



# 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:Ishwor Dhungana

Roll No :IH-63

**Submitted On :**

January 19, 2023

**Submitted To :**

Dr. Md. Abdur Razzaque

Md Mahmudur Rahman

Md. Ashraful Islam

Md. Fahim Arefin

# 1 Introduction

We will learn the Local Area Network(LAN),its configuration and troubleshooting.In this section you will learn how to configure machines in order to achieve IP connectivity within a Local Area Network (LAN). We will also use Wireshark to observe which traffic is sent (or not) in some scenarios.This will help us to find what is configured correctly and what has to be configured additionally in order to achieve the connectivity.

## 1.1 Objectives

Objectives of LAN configuration and troubleshooting tools:

- To learn basics of Local Area Network (LAN)
- To learn how to configure the troubleshooting in LAN.
- To demonstrate proficiency in using various troubleshooting tools, such as ping, traceroute etc
- To identify and solve common network issues,such as connectivity problems
- To document the lab procedures and results in a clear and organized manner.

# 2 Theory

A LAN is a high-speed data network that covers a relatively small geographic area; it typically connects workstations, personal computers, printers, servers, and other devices. LANs offer computer users many advantages, including shared access to devices and applications, file exchange between connected users, and communication between users via electronic mail and other applications. Configuring a LAN involves setting up the network infrastructure and configuring the network settings on each device that is connected to the LAN.

# 3 Methodology

## 3.1 PING

- **ping google.com:** Ping tool is a free web-based ping service, ping to any domain or IP address from worldwide locations. We can per-

form a ping request to a known server. In this example, we will use "google.com" as the destination for our device to ping. It's an excellent website to test internet connectivity with due to its distributed servers, and it rarely goes offline.

- **ping -c 20 google.com:** basic syntax of using ping on Ubuntu while limiting the number of pings.
- **ping -n google.com:** no dns name resolution
- **sudo ping -f localhost** Super users can send hundred or more packets per second using -f option.

### 3.2 TRACEROUTE

- **traceroute google.com:** to see the complete route of the google.com website
- **traceroute -d google.com:** If we want to trace the path without resolving each hop IP address
- **traceroute -N 5 google.com:** We can customize the number of probes to 5 using N options
- **traceroute -m 5 google.com:** By default, the Traceroute command will check the website for only 30 hops. We can set this value to 5 using the -m option

### 3.3 IFCONFIG

- **ifconfig -a:** The ifconfig command with the -a argument will display information of all active or inactive network interfaces on the server. It displays the results for enp3s0, lo, sit0 and tun0
- **ifconfig enp3s0 up:** The "up" or "ifup" flag with interface name (enp3s0) activates a network interface if it is not in inactive state and allowing to send and receive information. For example, "ifconfig enp3s0 up" or "ifup enp3s0" will activate the eth0 interface
- **ifconfig enp3s0 down:** The "down" flag with interface name (enp3s0) inactivates a network interface if it is not in active state. For example "ifconfig enp3s0 down" will inactivate the enp3s0 interface

- **ifconfig enp3s0 -promisc:** To disable promiscuous mode, use the “-promisc” switch that drops back the network interface in normal mode

### 3.4 ARP

- **arp -a:**checking arp for all
- **arp -v:**This option shows the verbose information
- **arp -e** Display all hosts in default(linux) style
- **arp -h:**This command is for help related to this arp command

### 3.5 RARP<https://www.overleaf.com/project/63c9060571bdd6b07bc9ff02>

RARP is abbreviation of Reverse Address Resolution Protocol which is a protocol based on computer networking which is employed by a client computer to request its IP address from a gateway server's Address Resolution Protocol table or cache. The network administrator creates a table in gateway-router, which is used to map the MAC address to corresponding IP address.

- **rarp -h:**view all commands related to rarp
- **rarp -V:** Display program version

### 3.6 NSLOOK

nslookup followed by the domain name will display the “A Record” (IP Address) of the domain. Use this command to find the address record for a domain. It queries to domain name servers and gets the details.

- **nslookup google.com**
- **nslookup 10.33.2.78:**Reverse DNS lookup. We can also do the reverse DNS look-up by providing the IP Address as an argument to nslookup.
- **nslookup -type=any google.com:**Lookup for any record. We can also view all the available DNS records using the -type=any option.

- **nslookup -type=mx google.com:** Lookup for an mx recordMX (Mail Exchange) record maps a domain name to a list of mail exchange servers for that domain. The MX record tells that all the mails sent to “google.com” should be routed to the Mail server in that domain.

### 3.7 NETSTAT

Netstat is a command-line tool used by system administrators to evaluate network configuration and activity. The term Netstat is results from network and statistics. It shows open ports on the host device and their corresponding addresses, the routing table, and masquerade connections. Netstat command displays various network related information such as network connections, routing tables, interface statistics, masquerade connections, multicast memberships etc.

- **netstat -a or netsatt -all:** To show both listening and non-listening sockets.
- **netstat -at:** To list all tcp ports.
- **netstat -au:** To list all udp ports.
- **netstat -l:** To list only the listening ports.
- **netstat -lt:** To list only the listening tcp ports.
- **netstat -lu:** To list only the listening udp ports.
- **netstat -i:** To get the list of network interfaces.

We will see links to some files that the server provided. If we click any of them we can download them in our pc.

## 4 Experimental result

Some Snapshots of the Client Side queries can be seen in the following figures:

```

estona@MFingEG:~$ ping google.com

PING google.com (142.251.12.101) 56(84) bytes of data.
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=1 ttl=51 time=719
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=2 ttl=51 time=919
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=3 ttl=51 time=113
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=4 ttl=51 time=476
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=6 ttl=51 time=73.2
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=7 ttl=51 time=84.5
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=8 ttl=51 time=454
ms
64 bytes from se-in-f101.1e100.net (142.251.12.101): icmp_seq=10 ttl=51 time=465
ms
^C
--- google.com ping statistics ---
11 packets transmitted, 8 received, 27.2727% packet loss, time 10042ms
rtt min/avg/max/mdev = 73.234/413.058/919.128/289.777 ms
estona@MFingEG:~$

```

Figure 1:ping google.png

```

estona@MFingEG:~$ ping -c 20 google.com
PING google.com (142.251.12.102) 56(84) bytes of data.
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=1 ttl=51 time=67.9 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=2 ttl=51 time=140 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=4 ttl=51 time=65.7 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=5 ttl=51 time=69.7 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=6 ttl=51 time=62.5 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=7 ttl=51 time=63.2 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=9 ttl=51 time=65.5 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=10 ttl=51 time=69.7 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=11 ttl=51 time=63.0 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=12 ttl=51 time=63.4 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=13 ttl=51 time=65.1 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=14 ttl=51 time=85.1 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=15 ttl=51 time=63.5 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=16 ttl=51 time=65.0 ms
64 bytes from se-in-f102.1e100.net (142.251.12.102): icmp_seq=17 ttl=51 time=63.7 ms
^C
--- google.com ping statistics ---
17 packets transmitted, 15 received, 11.7647% packet loss, time 16072ms
rtt min/avg/max/mdev = 62.474/71.554/140.430/19.184 ms
estona@MFingEG:~$

```

Figure 2:ping -c 20 google.com

```
estona@MFingEG:~$ sudo ping -f localhost
[sudo] password for estona:
PING localhost (127.0.0.1) 56(84) bytes of data.
```

Figure 3: Ping -f localhost

```
estona@MFingEG:~$ ping -n google.com
PING google.com (142.251.12.139) 56(84) bytes of data.
64 bytes from 142.251.12.139: icmp_seq=1 ttl=51 time=62.8 ms
64 bytes from 142.251.12.139: icmp_seq=2 ttl=51 time=222 ms
64 bytes from 142.251.12.139: icmp_seq=4 ttl=51 time=78.5 ms
64 bytes from 142.251.12.139: icmp_seq=5 ttl=51 time=66.1 ms
64 bytes from 142.251.12.139: icmp_seq=6 ttl=51 time=63.1 ms
64 bytes from 142.251.12.139: icmp_seq=7 ttl=51 time=66.8 ms
64 bytes from 142.251.12.139: icmp_seq=8 ttl=51 time=66.0 ms
64 bytes from 142.251.12.139: icmp_seq=9 ttl=51 time=65.1 ms
^X64 bytes from 142.251.12.139: icmp_seq=10 ttl=51 time=65.2 ms
64 bytes from 142.251.12.139: icmp_seq=11 ttl=51 time=63.4 ms
^C
--- google.com ping statistics ---
12 packets transmitted, 10 received, 16.6667% packet loss, time 11020ms
rtt min/avg/max/mdev = 62.782/81.935/222.401/47.015 ms
estona@MFingEG:~$
```

Figure 4: ping -n google.com

```

estona@MFingEG:~$ traceroute google.com
traceroute to google.com (142.251.12.113), 64 hops max
 1  172.16.17.254  32.767ms  2.409ms  1.805ms
 2  103.221.254.233  2.703ms  51.755ms  2.538ms
 3  10.50.50.49  2.139ms  2.024ms  2.062ms
 4  163.47.38.93  2.411ms  1.906ms  1.903ms
 5  100.100.2.1  4.200ms  3.986ms  2.735ms
 6  100.100.0.41  2.996ms  2.965ms  7.024ms
 7  103.16.154.1  3.378ms  3.646ms  3.498ms
 8  103.16.152.46  4.840ms  9.646ms  4.158ms
 9  103.16.152.82  15.256ms  17.764ms  22.117ms
10  103.16.153.25  60.904ms  89.572ms  83.027ms
11  142.250.165.236  89.486ms  150.054ms  185.344ms
12  * * *
13  108.170.240.225  61.755ms  57.186ms  *
14  108.170.240.172  509.742ms  69.200ms  54.314ms
15  216.239.50.192  60.158ms  68.929ms  73.823ms
16  108.170.230.143  79.656ms  ^C

```

Figure 5:tracerout google.com.png

```

estona@MFingEG:~$ traceroute -m 5 google.com
traceroute to google.com (142.251.12.138), 5 hops max
 1  172.16.17.254  1.767ms  1.789ms  1.684ms
 2  103.221.254.233  84.159ms  10.470ms  2.411ms
 3  10.50.50.49  12.269ms  12.104ms  22.008ms
 4  163.47.38.93  33.046ms  21.226ms  15.558ms
 5  * * *
estona@MFingEG:~$

```

Figure 6:traceroute -m 5 google.com.png



```
estona@MFingEG:~$ sudo apt install net-tools
[sudo] password for estona:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer
required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libflashrom1 lib
  libgstreamer-plugins-bad1.0-0 libva-wayland2
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 10 not upgraded.
Need to get 204 kB of archives.
After this operation, 819 kB of additional disk space will be used.
Get:1 http://bd.archive.ubuntu.com/ubuntu jammy/main amd64 net-tools
git20181103.0eebece-1ubuntu5 [204 kB]
Fetched 204 kB in 2s (96.1 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 220738 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20181103.0eebece-1ubuntu5
...
Unpacking net-tools (1.60+git20181103.0eebece-1ubuntu5) ...
Setting up net-tools (1.60+git20181103.0eebece-1ubuntu5) ...
Processing triggers for man-db (2.10.2-1) ...
estona@MFingEG:~$
```

Figure 7:installing net tools

```

estona@MFingEG:~$ ifconfig
enp1s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
        ether 98:e7:43:0b:39:09 txqueuelen 1000 (Ethernet)
        RX packets 0 bytes 0 (0.0 B)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 0 bytes 0 (0.0 B)
        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 6203513 bytes 522001154 (522.0 MB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 6203513 bytes 522001154 (522.0 MB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 172.16.16.17 netmask 255.255.254.0 broadcast 172.16.
        inet6 fe80::64a6:c599:e8b5:6dd8 prefixlen 64 scopeid 0x20
        ether 40:23:43:0c:2e:45 txqueuelen 1000 (Ethernet)
        RX packets 376650 bytes 295531326 (295.5 MB)
        RX errors 0 dropped 4792 overruns 0 frame 0
        TX packets 90185 bytes 21474323 (21.4 MB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

```

Figure 8:Result of ifconfig

```

estona@MFingEG:~$ ifconfig -a
enp1s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 98:e7:43:0b:39:09 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    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 6203550 bytes 522004979 (522.0 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 6203550 bytes 522004979 (522.0 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.16.16.17 netmask 255.255.254.0 broadcast 172.16.16.255
    inet6 fe80::64a6:c599:e8b5:6dd8 prefixlen 64 scopeid 0x20<link>
    ether 40:23:43:0c:2e:45 txqueuelen 1000 (Ethernet)
    RX packets 378008 bytes 295790020 (295.7 MB)
    RX errors 0 dropped 4847 overruns 0 frame 0
    TX packets 90516 bytes 21624473 (21.6 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

```

Figure 9:Result of ifconfig-a

```

estona@MFingEG:~$ arp -e
Address HWtype HWaddress Flags Mask Iface
172.16.16.242 ether 7a:98:bc:6e:d4:f1 C wlp2s0
0

```

Figure 10:Result of arp-e

```

estona@MFingEG:~$ arp -e
Address HWtype HWaddress Flags Mask Iface
172.16.16.242 ether 7a:98:bc:6e:d4:f1 C wlp2s0
0

```

Figure 11:Result of arp

```
estona@MFingEG:~$ arp -v
Address          HWtype  HWaddress      Flags Mask    Iface
172.16.16.242    ether   7a:98:bc:6e:d4:f1  C         wlp2s
0
_gateway        ether   4c:5e:0c:46:8e:63  C         wlp2s
0
172.16.16.16     ether   04:0e:3c:6e:3f:a0  C         wlp2s
0
Entries: 3      Skipped: 0      Found: 3
```

Figure 12:Result of arp-v

```
estona@MFingEG:~$ arp -h
Usage:
  arp [-vn] [<HW>] [-i <if>] [-a] [<hostname>]          <-Display ARP cache
  arp [-v]          [-i <if>] -d <host> [pub]          <-Delete ARP entry
  arp [-vnD] [<HW>] [-i <if>] -f [<filename>]          <-Add entry from file
  arp [-v]          [<HW>] [-i <if>] -s <host> <hwaddr> [temp] <-Add entry
  arp [-v]          [<HW>] [-i <if>] -Ds <host> <if> [netmask <nm>] pub <-''-

  -a              display (all) hosts in alternative (BSD) style
  -e              display (all) hosts in default (Linux) style
  -s, --set       set a new ARP entry
  -d, --delete    delete a specified entry
  -v, --verbose   be verbose
  -n, --numeric   don't resolve names
  -i, --device    specify network interface (e.g. eth0)
  -D, --use-device read <hwaddr> from given device
  -A, -p, --protocol specify protocol family
  -f, --file       read new entries from file or from /etc/ethers

<HW>=Use '-H <hw>' to specify hardware address type. Default: ether
List of possible hardware types (which support ARP):
  ash (Ash) ether (Ethernet) ax25 (AMPR AX.25)
  netrom (AMPR NET/ROM) rose (AMPR ROSE) arcnet (ARCnet)
  dlci (Frame Relay DLCI) fddi (Fiber Distributed Data Interface) hippi (HIPPI)
  )
  irlda (IrLAP) x25 (generic X.25) eui64 (Generic EUI-64)
```

Figure 13:Result of arp -h

```

estona@MFingEG:~$ arp -h
Usage:
arp [-vn] [<HW>] [-i <if>] [-a] [<hostname>]          <-Display ARP cache
arp [-v]      [-i <if>] -d <host> [pub]              <-Delete ARP entry
arp [-vnD] [<HW>] [-i <if>] -f [<filename>]           <-Add entry from file
arp [-v]      [<HW>] [-i <if>] -s <host> <hwaddr> [temp] <-Add entry
arp [-v]      [<HW>] [-i <if>] -Ds <host> <if> [netmask <nm>] pub <-'''

    -a                display (all) hosts in alternative (BSD) style
    -e                display (all) hosts in default (Linux) style
    -s, --set         set a new ARP entry
    -d, --delete      delete a specified entry
    -v, --verbose     be verbose
    -n, --numeric     don't resolve names
    -i, --device      specify network interface (e.g. eth0)
    -D, --use-device  read <hwaddr> from given device
    -A, -p, --protocol specify protocol family
    -f, --file        read new entries from file or from /etc/ethers

<HW>=Use '-H <hw>' to specify hardware address type. Default: ether
List of possible hardware types (which support ARP):
  ash (Ash) ether (Ethernet) ax25 (AMPR AX.25)
  netrom (AMPR NET/ROM) rose (AMPR ROSE) arcnet (ARCnet)
  dlci (Frame Relay DLCI) fddi (Fiber Distributed Data Interface) hippi (HIPPI)
  )
  irda (IrLAP) x25 (generic X.25) eui64 (Generic EUI-64)

```

Figure 14:Result of rarp -v

```

estona@MFingEG:~$ nslookup 10.33.2.78
** server can't find 78.2.33.10.in-addr.arpa: NXDOMAIN

```

Figure 15:Result of nslookup 10.33.2.78



```

estona@MFingEG:~$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp      0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp      0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp      0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp      0      0 MFingEG:54614           si-in-f95.1e100.n:https ESTABLISHED
tcp      0      0 MFingEG:45548           sd-in-f94.1e100.n:https ESTABLISHED
tcp      0      0 MFingEG:53098           fracktail.canonica:http TIME_WAIT
tcp      0      0 MFingEG:43600           ec2-52-1-10-207.c:https ESTABLISHED
tcp      0      0 MFingEG:34892           sf-in-f138.1e100.:https ESTABLISHED
tcp      0      0 MFingEG:56306           ec2-54-85-240-191:https ESTABLISHED
tcp      0      0 MFingEG:53504           64.52.120.34.bc.g:https ESTABLISHED
tcp      0      0 MFingEG:39470           64.52.120.34.bc.g:https ESTABLISHED
tcp      0      0 MFingEG:46750           sf-in-f18.1e100.n:https ESTABLISHED
tcp      0      0 MFingEG:54602           si-in-f95.1e100.n:https ESTABLISHED
tcp      0      0 MFingEG:55444           ec2-34-210-143-20:https ESTABLISHED
tcp6     0      0 ip6-localhost:ipp      [::]:*                  LISTEN
tcp6     0      0 [::]:http               [::]:*                  LISTEN
estona@MFingEG:~$

```

Figure 18:Result of netstat -at

```

estona@MFingEG:~$ netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp      0      0 0.0.0.0:mdns            0.0.0.0:*               *
udp      0      0 0.0.0.0:42909           0.0.0.0:*               *
udp      0      0 localhost:domain        0.0.0.0:*               *
udp      0      0 MFingEG:bootpc          _gateway:bootps         ESTABLISHED
udp      0      0 0.0.0.0:631             0.0.0.0:*               *
udp6     0      0 [::]:mdns               [::]:*                  *
udp6     0      0 [::]:44874               [::]:*                  *
udp6     0      0 MFingEG:dhcpv6-client   [::]:*                  *
estona@MFingEG:~$

```

Figure 19:Result of netstat -au

```

estona@MFingEG:~$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 MFingEG:54614          si-in-f95.1e100.n:https ESTABLISHED
tcp        0      0 MFingEG:45548          sd-in-f94.1e100.n:https ESTABLISHED
tcp        0      0 MFingEG:53098          fracktail.canonica:http TIME_WAIT
tcp        0      0 MFingEG:43600          ec2-52-1-10-207.c:https ESTABLISHED
tcp        0      0 MFingEG:34892          sf-in-f138.1e100.:https ESTABLISHED
tcp        0      0 MFingEG:56306          ec2-54-85-240-191:https ESTABLISHED
tcp        0      0 MFingEG:53504          64.52.120.34.bc.g:https ESTABLISHED
tcp        0      0 MFingEG:39470          64.52.120.34.bc.g:https ESTABLISHED
tcp        0      0 MFingEG:46750          sf-in-f18.1e100.n:https ESTABLISHED
tcp        0      0 MFingEG:54602          si-in-f95.1e100.n:https ESTABLISHED
tcp        0      0 MFingEG:55444          ec2-34-210-143-20:https ESTABLISHED
tcp6       0      0 :::localhost:ipp       ::::*                   LISTEN
tcp6       0      0 ::::http                ::::*                   LISTEN
estona@MFingEG:~$

```

Figure 20:Result of netstat -at

```

Activities Terminal
estona@MFingEG:~$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp6       0      0 :::localhost:ipp       ::::*                   LISTEN
udp        0      0 :::http                ::::*                   LISTEN
udp        0      0 0.0.0.0:ndns            0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:c299v          0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:16937          0.0.0.0:*               LISTEN
udp        0      0 localhost:domain        0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:131            0.0.0.0:*               LISTEN
udp6       0      0 :::ndns                 ::::*                   LISTEN
udp6       0      0 :::44894               ::::*                   LISTEN
udp6       0      0 MFingEG:dhcpv6-client  ::::*                   LISTEN
udp6       0      0 :::lvspe-icmp          ::::*                   LISTEN

Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type       State      I-Node   Path
unix 2      [ACC] STREAM LISTENING  33873      @tmp/.ICE-unix/1877
unix 2      [ACC] STREAM LISTENING  33886      /tmp/.X11-unix/X1
unix 2      [ACC] STREAM LISTENING  33876      @tmp/.ICE-unix/1877
unix 2      [ACC] STREAM LISTENING  33883      @tmp/.X11-unix/X0
unix 2      [ACC] STREAM LISTENING  33885      @tmp/.X11-unix/X1
unix 2      [ACC] STREAM LISTENING  59549      @tmp/dbus-tolW06s
unix 2      [ACC] STREAM LISTENING  28726      /run/crbalance/crbalance073.sock
unix 2      [ACC] STREAM LISTENING  33889      @tmp/dbus-odm4172
unix 2      [ACC] STREAM LISTENING  32048      /run/user/1000/systemd/private
unix 2      [ACC] STREAM LISTENING  38541      /run/user/1000/bus
unix 2      [ACC] STREAM LISTENING  33384      /tmp/.X11-unix/X0
unix 2      [ACC] STREAM LISTENING  38543      /run/user/1000/gnupg/S.dirmgr
unix 2      [ACC] STREAM LISTENING  38545      /run/user/1000/gnupg/S.gpg-agent.browser
unix 2      [ACC] STREAM LISTENING  38547      /run/user/1000/gnupg/S.gpg-agent.extra
unix 2      [ACC] STREAM LISTENING  38549      /run/user/1000/gnupg/S.gpg-agent.ssh
unix 2      [ACC] STREAM LISTENING  38551      /run/user/1000/gnupg/S.gpg-agent
unix 2      [ACC] STREAM LISTENING  38553      /run/user/1000/pipewire-0
unix 2      [ACC] STREAM LISTENING  38555      /run/user/1000/pk-debconf/socket
unix 2      [ACC] STREAM LISTENING  38557      /run/user/1000/pulse/native
unix 2      [ACC] STREAM LISTENING  38559      /run/user/1000/napd-session-agent.socket
unix 2      [ACC] STREAM LISTENING  32962      /run/user/1000/keyring/control
unix 2      [ACC] STREAM LISTENING  32285      /run/user/1000/keyring/pkcs11
unix 2      [ACC] STREAM LISTENING  32287      /run/user/1000/keyring/ssh
unix 2      [ACC] STREAM LISTENING  59550      @tmp/dbus-Luq4Nvo
unix 2      [ACC] STREAM LISTENING  32573      @home/estona/.cache/bus/dbus-WM7eFY
unix 2      [ACC] STREAM LISTENING  32435      /run/user/1000/at-spi-bus
unix 2      [ACC] STREAM LISTENING  33387      /run/user/1000/wayland-0
unix 2      [ACC] STREAM LISTENING  18657      /run/systemd/userd/lo.systemd.dynamicuser
unix 2      [ACC] STREAM LISTENING  18658      /run/systemd/lo.systemd.managedon
unix 2      [ACC] STREAM LISTENING  18670      /run/systemd/rscd.progress
unix 2      [ACC] STREAM LISTENING  18661      /run/systemd/journal/stdout
unix 2      [ACC] STREAM LISTENING  18663      /run/udev/control
unix 2      [ACC] STREAM LISTENING  18664      /run/udev/control

```

Figure 21:Result of netstat -l



```

estona@MFingEG:~$ netstat -lt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp6       0      0 ip6-localhost:ipp      [::]:*                  LISTEN
tcp6       0      0 [::]:http                [::]:*                  LISTEN
estona@MFingEG:~$

```

Figure 22:Result of netstat -lt

```

estona@MFingEG:~$ netstat -lu
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 0.0.0.0:mdns            0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:42909           0.0.0.0:*               LISTEN
udp        0      0 localhost:domain        0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:631             0.0.0.0:*               LISTEN
udp6       0      0 [::]:mdns                [::]:*                  LISTEN
udp6       0      0 [::]:44874               [::]:*                  LISTEN
udp6       0      0 MFingEG:dhcpv6-client   [::]:*                  LISTEN
estona@MFingEG:~$

```

Figure 23:Result of netstat -lu

```

Activities Terminal
estona@MFingEG:~$ netstat -lx
Active UNIX domain sockets (only servers)
Proto RefCnt Flags   Type       State         I-Node   Path
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/.ICE-unix/1877
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/.X11-unix/X1
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/.ICE-unix/1877
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/.X11-unix/X0
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/.X11-unix/X1
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/dbus-tcp1wvps
unix 2      [ACC]  STREAM   LISTENING   -          /run/irgbalance/irgbalance873.sock
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/dbus-otm0222
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/systemd/private
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/bus
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/.X11-unix/X0
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/gnupg/S.dirnpg
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/gnupg/S.gpg-agent.browser
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/gnupg/S.gpg-agent.extra
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/gnupg/S.gpg-agent.ssh
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/gnupg/S.gpg-agent
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/pipewire-0
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/pk-debconf.socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/pulse/native
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/snapp-session-agent.socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/keyring/control
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/keyring/pcsc11
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/keyring/ssh
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/dbus-luafatvo
unix 2      [ACC]  STREAM   LISTENING   -          /home/estona/.cache/bus/dbus-wM7eFY
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/pk-gtk/bus
unix 2      [ACC]  STREAM   LISTENING   -          /run/user/1000/keyland-0
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/private
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/userdb/lo.systemd.DynamicUser
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/lo.system.ManagedOOM
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/fckd.progress
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/journal/stdout
unix 2      [ACC]  STREAM   LISTENING   -          /run/udev/control
unix 2      [ACC]  STREAM   LISTENING   -          /var/run/mysqld/mysql.sock
unix 2      [ACC]  STREAM   LISTENING   -          /var/run/mysqld/mysqld.sock
unix 2      [ACC]  STREAM   LISTENING   -          /tmp/dbus-BXAN0UP2
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/journal/lo.systemd.journal
unix 2      [ACC]  STREAM   LISTENING   -          /run/acpid.socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/avahi-daemon/socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/cups/cups.sock
unix 2      [ACC]  STREAM   LISTENING   -          /run/dbus/system_bus.socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/snapd.socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/snapd-snap.socket
unix 2      [ACC]  STREAM   LISTENING   -          /run/mtd/irrequest
unix 2      [ACC]  STREAM   LISTENING   -          /run/systemd/resolve/lo.systemd.Resolve
estona@MFingEG:~$

```

Figure 24:Result of netstat -lx

```

estona@MFingEG:~$ netstat -lt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 localhost:ipp            0.0.0.0:*               LISTEN
tcp      0      0 localhost:33060          0.0.0.0:*               LISTEN
tcp      0      0 localhost:domain         0.0.0.0:*               LISTEN
tcp      0      0 localhost:mysql          0.0.0.0:*               LISTEN
tcp6     0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6     0      0 [::]:http                [::]:*                  LISTEN
estona@MFingEG:~$

```

Figure 25:Result of netstat -lt

```

estona@MFingEG:~$ netstat -lt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 localhost:ipp            0.0.0.0:*               LISTEN
tcp      0      0 localhost:33060          0.0.0.0:*               LISTEN
tcp      0      0 localhost:domain         0.0.0.0:*               LISTEN
tcp      0      0 localhost:mysql          0.0.0.0:*               LISTEN
tcp6     0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6     0      0 [::]:http                [::]:*                  LISTEN
estona@MFingEG:~$

```

Figure 26:Result of netstat -lt

## 5 Experience

- 1.It was a nice experience working on overleaf latex.  
Its wa tough on beginings but after working on this project  
I found it quite familiar.
- 2.We used may commands to get informations LAN configuration  
and troubleshooting tools (PING, Traceroute, Static routing, netstat,  
ifconfig, nslook etc)

## References

- [1]Computer networking : A top- down approach 6<sup>th</sup> ed
- [2]StackOverflow : <http://stackoverflow.com/>
- [3] Youtube: [https://www.youtube.com/watch?v=hwTpPW6N9og&t=192s&ab\\_channel=TajimandStory](https://www.youtube.com/watch?v=hwTpPW6N9og&t=192s&ab_channel=TajimandStory)