

Assignment 1

- Name: Raushan Kumar Singh
- Roll: 2020CSB067
- Subject: Computer Networks Lab (CS 3272)

Question 1

Read the man pages of ifconfig, ping, traceroute, arp, dig, nslookup, and netstat and write their utilities in brief.

Answer 1

Ifconfig

- used to configure kernel-resident network interfaces.
- displays detailed information about the active interfaces.

Ping

- checks if the internet connection to the destination host is available or not.
- gives information about the round-trip delay in communicating with the host.
- tells us the percentage of packet loss.

Traceroute

- helps figure out the routing hops data has to go through, as well as response delays as it travels across nodes.
- enables you to locate where the data was unable to be sent along, known as points of failure.

Arp

- viewing and modifying the local Address Resolution Protocol (ARP) cache, which contains recently resolved MAC addresses of Internet Protocol (IP) hosts on the network.

Dig

- query information about various DNS records.

Nslookup

- use to diagnose Domain Name System (DNS) infrastructure.
- If the host is an Internet address and the query type is A or PTR, the nslookup command returns the name of the host.
- If the host is a name and does not have a trailing period, the search list is used to qualify the name.

Netstat

- Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols).

Question 2

Find the IP and hardware addresses of your machine using the ifconfig command.

Answer 2

```
wlp4s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.254.92 netmask 255.255.255.0 broadcast 192.168.254.255
inet6 2409:4060:2096:243a:ddd9:2b7:af4a:9cb5 prefixlen 64 scopeid 0x0<global>
inet6 fe80::db30:939c:534:6120 prefixlen 64 scopeid 0x20<link>
inet6 2409:4060:2096:243a:9f9:55eb:d8e6:626b prefixlen 64 scopeid 0x0<global>
ether dc:f5:05:c1:e4:e1 txqueuelen 1000 (Ethernet)
RX packets 264305 bytes 261732189 (261.7 MB)
RX errors 0 dropped 5273 overruns 0 frame 0
TX packets 121852 bytes 29512754 (29.5 MB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

- IP address is: 192.168.254.92
- HW address is: dc:f5:05:c1:e4:e1

Question 3

Use ping command and find out

- I. The average RTT (round trip time).
- II. The %packet loss.
- III. Size of the packet that is sent to the server.
- IV. Size of the packet that is received by your machine.

Answer 3

```
raushan@blackbox:~$ ping google.com
PING google.com (del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e)) 56 data bytes
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=1 ttl=117 time=203 ms
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=2 ttl=117 time=213 ms
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=3 ttl=117 time=249 ms
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=4 ttl=117 time=210 ms
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=5 ttl=117 time=86.6 ms
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=6 ttl=117 time=108 ms
64 bytes from del12s10-in-x0e.1e100.net (2404:6800:4002:82e::200e): icmp_seq=7 ttl=117 time=131 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6011ms
rtt min/avg/max/mdev = 86.604/171.451/248.517/57.367 ms
```

- I. Average RTT is: 171.451 ms
- II. Packet Loss is: 0%
- III. Size of the packet sent to google.com is: 56 bytes .
- IV. Size of the packet received is: 64 bytes .

Question 4

Use the dig command and find out.

- I. the IP address of .
- II. the IP addresses of DNS servers.

Answer 4

```
raushan@blackbox:~$ dig google.com

; <<>> DiG 9.18.1-1ubuntu1.2-Ubuntu <<>> google.com
; global options: +cmd
; Got answer:
; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 62506
; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
; QUESTION SECTION:
; google.com.                IN      A
;
; ANSWER SECTION:
google.com.                  79      IN      A      142.250.194.206

; Query time: 75 msec
; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
; WHEN: Tue Jan 17 00:39:31 IST 2023
; MSG SIZE rcvd: 55
```

1. The IP Address of github.com is: 142.250.194.206
2. The IP Address of the DNS server is: 127.0.0.53

Question 5

Use traceroute and find out.

1. number of hops in between your machine and server.
2. the IP address of your network gateway of your subnet.

Answer 5

```
raushan@blackbox:~$ sudo traceroute codeforces.com
traceroute to codeforces.com (213.248.110.126), 30 hops max, 60 byte packets
 1  * * *
 2  * * *
 3  10.71.159.10 (10.71.159.10)  204.666 ms  204.641 ms  204.755 ms
 4  192.168.37.43 (192.168.37.43)  204.643 ms  192.168.37.41 (192.168.37.41)  204.893 ms  192.168.37.43 (192.168.37.43)  204.992 ms
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  103.198.140.15 (103.198.140.15)  108.089 ms  49.45.4.80 (49.45.4.80)  108.151 ms  103.198.140.64 (103.198.140.64)  213.378 ms
15  103.198.140.247 (103.198.140.247)  213.280 ms  103.198.140.15 (103.198.140.15)  213.255 ms *
16  49.45.4.82 (49.45.4.82)  214.272 ms sng-e-b3-link.ip.twelve99.net (62.115.177.10)  410.453 ms mei-b5-1-link.ip.twelve99.net (62.115.116.204)  410.377 ms
17  ffm-bb1-link.ip.twelve99.net (62.115.124.58)  410.473 ms ffm-bb2-link.ip.twelve99.net (62.115.114.202)  410.937 ms mei-b5-link.ip.twelve99.net (62.115.124.123)  363.251 ms
18  ffm-bb1-link.ip.twelve99.net (62.115.124.58)  363.203 ms ffm-bb2-link.ip.twelve99.net (62.115.124.60)  363.172 ms mei-b4-link.ip.twelve99.net (62.115.143.22)  361.927 ms
19  ffm-bb2-link.ip.twelve99.net (62.115.124.60)  220.681 ms s-bb1-link.ip.twelve99.net (62.115.143.28)  249.724 ms ffm-bb1-link.ip.twelve99.net (62.115.124.58)  226.498 ms
20  sap-b4-link.ip.twelve99.net (62.115.143.31)  263.874 ms s-bb1-link.ip.twelve99.net (62.115.143.28)  266.706 ms s-bb2-link.ip.twelve99.net (62.115.138.104)  257.774 ms
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

1. Number of hops between my machine and github.com is: 30 .
2. The IP address of my network gateway is: 192.168.254.106 .

Question 6

Use arp command to find out the MAC address of the device that is performing as your network gateway.

Answer 6

```
raushan@blackbox:~$ arp
Address HWtype HWaddress Flags Mask Iface
_gateway ether 26:c9:60:5d:6b:6e C wlp4s0
```

MAC address of the device that is performing as my network gateway is: 26:c9:60:5d:6b:6e

Question 7

Use nslookup command and find out the IP address of .Use nslookup command and perform reverse domain lookup.

Answer 7

```
raushan@blackbox:~$ nslookup codeforces.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   codeforces.com
Address: 213.248.110.126

raushan@blackbox:~$ nslookup 213.248.110.126
126.110.248.213.in-addr.arpa    name = 213-248-110-126.teliacarrier-cust.com.

Authoritative answers can be found from:
```

- The IP address of codeforces.com is 213.248.110.126
- Doing a reverse domain lookup I got: 213-248-110-126.teliacarrier-cust.com.

Question 8

Use netstat command and find out the active connections of your machine.

Answer 8

```

raushan@blackbox: ~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 blackbox:59380         stackoverflow.com:https ESTABLISHED
tcp        0      0 blackbox:42288         whatsapp-cdn-shv-:https ESTABLISHED
tcp6       130    0 blackbox:35746         del03s10-in-x01.1:https CLOSE_WAIT
tcp6        0      0 blackbox:46924         del11s12-in-x03.1:https ESTABLISHED
tcp6        0      0 blackbox:42332         del12s05-in-x05.1:https TIME_WAIT
tcp6       130    0 blackbox:59596         del11s14-in-x0a.1:https CLOSE_WAIT
tcp6        0      0 blackbox:39578         sf-in-f188.1e100.:https ESTABLISHED
tcp6        0      0 blackbox:56498         2600:9000:2041:72:https ESTABLISHED
udp        0      0 localhost:44183         localhost:44183         ESTABLISHED
udp        0      0 blackbox:bootpc        _gateway:bootps        ESTABLISHED
udp6        0      0 blackbox:51830         del11s20-in-x0e.1:https ESTABLISHED
udp6        0      0 blackbox:37059         del11s18-in-x0a.1:https ESTABLISHED
udp6        0      0 blackbox:41361         del12s11-in-x0e.1:https ESTABLISHED
udp6        0      0 blackbox:53911         del11s14-in-x0a.1:https ESTABLISHED
udp6        0      0 blackbox:45951         del11s11-in-x0a.1:https ESTABLISHED
udp6        0      0 blackbox:37785         del12s05-in-x0e.1:https ESTABLISHED
udp6        0      0 blackbox:42015         del11s11-in-x0a.1:https ESTABLISHED
udp6        0      0 blackbox:46147         del12s11-in-x0e.1:https ESTABLISHED
udp6        0      0 blackbox:33923         del11s18-in-x0a.1:https ESTABLISHED
Active UNIX domain sockets (w/o servers)

```