bottom indicates 'Hypertext Transfer Protocol: Protocol', 'Packets: 373 · Displayed: 4 (1.1%)', and 'Profile: Default'.

Http request type = GET

User agent type = Mozilla/5.0

HTTP request packet's URL = http://info.cern.ch/

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help						
ip.addr == 188.184.21.108 and http						
No.	Time	Source	Destination	Protocol	Length-Info	
123	31.465862761	192.168.168.129	188.184.21.108	HTTP	398	GET / HTTP/1.1
129	31.763174083	188.184.21.108	192.168.168.129	HTTP	932	HTTP/1.1 200 OK (text/html)
188	32.160924928	192.168.168.129	188.184.21.108	HTTP	350	GET /favicon.ico HTTP/1.1
205	32.375732719	188.184.21.108	192.168.168.129	HTTP	458	HTTP/1.1 200 OK (image/vnd.microsoft.icon)

<p>Frame 129: 932 bytes on wire (7456 bits), 932 bytes captured (7456 bits) on interface ens33, id 0</p> <p>Ethernet II, Src: VMware_e9:c1:5c (00:50:56:e9:c1:5c), Dst: VMware_02:b:9a (00:0c:29:02:b:9a)</p> <p>Internet Protocol Version 4, Src: 188.184.21.108, Dst: 192.168.168.129</p> <p>Transmission Control Protocol, Src Port: 80, Dst Port: 53104, Seq: 1, Ack: 345, Len: 878</p> <p>Hypertext Transfer Protocol</p> <p>HTTP/1.1 200 OK\r\n</p> <p>[Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]</p> <p>Response Version: HTTP/1.1</p> <p>Status Code: 200</p> <p>[Status Code Description: OK]</p> <p>Response Phrase: OK</p> <p>Date: Fri, 23 Sep 2022 13:36:25 GMT\r\n</p> <p>Server: Apache\r\n</p> <p>Last-Modified: Wed, 05 Feb 2014 16:00:31 GMT\r\n</p> <p>Etag: "286-4f1aadb3105c0"\r\n</p> <p>Accept-Ranges: bytes\r\n</p> <p>Content-Length: 646\r\n</p> <p>Connection: close\r\n</p> <p>Content-Type: text/html\r\n</p> <p>\r\n</p> <p>[HTTP response 1/1]</p> <p>[Time since request: 0.267311322 seconds]</p> <p>[Request in frame: 123]</p> <p>[Request URI: http://info.cern.ch/]</p> <p>File Data: 646 bytes</p>	<p>0000 00 0c 29 02 b 9a 00 50 56 e9 c1 5c 08 00 45 00 ..) +..P V...E</p>
--	---

0000 00 0c 29 02 b 9a 00 50 56 e9 c1 5c 08 00 45 00 ..) +..P V...E

Hypertext Transfer Protocol: Protocol

Packets: 438 · Displayed: 4 (0.9%)

Profile: Default

HTTP response code = 200

HTTP response description = OK

Name and version of the web server = Apache 1.1

4 packets have been downloaded. They were on the same TCP connections.

Persistent. As the versions of the requests and responses are not the same.

6)

a) netstat -ano -t tcp 188.184.21.108(IP address)

```
vishnu@vishnu-virtual-machine:~$ nslookup info.cern.ch
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
info.cern.ch canonical name = webafs706.cern.ch.
Name:   webafs706.cern.ch
Address: 188.184.21.108
Name:   webafs706.cern.ch
Address: 2001:1458:d00:34::100:125

vishnu@vishnu-virtual-machine:~$ netstat -ano -t tcp 188.184.21.108
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       Timer
tcp      0      0 127.0.0.1:631          0.0.0.0:*               LISTEN      off (0.00/0/0)
tcp      0      0 127.0.0.53:53          0.0.0.0:*               LISTEN      off (0.00/0/0)
tcp      0      0 192.168.168.129:59344  13.227.138.17:443      ESTABLISHED keepalive (9.44/0/0)
tcp      0      0 192.168.168.129:59192  13.35.191.54:443       ESTABLISHED keepalive (7.29/0/0)
tcp      0      0 192.168.168.129:59354  13.227.138.17:443      ESTABLISHED keepalive (9.44/0/0)
tcp    1562      0 192.168.168.129:59356  13.227.138.17:443      ESTABLISHED keepalive (9.44/0/0)
tcp      0      0 192.168.168.129:59268  18.66.78.9:443         ESTABLISHED off (0.00/0/0)
tcp      0      0 192.168.168.129:58334  34.117.237.239:443     TIME_WAIT   timewait (18.96/0/0)
tcp      0      0 192.168.168.129:42680  13.35.191.54:443       ESTABLISHED keepalive (4.15/0/0)
tcp      0      0 192.168.168.129:59210  13.35.191.54:443       ESTABLISHED keepalive (7.30/0/0)
tcp      0      0 192.168.168.129:59370  13.227.138.17:443      ESTABLISHED keepalive (9.43/0/0)
tcp    2613      0 192.168.168.129:59332  13.227.138.17:443      ESTABLISHED keepalive (9.44/0/0)
tcp      0      0 192.168.168.129:59196  13.35.191.54:443       ESTABLISHED keepalive (7.29/0/0)
tcp      0      0 192.168.168.129:59178  13.35.191.54:443       ESTABLISHED keepalive (7.29/0/0)
tcp      0      0 192.168.168.129:59334  13.227.138.17:443      ESTABLISHED keepalive (9.43/0/0)
tcp      0      0 192.168.168.129:59212  13.35.191.54:443       ESTABLISHED keepalive (7.30/0/0)
tcp      0      0 192.168.168.129:60398  34.210.107.213:443     ESTABLISHED keepalive (93.68/0/0)
tcp6     0      0 :::1:631               :::*                    LISTEN      off (0.00/0/0)
```

b)

```
vishnu@vishnu-virtual-machine:~$ netstat -t http://info.cern.ch
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 vishnu-virtual-ma:58700 _gateway:domain        TIME_WAIT
tcp      0      0 vishnu-virtual-ma:53628 ec2-52-42-74-230.:https ESTABLISHED
tcp      0      0 vishnu-virtual-ma:36644 _gateway:domain        ESTABLISHED
```

Status:- Established