



COLLEGE OF ENGINEERING, TRIVANDRUM

COURSE CODE

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# Network Programming Lab

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*Author:*  
Alan Anto

*Registration Number :*  
TVE16CS09

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# 1 Basics of Network configurations files and Networking Commands

## 1.1 AIM

Familiarising with Basics of Network configurations files and Networking Commands in Linux.

## 1.2 ifconfig

ifconfig stands for "interface configuration". It can be used for viewing and changing configurations of network interfaces on your system.

```
Alans-MacBook-Air:~ alan$ ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
    options=1203<RXCSUM,TXCSUM,TXSTATUS,SW_TIMESTAMP>
    inet 127.0.0.1 netmask 0xff000000
    inet6 ::1 prefixlen 128
    inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
    nd6 options=201<PERFORMNUD,DAD>
gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280
stf0: flags=0<> mtu 1280
XHC20: flags=0<> mtu 0
en1: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
    options=60<TS04,TS06>
    ether 9a:00:16:ee:b8:70
    media: autoselect <full-duplex>
    status: inactive
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    ether 14:c2:13:01:b3:12
    nd6 options=201<PERFORMNUD,DAD>
    media: autoselect <unknown type>
    status: inactive
bridge0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    options=63<RXCSUM,TXCSUM,TS04,TS06>
    ether 9a:00:16:ee:b8:70
    Configuration:
        id 0:0:0:0:0:0 priority 0 hellotime 0 fwddelay 0
        maxage 0 holdcnt 0 proto stp maxaddr 100 timeout 1200
        root id 0:0:0:0:0:0 priority 0 ifcost 0 port 0
        ipfilter disabled flags 0x2
        member: en1 flags=3<LEARNING,DISCOVER>
            ifmaxaddr 0 port 5 priority 0 path cost 0
        nd6 options=201<PERFORMNUD,DAD>
        media: <unknown type>
        status: inactive
p2p0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 2304
    ether 06:c2:13:01:b3:12
    media: autoselect
    status: inactive
awdl0: flags=8943<UP,BROADCAST,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1484
    ether 4e:11:ea:5c:85:96
    inet6 fe80::4c11:ea5c:8596%awdl0 prefixlen 64 scopeid 0x9
    nd6 options=201<PERFORMNUD,DAD>
    media: autoselect
    status: active
utun0: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 2000
    inet6 fe80::902f:ed42:b855:8e2%utun0 prefixlen 64 scopeid 0xa
    nd6 options=201<PERFORMNUD,DAD>
```

### 1.2.1 ifconfig -a

Used to view all network interfaces on the system.

## 1.3 ping

Ping stands for Packet Internet Groper . Its used to check the connectivity status between two, a source and a destination device . It uses ICMP(Internet Control Message Protocol) to sent and recieve between the source and destination systems.

### 1.3.1 ping -c

Used to specify the number of packets to be sent before exiting.

```
Alans-MacBook-Air ~ alan$ ping google.com
PING google.com (172.217.163.46): 56 data bytes
64 bytes from 172.217.163.46: icmp_seq=0 ttl=53 time=51.437 ms
64 bytes from 172.217.163.46: icmp_seq=1 ttl=53 time=93.168 ms
64 bytes from 172.217.163.46: icmp_seq=2 ttl=53 time=204.728 ms
64 bytes from 172.217.163.46: icmp_seq=3 ttl=53 time=68.376 ms
64 bytes from 172.217.163.46: icmp_seq=4 ttl=53 time=60.550 ms
64 bytes from 172.217.163.46: icmp_seq=5 ttl=53 time=57.869 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 51.437/89.355/204.728/53.267 ms
Alans-MacBook-Air ~ alan$ ping -c 5 google.com
PING google.com (172.217.163.46): 56 data bytes
64 bytes from 172.217.163.46: icmp_seq=0 ttl=53 time=57.305 ms
64 bytes from 172.217.163.46: icmp_seq=1 ttl=53 time=77.910 ms
64 bytes from 172.217.163.46: icmp_seq=2 ttl=53 time=72.177 ms
64 bytes from 172.217.163.46: icmp_seq=3 ttl=53 time=50.026 ms
64 bytes from 172.217.163.46: icmp_seq=4 ttl=53 time=125.407 ms
--- google.com ping statistics ---
5 packets transmitted, 5 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 50.026/76.565/125.407/26.389 ms
```

## 1.4 traceroute

It is used to track the route packets take to reach the destination or host.

```
Alans-MacBook-Air ~ alan$ traceroute google.com
traceroute to google.com (216.58.196.174): 64 hops max, 52 byte packets
 1  192.168.43.1 (192.168.43.1)  4.213 ms  2.670 ms  3.446 ms
 2  * * *
 3  10.72.51.19 (10.72.51.19)  40.389 ms  39.259 ms  50.105 ms
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  74.125.48.26 (74.125.48.26)  54.119 ms  49.641 ms  60.288 ms
 9  108.170.253.113 (108.170.253.113)  48.885 ms  49.732 ms
10  216.239.43.239 (216.239.43.239)  49.794 ms
    74.125.253.16 (74.125.253.16)  121.242 ms
    216.239.43.239 (216.239.43.239)  45.904 ms
11  216.239.43.235 (216.239.43.235)  48.651 ms
    74.125.242.146 (74.125.242.146)  39.519 ms
    74.125.242.130 (74.125.242.130)  55.292 ms
12  maa03s31-in-f14.1e100.net (216.58.196.174)  50.349 ms  119.282 ms  45.628 ms
```

## 1.5 netstat

It is used to find network connections, routing tables etc.

### 1.5.1 netstat -r

It can be used for displaying routing table details.

```
Alans-MacBook-Air:~ alan$ netstat -r
Routing tables
Internet:
Destination Gateway Flags Refs Use Netif Expire
default: 192.168.43.1 UGSc 53 105 en0
127 localhost localhost UCS 0 0 lo0
169.254 link#6 UCS 0 0 en0
192.168.43 link#6 UCS 0 0 en0
192.168.43.1/32 link#6 UCS 1 0 en0
192.168.43.1 20:a6:c:b5:1b:97 UHLWIir 13 43 en0 1144
192.168.43.39/32 link#6 UCS 0 0 en0
224.0.0/4 link#6 UCS 0 0 en0
224.0.0.251 1:0:5e:0:0:fb UHmLWI 0 0 en0
239.255.255.250 1:0:5e:7f:ff:fa UHmLWI 0 60 en0
255.255.255.255/32 link#6 UCS 0 0 en0
```

## 1.6 nslookup

It is used to find the information about an ip address or a domain. It will translate a domain name to IP address and vice-versa.

```
Alans-MacBook-Air:~ alan$ nslookup google.com
Server: 2405:204:d20b:85d2::91
Address: 2405:204:d20b:85d2::91#53

Non-authoritative answer:
Name: google.com
Address: 172.217.163.174
```

## 1.7 route

It is used to for manipulating the routing table.

## 1.8 dig

It stands for domain Information Groper . It is used to query DNS Name servers .

```
Alans-MacBook-Air:~ alan$ dig google.com
<<>> DiG 9.10.6<<>> google.com
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 63604
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:;, udp: 1280
;; QUESTION SECTION:
;; google.com. IN A
<<>> DiG 9.7.3-Redhat-9.7.3-2.el6<<>> redhat.com
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 62863
;; SERVER: 2405:204:d20b:85d2::91#53(2405:204:d20b:85d2:91)
;; WHEN: Mon Feb 04 17:33:17 IST 2019
;; MSG SIZE rcvd: 55
```

## 1.9 host

Its used for performing DNS Lookups. It can be used to change names to IP addresses and vice-versa.

```
Alans-MacBook-Air:~ alan$ host 216.58.197.78
216.58.197.78.in-addr.arpa domain name pointer maa03s21-
216.58.197.78.in-addr.arpa domain name pointer maa03s21-
```

## 1.10 hostname

It is used to find the hostname and domain name of the system.

```
Alans-MacBook-Air:~ alan$ hostname
Alans-MacBook-Air.local
```

## 1.11 ethtool

It is used to manipulate Network Interface Card's settings. We can set the speed,port etc using this tool.

## **1.12 Result**

The familiarization of basic networking commands used in Linux was completed successfully.