



UNIVERSITY OF DHAKA

Department of Computer Science and Engineering

CSE-3111 : Computer Networking Lab

Lab Report 1 : Lab exercises on LAN configuration and Troubleshooting Tools

Submitted By:

Name: Bholanath Das Niloy

Roll No : 22

Submitted On :

January 19th, 2023

Submitted To :

Dr. Md. Abdur Razzaque

Md Mahmudur Rahman

Md. Ashraful Islam

Md. Fahim Arefin

1 Objectives and Goals achieved in Lab-1

In this lab we have learnt how to use common tools such monitor/change networks and their behaviours on a linux terminal. The commands we have learnt in this lab are as follows:

1. ping

```
> ping google.com
PING google.com (142.250.194.142) 56(84) bytes of data.
64 bytes from del12s05-in-f14.1e100.net (142.250.194.142): icmp_seq=1 ttl=115 time=56.0 ms
64 bytes from del12s05-in-f14.1e100.net (142.250.194.142): icmp_seq=2 ttl=115 time=56.4 ms
64 bytes from del12s05-in-f14.1e100.net (142.250.194.142): icmp_seq=3 ttl=115 time=55.4 ms
64 bytes from del12s05-in-f14.1e100.net (142.250.194.142): icmp_seq=4 ttl=115 time=55.8 ms
64 bytes from del12s05-in-f14.1e100.net (142.250.194.142): icmp_seq=5 ttl=115 time=56.5 ms
64 bytes from del12s05-in-f14.1e100.net (142.250.194.142): icmp_seq=6 ttl=115 time=56.4 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5008ms
rtt min/avg/max/mdev = 55.433/56.104/56.534/0.384 ms

~/Desktop/Networking-Lab ..... took 5s at 08:44:02 PM
> |
```

Figure 1: Pinging google.com

2. ping -c This controls the number of packets sent.

```
> ping -c 3 google.com
PING google.com (142.250.76.78) 56(84) bytes of data.
64 bytes from maa05s14-in-f14.1e100.net (142.250.76.78): icmp_seq=1 ttl=115 time=35.1 ms
64 bytes from maa05s14-in-f14.1e100.net (142.250.76.78): icmp_seq=2 ttl=115 time=36.1 ms
64 bytes from maa05s14-in-f14.1e100.net (142.250.76.78): icmp_seq=3 ttl=115 time=36.1 ms

--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 35.147/35.784/36.138/0.451 ms

~/Desktop/Networking-Lab ..... at 09:02:12 PM
> |
```

Figure 2: Pinging google.com with only 2 packets

3. traceroute

```
> traceroute google.com
traceroute to google.com (142.250.76.78), 30 hops max, 60 byte packets
 1 _gateway (192.168.0.1) 0.373 ms 0.497 ms 0.602 ms
 2 10.200.200.22 (10.200.200.22) 1.738 ms 1.897 ms 1.787 ms
 3 10.200.23.137 (10.200.23.137) 2.145 ms 2.051 ms 2.194 ms
 4 10.200.20.1 (10.200.20.1) 2.934 ms 2.984 ms 1.901 ms
 5 * * *
 6 hu-cig1-0000-cig2-0000.pico.net.bd (163.47.159.93) 2.659 ms 3.210 ms 2.192 ms
 7 be-google-chn-tata-cig1-100.pico.net.bd (103.7.248.142) 38.835 ms 37.663 ms 36.981
ms
 8 * * *
 9 108.170.253.97 (108.170.253.97) 39.125 ms 142.251.55.88 (142.251.55.88) 37.947 ms 10
8.170.253.97 (108.170.253.97) 38.024 ms
10 * * 108.170.253.120 (108.170.253.120) 39.065 ms
11 maa05s14-in-f14.1e100.net (142.250.76.78) 37.619 ms 37.238 ms 74.125.242.129 (74.125
.242.129) 38.014 ms

~/Desktop/Networking-Lab ..... at 09:05:17 PM
> |
```

Figure 3: traceroute google.com

4. traceroute -N This command limits the number of probes sent.

```
> traceroute -N 5 google.com
traceroute to google.com (142.250.76.78), 30 hops max, 60 byte packets
 1 _gateway (192.168.0.1) 0.563 ms 0.516 ms 0.663 ms
 2 10.200.200.22 (10.200.200.22) 2.355 ms 2.435 ms 1.613 ms
 3 10.200.23.137 (10.200.23.137) 23.993 ms 23.953 ms 20.368 ms
 4 10.200.20.1 (10.200.20.1) 1.700 ms 1.732 ms 1.412 ms
 5 * * *
 6 103.131.159.70 (103.131.159.70) 2.386 ms hu-cig1-0000-cig2-0000.pico.net.bd (163.47.1
59.93) 2.394 ms 2.399 ms
 7 be-google-chn-tata-cig1-100.pico.net.bd (103.7.248.142) 37.295 ms 37.277 ms 37.472
ms
 8 * * *
 9 * 142.251.55.64 (142.251.55.64) 37.674 ms 142.251.55.206 (142.251.55.206) 39.565 ms
10 142.250.228.245 (142.250.228.245) 38.766 ms 142.250.228.187 (142.250.228.187) 38.315
ms 108.170.253.104 (108.170.253.104) 38.352 ms
11 maa05s14-in-f14.1e100.net (142.250.76.78) 37.533 ms 37.556 ms 74.125.242.145 (74.125
.242.145) 37.432 ms

~/Desktop/Networking-Lab ..... at 09:08:30 PM
> |
```

Figure 4: traceroute google.com with only 2 probes

5. **ifconfig** This command is deprecated on my linux distribution at home so I used **ip addr** instead.

```
> ip addr
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: enp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether e0:d5:5e:1d:d6:09 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.133/24 brd 192.168.0.255 scope global dynamic noprefixroute enp2s0
        valid_lft 5054sec preferred_lft 5054sec
    inet6 fe80::acfb:24f2:cce6:3af4/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

~/Desktop/Networking-Lab at 09:12:40 PM
```

Figure 5: ip addr

6. **Enabling and Disabling the internet connection**

```
sudo ip link set dev eth0 up
```

Figure 6: Enabling the connection

```
sudo ip link set dev eth0 down
```

Figure 7: Disabling the connection

7. **arp** Given IP requests for MAC address, has other - options such as *n* and *v* for numbered and verbose versions.

```
> arp -a
_gateway (192.168.0.1) at c0:06:c3:e3:e7:8e [ether] on enp2s0
```

Figure 8: arp

8. nslookup

```
> nslookup google.com
Server:          192.168.0.1
Address:         192.168.0.1#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.194.14
Name:   google.com
Address: 2404:6800:4007:815::200e
```

Figure 9: nslookup

9. netstat

```
> netstat -a | more
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 localhost:ipps          0.0.0.0:*               LISTEN
tcp      0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp      0      0 localhost:postgresql    0.0.0.0:*               LISTEN
tcp      0      0 manjaro-desktop:51424   edge-star-shv-01-:https ESTABLISHED
tcp      0      0 manjaro-desktop:43988   sa-in-f188.1e10:hvproom ESTABLISHED
tcp      0      0 manjaro-desktop:44670   nerdvpn.de:https        ESTABLISHED
tcp      0      0 manjaro-desktop:55392   server-18-66-53-1:https ESTABLISHED
tcp      0      0 manjaro-desktop:34370   64.52.120.34.bc.g:https ESTABLISHED
tcp      0      0 manjaro-desktop:51498   server-18-155-68-:https ESTABLISHED
tcp      0      0 manjaro-desktop:43962   stackoverflow.com:https ESTABLISHED
tcp      0      0 manjaro-desktop:55410   server-18-66-53-1:https TIME_WAIT
tcp      0      0 manjaro-desktop:51412   edge-star-shv-01-:https ESTABLISHED
tcp      0      0 manjaro-desktop:52188   maa05s19-in-f14.1:https ESTABLISHED
tcp      0      0 manjaro-desktop:51434   edge-star-shv-01-:https ESTABLISHED
tcp      1      0 manjaro-desktop:39870   249.195.120.34.bc:https CLOSE_WAIT
tcp      0      0 manjaro-desktop:39972   104.22.1.242:https      ESTABLISHED
tcp      0      0 manjaro-desktop:35982   ec2-54-218-71-74.:https ESTABLISHED
tcp      0      0 manjaro-desktop:51612   150.138.117.34.bc:https ESTABLISHED
tcp      0      0 manjaro-desktop:40120   64.52.120.34.bc.g:https ESTABLISHED
tcp      0      0 manjaro-desktop:35600   229.26.211.130.bc:https TIME_WAIT
tcp      0      0 manjaro-desktop:42926   edge-msgr-latest-:https ESTABLISHED
tcp6     0      0 localhost:postgresql    [::]:*                 LISTEN
tcp6     0      0 [::]:xmsg               [::]:*                 LISTEN
tcp6     0      0 [::]:ssh                [::]:*                 LISTEN
tcp6     0      0 localhost:ipps          [::]:*                 LISTEN
```

Figure 10: netstat

References

- [1] Netstat command in Linux. *GeeksforGeeks*, may 30 2017. [Online; accessed 2023-01-17].
- [2] nslookup command in Linux with Examples. *GeeksforGeeks*, dec 20 2018. [Online; accessed 2023-01-17].
- [3] arp command in Linux with examples. *GeeksforGeeks*, mar 8 2019. [Online; accessed 2023-01-17].
- [4] What is RARP ? *GeeksforGeeks*, apr 20 2020. [Online; accessed 2023-01-17].
- [5] Emmet. How to use the ping Command on Ubuntu. <https://pimylifeup.com/ubuntu-ping/>, may 17 2022. [Online; accessed 2023-01-17].
- [6] Hitesh Jethva. How to install Traceroute and run on Ubuntu 20.04. <https://cloudinfrastructureservices.co.uk/how-to-install-traceroute-and-run-on-ubuntu-20-04/>, oct 27 2022. [Online; accessed 2023-01-17].
- [7] Josphat Mutai. ifconfig vs ip usage guide on Linux. <https://computingforgeeks.com/ifconfig-vs-ip-usage-guide-on-linux/>, jan 13 2018. [Online; accessed 2023-01-18].
- [8] Ravi Saive. 15 useful "ifconfig" commands to configure network in linux. <https://www.tecmint.com/ifconfig-command-examples/>, aug 12 2021. [Online; accessed 2023-01-17].