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BCSE308P – COMPUTER NETWORKS LAB
LAB EXERCISE - 1

1) Prepare a report for the network commands (Windows/Linux) with two options. Execute the commands in prompt and include screenshot with explanation

1. ifconfig - Display and manipulate route and network interfaces.

2. ifconfig -a

3. ping - To check connectivity between two nodes.

4. ping –c - -c option exit after N number of request

```
matlab@sjt418scope012:~$ ping -c 5 vtop.vit.ac.in
PING vtop.vit.ac.in (10.10.5.168) 56(84) bytes of data.
64 bytes from testbuild.vit.ac.in (10.10.5.168): icmp_seq=1 ttl=61 time=1.59 ms
64 bytes from admissionstat.vit.ac.in (10.10.5.168): icmp_seq=2 ttl=61 time=0.61
8 ms
64 bytes from ugresults.vit.ac.in (10.10.5.168): icmp_seq=3 ttl=61 time=0.506 ms
64 bytes from explorer.vit.ac.in (10.10.5.168): icmp_seq=4 ttl=61 time=0.598 ms
64 bytes from vconnectplus.vit.ac.in (10.10.5.168): icmp_seq=5 ttl=61 time=0.512
 ms

--- vtop.vit.ac.in ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 0.506/0.765/1.593/0.416 ms
matlab@sjt418scope012:~$
```

5. traceroute - Network troubleshooting utility.

```
matlab@sjt418scope012:~$ traceroute vtop.vit.ac.in
traceroute to vtop.vit.ac.in (10.10.5.168), 30 hops max, 60 byte packets
 1  _gateway (10.30.158.1)  0.471 ms  0.450 ms  0.531 ms
 2  10.30.0.5 (10.30.0.5)  0.389 ms  0.381 ms  0.507 ms
 3  10.11.0.2 (10.11.0.2)  1.182 ms  1.267 ms  1.167 ms
 4  chineseexam.vit.ac.in (10.10.5.168)  2.341 ms  2.333 ms  2.326 ms
matlab@sjt418scope012:~$
```

6. netstat –a - Display connection information.

```
matlab@sjt418scope012:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:27017         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 sjt418scope012:45241    0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:902             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 localhost:37843         0.0.0.0:*               LISTEN
tcp        0      1 sjt418scope012:45914    hit-malware.opendn:3333 SYN_SENT
tcp        0      1 sjt418scope012:41024    server:789              SYN_SENT
tcp        0      0 sjt418scope012:55560    codes-buttonkey.pa:3478 ESTABLISHED
tcp        0      1 sjt418scope012:41026    server:789              SYN_SENT
tcp6       0      0 sjt418scope012:38797    [::]:*                  LISTEN
tcp6       0      0 [::]:http-alt           [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:35585     [::]:*                  LISTEN
tcp6       0      0 localhost:7474          [::]:*                  LISTEN
tcp6       0      0 localhost:7687          [::]:*                  LISTEN
```

7. netstat –at - Listing only TCP Ports connections

```
matlab@sjt418scope012:~$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:27017         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 sjt418scope012:45241    0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:902             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 localhost:37843         0.0.0.0:*               LISTEN
tcp        0      1 sjt418scope012:41024    server:789              SYN_SENT
tcp        0      0 sjt418scope012:55560    codes-buttonkey.pa:3478 ESTABLISHED
tcp        0      1 sjt418scope012:54284    hit-malware.opendn:3333 SYN_SENT
tcp        0      1 sjt418scope012:41026    server:789              SYN_SENT
tcp6       0      0 sjt418scope012:38797    [::]:*                  LISTEN
tcp6       0      0 [::]:http-alt           [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:35585     [::]:*                  LISTEN
tcp6       0      0 localhost:7474          [::]:*                  LISTEN
tcp6       0      0 localhost:7687          [::]:*                  LISTEN
```

8. netstat –au - Listing only UDP Ports connections

```
tcp6      0      0 [::]:ssh                [::]:*                  LISTEN
matlab@sjt418scope012:~$ netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 239.255.255.250:1900    0.0.0.0:*
udp        0      0 sjt418scope012:1900     0.0.0.0:*
udp        0      0 239.255.255.250:1900    0.0.0.0:*
udp        0      0 localhost:1900          0.0.0.0:*
udp        0      0 0.0.0.0:36572           0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 localhost:41126         0.0.0.0:*
udp        0      0 sjt418scope012:41694    0.0.0.0:*
udp6       0      0 ip6-localhost:51288     [::]:*
udp6       0      0 sjt418scope012:59495    [::]:*
udp6       0      0 ip6-localhost:1900      [::]:*
udp6       0      0 ff05::c:1900            [::]:*
udp6       0      0 sjt418scope012:1900     [::]:*
udp6       0      0 ff02::c:1900            [::]:*
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:42744              [::]:*
matlab@sjt418scope012:~$
```

9. netstat –l - Listing all active LISTENING Connections

```
matlab@sjt418scope012:~$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:27017         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 sjt418scope012:45241    0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:902             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 localhost:37843         0.0.0.0:*               LISTEN
tcp6       0      0 sjt418scope012:38797    [::]:*                  LISTEN
tcp6       0      0 [::]:http-alt           [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:35585     [::]:*                  LISTEN
tcp6       0      0 localhost:7474          [::]:*                  LISTEN
tcp6       0      0 localhost:7687          [::]:*                  LISTEN
tcp6       0      0 localhost:8005          [::]:*                  LISTEN
tcp6       0      0 [::]:ms-wbt-server      [::]:*                  LISTEN
tcp6       0      0 [::]:902                [::]:*                  LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
```

10. netstat –lt - Listing all active TCP Listening Ports

```
matlab@sjt418scope012:~$ netstat -lt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:27017         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 sjt418scope012:45241    0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:33060         0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:902             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 localhost:37843         0.0.0.0:*               LISTEN
tcp6       0      0 sjt418scope012:38797    [::]:*                  LISTEN
tcp6       0      0 [::]:http-alt           [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:35585     [::]:*                  LISTEN
tcp6       0      0 localhost:7474          [::]:*                  LISTEN
tcp6       0      0 localhost:7687          [::]:*                  LISTEN
tcp6       0      0 localhost:8005          [::]:*                  LISTEN
tcp6       0      0 [::]:ms-wbt-server      [::]:*                  LISTEN
tcp6       0      0 [::]:902                [::]:*                  LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 [::]:ssh                [::]:*                  LISTEN
matlab@sjt418scope012:~$
```

11. netstat –lu - Listing all UDP Listening Ports

```
matlab@sjt418scope012:~$ netstat -lu
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 239.255.255.250:1900    0.0.0.0:*
udp        0      0 sjt418scope012:1900     0.0.0.0:*
udp        0      0 239.255.255.250:1900    0.0.0.0:*
udp        0      0 localhost:1900          0.0.0.0:*
udp        0      0 0.0.0.0:36572           0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 localhost:41126         0.0.0.0:*
udp        0      0 sjt418scope012:41694    0.0.0.0:*
udp6       0      0 ip6-localhost:51288     [::]:*
udp6       0      0 sjt418scope012:59495    [::]:*
udp6       0      0 ip6-localhost:1900      [::]:*
udp6       0      0 ff05::c:1900            [::]:*
udp6       0      0 sjt418scope012:1900     [::]:*
udp6       0      0 ff02::c:1900            [::]:*
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:42744              [::]:*
matlab@sjt418scope012:~$
```

12. netstat –lx - Listing all UNIX Listening Ports

```
matlab@sjt418scope012:~$ netstat -lx
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ACC ]     STREAM     LISTENING     34613    /tmp/mongodb-27017.so
ck
unix  2      [ ACC ]     STREAM     LISTENING     89304    /tmp/OSL_PIPE_1001_Si
ngleOfficeIPC_ac2dfe61979762ac7912a77c28bbdcfe
unix  2      [ ACC ]     STREAM     LISTENING     14319    /tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM     LISTENING     27573    /tmp/.ICE-unix/2651
unix  2      [ ACC ]     STREAM     LISTENING     34452    /run/user/1001/system
d/private
unix  2      [ ACC ]     STREAM     LISTENING     34458    /run/user/1001/bus
unix  2      [ ACC ]     STREAM     LISTENING     34460    /run/user/1001/gnupg/
S.dirmngr
unix  2      [ ACC ]     STREAM     LISTENING     34462    /run/user/1001/gnupg/
S.gpg-agent.browser
unix  2      [ ACC ]     STREAM     LISTENING     34464    /run/user/1001/gnupg/
S.gpg-agent.extra
unix  2      [ ACC ]     STREAM     LISTENING     34466    /run/user/1001/gnupg/
S.gpg-agent.ssh
unix  2      [ ACC ]     STREAM     LISTENING     34468    /run/user/1001/gnupg/
S.gpg-agent
unix  2      [ ACC ]     STREAM     LISTENING     34470    /run/user/1001/pipewi
re-0
```

13. netstat –s --s parameter can be used to specify a set of protocols

```
6-2610@
matlab@sjt418scope012:~$ netstat -s
Ip:
    Forwarding: 2
    61497 total packets received
    0 forwarded
    0 incoming packets discarded
    61493 incoming packets delivered
    55550 requests sent out
    20 outgoing packets dropped
    1 dropped because of missing route
    OutTransmits: 55550
Icmp:
    194 ICMP messages received
    0 input ICMP message failed
    ICMP input histogram:
        destination unreachable: 154
        timeout in transit: 18
        echo replies: 22
    283 ICMP messages sent
    0 ICMP messages failed
    ICMP output histogram:
        destination unreachable: 135
        echo requests: 148
```

14. netstat –st - Showing Statistics by TCP Protocol

```
MPTcpExt:
matlab@sjt418scope012:~$ netstat -st
IcmpMsg:
    InType0: 22
    InType3: 154
    InType11: 18
    OutType3: 135
    OutType8: 148
Tcp:
    3321 active connection openings
    9 passive connection openings
    462 failed connection attempts
    1172 connection resets received
    1 connections established
    49749 segments received
    43828 segments sent out
    5702 segments retransmitted
    0 bad segments received
    3192 resets sent
UdpLite:
TcpExt:
    699 TCP sockets finished time wait in fast timer
    86 delayed acks sent
    1 delayed acks further delayed because of locked socket
```

15. netstat –su - Showing Statistics by UDP Protocol

```
matlab@sjt418scope012:~$ netstat -su
IcmpMsg:
    InType0: 22
    InType3: 154
    InType11: 18
    OutType3: 135
    OutType8: 148
Udp:
    11766 packets received
    135 packets to unknown port received
    0 packet receive errors
    8126 packets sent
    0 receive buffer errors
    0 send buffer errors
    IgnoredMulti: 264
UdpLite:
IpExt:
    InMcastPkts: 4047
    OutMcastPkts: 112
    InBcastPkts: 171
    OutBcastPkts: 3
    InOctets: 100532477
    OutOctets: 9007575
    InMcastOctets: 583423
```

16. netstat –i - Showing Network Interface Transactions - including both transferring and receiving packets with MTU size

```
matlab@sjt418scope012:~$ netstat -i
Kernel Interface table
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
eno1      1500    108674      0      0 0        52205      0      0      0 BMRU
lo       65536      6233      0      0 0         6233      0      0      0 LRU
matlab@sjt418scope012:~$
```

17. netstat –c - Print Netstat Information Continuously

18. netstat -ap| grep http - Finding Listening Programs running on a port

19. netstat --statistics -- raw - Displaying RAW Network Statistics

20. dig - Query DNS related information.


```
matlab@sjt418scope012:~$ dig yahoo.com

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> yahoo.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 63241
;; flags: qr rd ra; QUERY: 1, ANSWER: 6, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;yahoo.com.                     IN      A

;; ANSWER SECTION:
yahoo.com.              1400    IN      A       74.6.143.26
yahoo.com.              1400    IN      A       74.6.231.20
yahoo.com.              1400    IN      A       74.6.231.21
yahoo.com.              1400    IN      A       98.137.11.163
yahoo.com.              1400    IN      A       98.137.11.164
yahoo.com.              1400    IN      A       74.6.143.25

;; Query time: 4 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Tue Jul 22 12:34:49 IST 2025
```

21. dig +short - One way to cut down the output


```
matlab@sjt418scope012:~$ dig yahoo.com+short

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> yahoo.com+short
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 52722
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;yahoo.com+short.                IN      A

;; AUTHORITY SECTION:
.                       900     IN      SOA     a.root-servers.net. nstld.verisi
gn-grs.com. 2025072200 1800 900 604800 86400

;; Query time: 11 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Tue Jul 22 12:35:55 IST 2025
;; MSG SIZE  rcvd: 119

matlab@sjt418scope012:~$
```

22. dig MX – The MX or Mail eXchange record tells mail servers how to route the email for the domain

```
matlab@sjt418scope012:~$ dig yahoo.com MX

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> yahoo.com MX
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 56263
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 25

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;yahoo.com.                     IN      MX

;; ANSWER SECTION:
yahoo.com.              1800    IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta6.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta7.am0.yahoodns.net.

;; ADDITIONAL SECTION:
mta5.am0.yahoodns.net.  56      IN      A       67.195.228.109
mta5.am0.yahoodns.net.  56      IN      A       67.195.228.110
mta5.am0.yahoodns.net.  56      IN      A       67.195.228.111
mta5.am0.yahoodns.net.  56      IN      A       98.136.96.77
```

23. dig SOA - Querying SOA Record for Domain

```
matlab@sjt418scope012:~$ dig yahoo.com SOA

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> yahoo.com SOA
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 31933
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;yahoo.com.                     IN      SOA

;; ANSWER SECTION:
yahoo.com.              559     IN      SOA     ns1.yahoo.com. hostmaster.yahoo-
inc.com. 2025072207 3600 300 1814400 600

;; ADDITIONAL SECTION:
ns1.yahoo.com.          86399   IN      A       68.180.131.16
ns1.yahoo.com.          49757   IN      AAAA    2001:4998:1b0::7961:686f:6f21

;; Query time: 26 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Tue Jul 22 12:37:12 IST 2025
```

24. dig yahoo.com ANY+noall+answer - Querying ALL DNS Records Types

```
matlab@sjt418scope012:~$ dig yahoo.com ANY+noall+answer

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> yahoo.com ANY+noall+answer
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 27121
;; flags: qr rd ra; QUERY: 1, ANSWER: 6, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;yahoo.com.                     IN      A

;; ANSWER SECTION:
yahoo.com.              1199    IN      A       98.137.11.163
yahoo.com.              1199    IN      A       74.6.231.21
yahoo.com.              1199    IN      A       74.6.143.26
yahoo.com.              1199    IN      A       74.6.231.20
yahoo.com.              1199    IN      A       98.137.11.164
yahoo.com.              1199    IN      A       74.6.143.25

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
```

25. dig -x72.30.38.140 +short - DNS Reverse Look-up

```
matlab@sjt418scope012:~$ dig -x72.30.38.140 +short
oxy-oxygen-481e268c.bf1.yahoo.com.
matlab@sjt418scope012:~$
```

26. dig yahoo.com mx+noall+answer redhat.com ns+noall+answer - Query multiple website's DNS specific query viz. MX, NS etc. Records.

```
matlab@sjt418scope012:~$ dig yahoo.com mx+noall+answer redhat.com ns+noall+answe
r

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> yahoo.com mx+noall+answer redhat
.com ns+noall+answer
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 61224
;; flags: qr rd ra; QUERY: 1, ANSWER: 6, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;yahoo.com.                     IN      A

;; ANSWER SECTION:
yahoo.com.              1022    IN      A       98.137.11.164
yahoo.com.              1022    IN      A       74.6.143.25
yahoo.com.              1022    IN      A       74.6.231.20
yahoo.com.              1022    IN      A       74.6.231.21
yahoo.com.              1022    IN      A       74.6.143.26
yahoo.com.              1022    IN      A       98.137.11.163

;; Query time: 1 msec
```

27. nslookup - Find DNS related query.

```
;; MSG SIZE  rcvd: 44

matlab@sjt418scope012:~$ nslookup yahoo.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   yahoo.com
Address: 98.137.11.163
Name:   yahoo.com
Address: 74.6.143.26
Name:   yahoo.com
Address: 74.6.231.21
Name:   yahoo.com
Address: 98.137.11.164
Name:   yahoo.com
Address: 74.6.143.25
Name:   yahoo.com
Address: 74.6.231.20
Name:   yahoo.com
Address: 2001:4998:124:1507::f000
Name:   yahoo.com
Address: 2001:4998:124:1507::f001
Name:   yahoo.com
```

28. route - Shows and manipulate IP routing table.

```
matlab@sjt418scope012:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 eno1
10.30.158.0     0.0.0.0         255.255.255.0   U     100    0        0 eno1
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 eno1
matlab@sjt418scope012:~$
```

29. host- Performs DNS lookups.

```
matlab@sjt418scope012:~$ host www.google.com
www.google.com has address 142.250.67.196
www.google.com has IPv6 address 2404:6800:4007:832::2004
matlab@sjt418scope012:~$
/
```

30. arp –e - View or add contents of the kernel's ARP table.

```
matlab@sjt418scope012:~$ arp -e
Address                  HWtype  HWaddress           Flags Mask            Iface
server                   ether   28:c5:c8:80:04:ac   C                     eno1
_gateway                 ether   f8:e5:7e:bb:52:7d   C                     eno1
matlab@sjt418scope012:~$
```

31. hostname - To identify a network name.

```
matlab@sjt418scope012:~$ hostname
sjt418scope012
matlab@sjt418scope012:~$
```

32. curl or wget - To download a file from internet.

```
vboxuser@UbuntuPrac:~$ curl -O google.com/doodles/childrens-day-2014-multiple-co
untries
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   265  100   265    0     0   3213      0 --:--:-- --:--:-- --:--:--  3231
```

33. mtr - Combines ping and tracepath into a single command.

```
                    My traceroute  [v0.95]
UbuntuPrac (10.0.2.15) -> google.com (142.250.195.238) 2025-07-29T10:37:44+0000
Keys:  Help   Display mode   Restart statistics   Order of fields   quit
                              Packets               Pings
 Host                        Loss%   Snt   Last   Avg  Best  Wrst StDev
 1. maa03s43-in-f14.1e100.net  0.0%    19    6.5   7.6   6.4  11.6   1.5
```

34. whois - Will tell you about the website's whois.

```
vboxuser@UbuntuPrac:~$ whois google.com
   Domain Name: GOOGLE.COM
   Registry Domain ID: 2138514_DOMAIN_COM-VRSN
   Registrar WHOIS Server: whois.markmonitor.com
   Registrar URL: http://www.markmonitor.com
   Updated Date: 2019-09-09T15:39:04Z
   Creation Date: 1997-09-15T04:00:00Z
   Registry Expiry Date: 2028-09-14T04:00:00Z
   Registrar: MarkMonitor Inc.
   Registrar IANA ID: 292
   Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
   Registrar Abuse Contact Phone: +1.2086851750
   Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhi
bited
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferP
rohibited
   Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhi
bited
   Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhi
bited
```

35. ifplugstatus - Tells whether a cable is plugged in or not.

```
vboxuser@UbuntuPrac:~$ ifplugstatus
lo: link beat detected
enp0s3: link beat detected
vboxuser@UbuntuPrac:~$
```

2) Prepare a report for anyone networking device. The report contains image of the device and details of components.

BRIDGE:
A hardware device used to create a connection between two separate computer networks or to divide one network into two. Filters data traffic at a network boundary and reduces the amount of traffic on a LAN dividing it into two segments.

Working:
Each bridge consist of a MAC address and operates at layer 2 of the OSI model. When a packet is received on the bridge ports the forwarding table including the MAC address is automatically updated to map the source MAC address to the network port from which the packet originated. The gateway then process the received packet according to the packet's type. A Bridge is a device that connects two LANs and controls data flow.
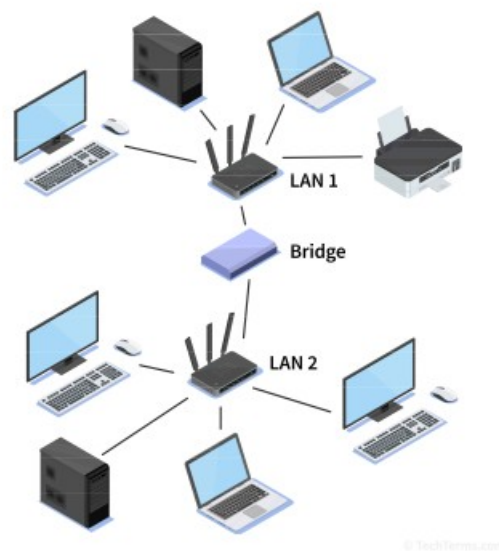
- A bridge examines each message on a LAN and passes the ones known to be within the same LAN.
- Computer addresses have no relationship to location in a bridging network.
- A bridge is sometimes referred to as a brouter.
- Wireless network bridges can costs anywhere from $100 to $1000 or more depending on the type of bridge purchased.

Types of Bridges:
- Transparent Bridges – Work invisibly in the network, automatically forwarding and learning addresses.
- Source Routing Bridges - Used mainly in Token Ring networks; frames contain routing information.
- Translational Bridge - Connects network segments with different Layer 2 protocols
- Remote Bridges - Connects two LANs over a WAN.

Components:
- Network Interfaces - A bridge has two or more network interfaces, each connecting to a different LAN segment.
- MAC Address Table - The Bridge maintains a dynamic table to map MAC addresses to specific interfaces. This table is initially empty and is automatically updated by learning the source MAC addresses from incoming frames.
- Packet Processing Engine - Dedicated memory and a processing unit handle frame inspection, address extraction, and filtering or forwarding decisions.
- Filtering Logic - This component compares the destination MAC address of each frame with the entries in the table. If the address is known and connected to a different segment, the frame is forwarded only to the appropriate port; if not, the frame is broadcasted to all ports except the source.
- Frame Transmission - Bridges use a "store and forward" technique receiving the entire frame, checking it for integrity, and then deciding whether and where to forward it.
- Bridge Management Logic - Some bridges include management software or firmware for monitoring, updating the bridging table, spanning tree calculations, and event logging.

Limitations:
Bridges cannot connect segments using different Layer 2 technologies unless they are translational bridges, may not scale well in large, modern networks, and add processing delays due to frame inspection