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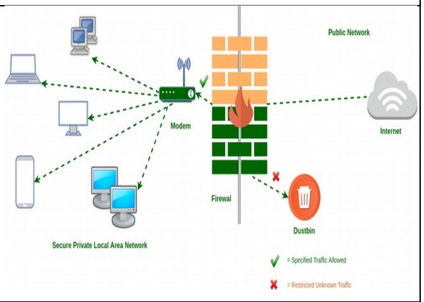
Digital Assignment-I

NETWORK DEVICES

S.No	Networking Devices	Functionality	Layer	Diagram
1	**Hub**	A hub receives data packets and passes on all the Information it receives to all the other computers connected to the hub. Information is also sent to the computer that sent the information!	Physical	
2	**Repeater**	The maximum path between 2 stations on the network should not be more than 5 segments with 4 repeaters between those segments and no more than 3 populated segments.	Physical	
3	**Switch**	A switch is a device that is used to segment networks into subnetworks called subnets. Allow different nodes of a network to communicate directly with each other. Allow several users	Data-link	

		to send information over a network at the same time without slowing each other down.		
4	**Router**	A router receives data from the user. Looks for the remote address of the other computer making routing decisions along the way Forwards the user data out to a different interface that is closer to the remote computer	Network	
5	**Network Bridges**	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.	Data-link	
6	**Gateway**	The gateway node acts like a proxy server and firewall The gateway uses forwarding tables to determine where packet are to be sent	Network	
7	**Firewall**	Most home network routers have built in firewall. The term “firewall” originated from firefighting, where a firewall is a	Network and Transport	 Public Network Modem Internet Firewal Dustbin Secure Private Local Area Network ✓ = Specified Traffic Allowed ✗ = Restricted Unknown Traffic

		barrier established to prevent the spread of a fire. A firewall works with the proxy server making request on behalf of workstation users. There are a number of features firewalls can include from logging and reporting to setting alarms of an attack.		
8	**Wireless Access Point**	Operates using radio frequency technology Broadcast wireless signals computers can detect and use A wireless network adapter is implemented while using a wireless access point, most computers today already have network adapters built into the computer.	Data-link	
9	**Modems**	A modem is a computer peripheral that allows us to connect and communicate with other computers via telephone lines.	Physical	

NETWORK COMMANDS

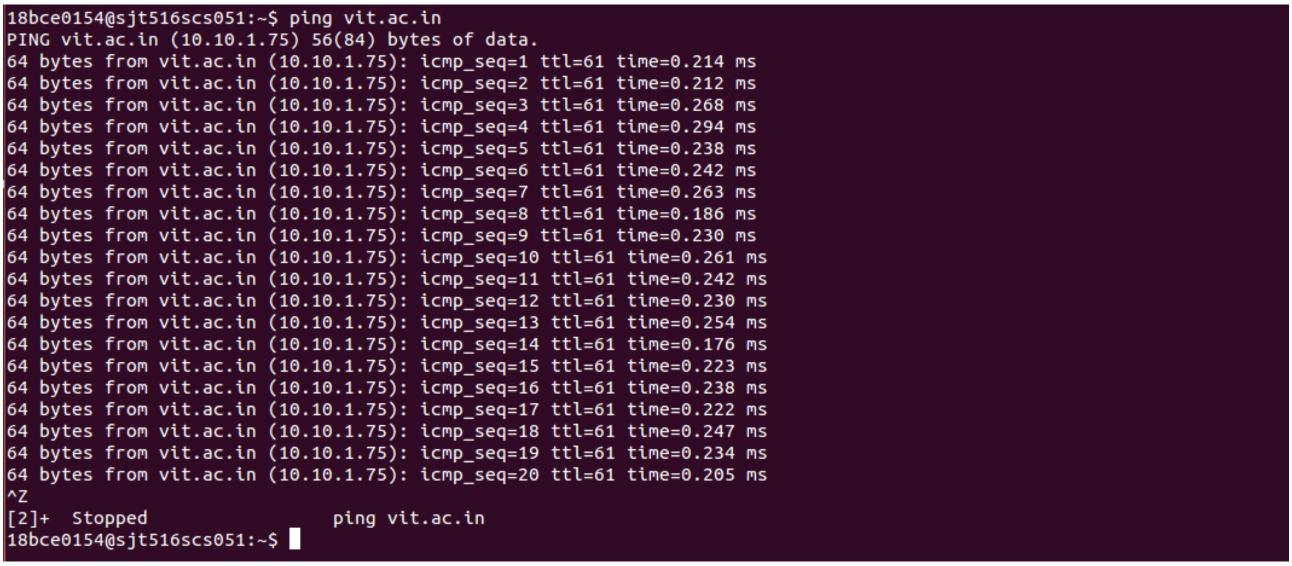
1) ping

The ping command (named after the sound of an active sonar system) sends echo requests to the host specified on the command line, and lists the responses received.

Syntax: ping ip Address or hostname

- ping - sends an ICMP *ECHO_REQUEST* packet to the specified host. If the host responds, an ICMP packet is received.
- One can “ping” an IP address to see if a machine is alive.
- It provides a very quick way to see if a machine is up and connected to the network.

Output



```
18bce0154@sjt516scs051:~$ ping vit.ac.in
PING vit.ac.in (10.10.1.75) 56(84) bytes of data.
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=1 ttl=61 time=0.214 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=2 ttl=61 time=0.212 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=3 ttl=61 time=0.268 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=4 ttl=61 time=0.294 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=5 ttl=61 time=0.238 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=6 ttl=61 time=0.242 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=7 ttl=61 time=0.263 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=8 ttl=61 time=0.186 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=9 ttl=61 time=0.230 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=10 ttl=61 time=0.261 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=11 ttl=61 time=0.242 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=12 ttl=61 time=0.230 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=13 ttl=61 time=0.254 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=14 ttl=61 time=0.176 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=15 ttl=61 time=0.223 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=16 ttl=61 time=0.238 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=17 ttl=61 time=0.222 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=18 ttl=61 time=0.247 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=19 ttl=61 time=0.234 ms
64 bytes from vit.ac.in (10.10.1.75): icmp_seq=20 ttl=61 time=0.205 ms
^Z
[2]+  Stopped                 ping vit.ac.in
18bce0154@sjt516scs051:~$ 
```

INTERPRETATION OF PING COMMAND:

Using ping command we can test whether our computer can reach another device—like our router—on our local network, or whether it can reach a device on the Internet. This can help us determine if a network problem is somewhere on our local network, or somewhere beyond. The time it takes packets to return to us can help us identify a slow connection, or if we're experiencing packet loss.

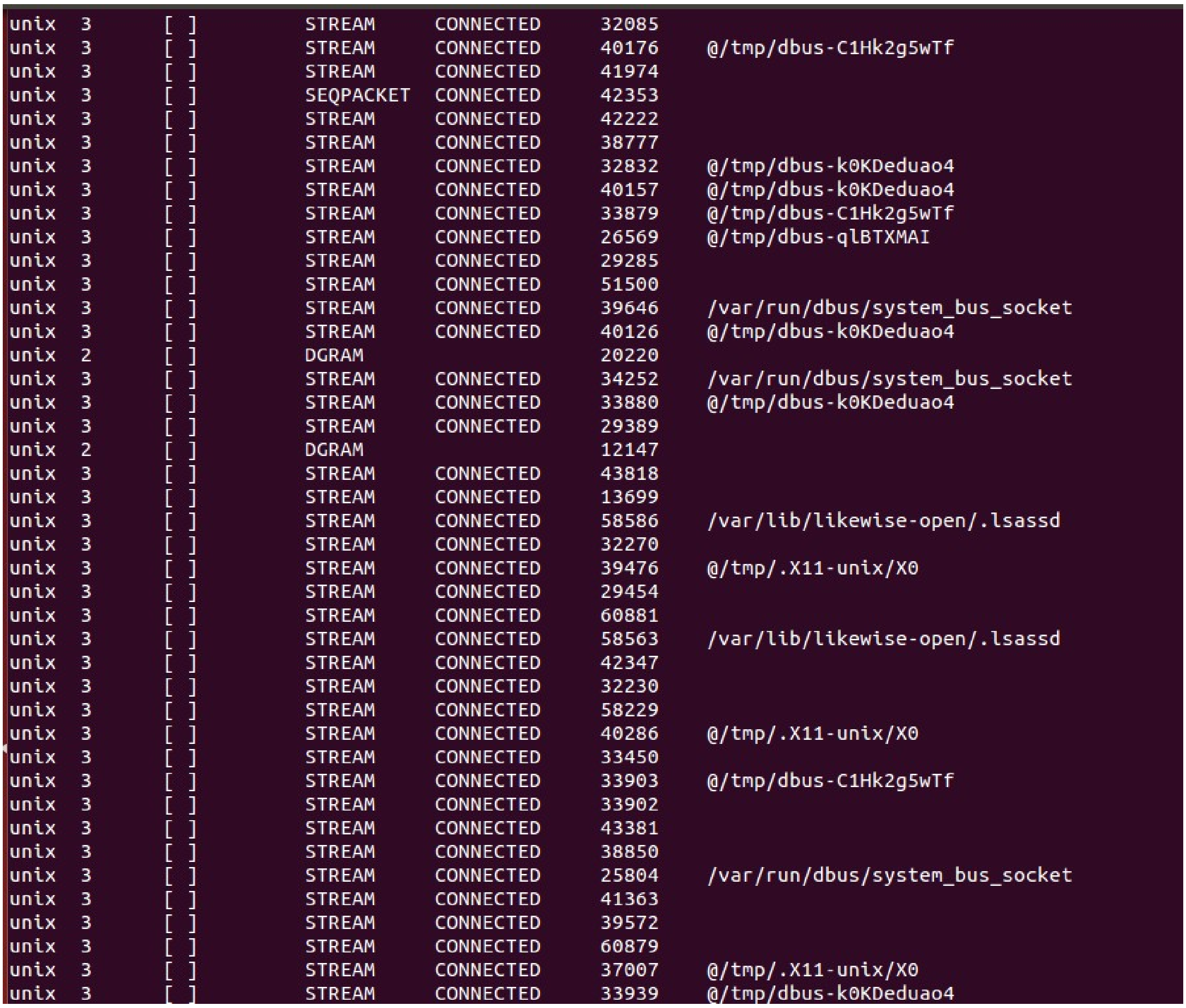
2) Netstat

- It works with the LINUX Network Subsystem, it will tell us what the status of ports are ie. open, closed, waiting connections. It is used to display the TCP/IP network protocol statistics and information.

e.g **netstat**

netstat -a

OUTPUT:



```
unix  3      [ ]         STREAM     CONNECTED     32085
unix  3      [ ]         STREAM     CONNECTED     40176    @/tmp/dbus-C1Hk2g5wTf
unix  3      [ ]         STREAM     CONNECTED     41974
unix  3      [ ]         SEQPACKET  CONNECTED     42353
unix  3      [ ]         STREAM     CONNECTED     42222
unix  3      [ ]         STREAM     CONNECTED     38777
unix  3      [ ]         STREAM     CONNECTED     32832    @/tmp/dbus-k0KDeduao4
unix  3      [ ]         STREAM     CONNECTED     40157    @/tmp/dbus-k0KDeduao4
unix  3      [ ]         STREAM     CONNECTED     33879    @/tmp/dbus-C1Hk2g5wTf
unix  3      [ ]         STREAM     CONNECTED     26569    @/tmp/dbus-qlBTXMAI
unix  3      [ ]         STREAM     CONNECTED     29285
unix  3      [ ]         STREAM     CONNECTED     51500
unix  3      [ ]         STREAM     CONNECTED     39646    /var/run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     40126    @/tmp/dbus-k0KDeduao4
unix  2      [ ]         DGRAM                    20220
unix  3      [ ]         STREAM     CONNECTED     34252    /var/run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     33880    @/tmp/dbus-k0KDeduao4
unix  3      [ ]         STREAM     CONNECTED     29389
unix  2      [ ]         DGRAM                    12147
unix  3      [ ]         STREAM     CONNECTED     43818
unix  3      [ ]         STREAM     CONNECTED     13699
unix  3      [ ]         STREAM     CONNECTED     58586    /var/lib/likewise-open/.lsassd
unix  3      [ ]         STREAM     CONNECTED     32270
unix  3      [ ]         STREAM     CONNECTED     39476    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     29454
unix  3      [ ]         STREAM     CONNECTED     60881
unix  3      [ ]         STREAM     CONNECTED     58563    /var/lib/likewise-open/.lsassd
unix  3      [ ]         STREAM     CONNECTED     42347
unix  3      [ ]         STREAM     CONNECTED     32230
unix  3      [ ]         STREAM     CONNECTED     58229
unix  3      [ ]         STREAM     CONNECTED     40286    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     33450
unix  3      [ ]         STREAM     CONNECTED     33903    @/tmp/dbus-C1Hk2g5wTf
unix  3      [ ]         STREAM     CONNECTED     33902
unix  3      [ ]         STREAM     CONNECTED     43381
unix  3      [ ]         STREAM     CONNECTED     38850
unix  3      [ ]         STREAM     CONNECTED     25804    /var/run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     41363
unix  3      [ ]         STREAM     CONNECTED     39572
unix  3      [ ]         STREAM     CONNECTED     60879
unix  3      [ ]         STREAM     CONNECTED     37007    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     33939    @/tmp/dbus-k0KDeduao4
```

INTERPRETATION OF NETSTAT COMMAND:

It delivers basic statistics on all network activities and informs users on which portsand addresses the corresponding connections (TCP, UDP) are running and which ports are open for tasks.

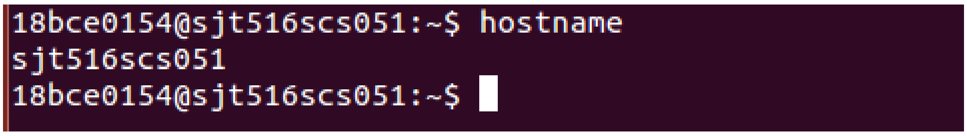
3) Hostname

Each host will be displayed, along with the response times at each host.

Tells the user the host name of the computer they are logged into.

e.g **hostname**

OUTPUT:



```
18bce0154@sjt516scs051:~$ hostname
sjt516scs051
18bce0154@sjt516scs051:~$ 
```

INTERPRETATION OF HOSTNAME COMMAND:

Hostname command simply tells the user the host name of the computer they are logged into.

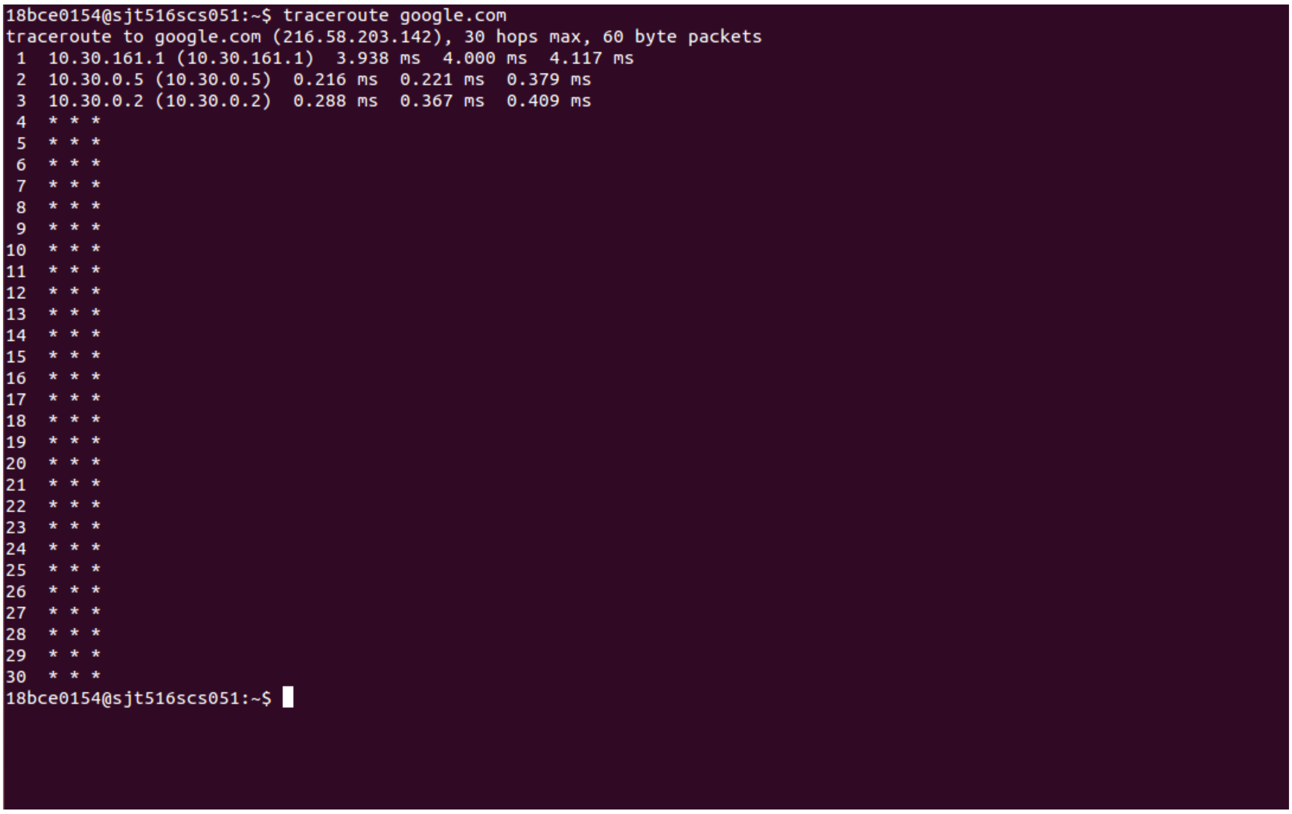
4)traceroute

traceroute will show the route of a packet. It attempts to list the series of hosts through which our packets travel on their way to a given destination.

Command syntax: traceroute machineName or ip

e.g **traceroute www.vit.ac.in**

OUTPUT



```
18bce0154@sjt516scs051:~$ traceroute google.com
traceroute to google.com (216.58.203.142), 30 hops max, 60 byte packets
 1  10.30.161.1 (10.30.161.1)  3.938 ms  4.000 ms  4.117 ms
 2  10.30.0.5 (10.30.0.5)  0.216 ms  0.221 ms  0.379 ms
 3  10.30.0.2 (10.30.0.2)  0.288 ms  0.367 ms  0.409 ms
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
18bce0154@sjt516scs051:~$ 
```

INTERPRETATION OF TRACEROUTE COMMAND:

Traceroute will actually send three packets of data, and measure the time taken for each. In the hop of our results you can see that each packet took less than a millisecond

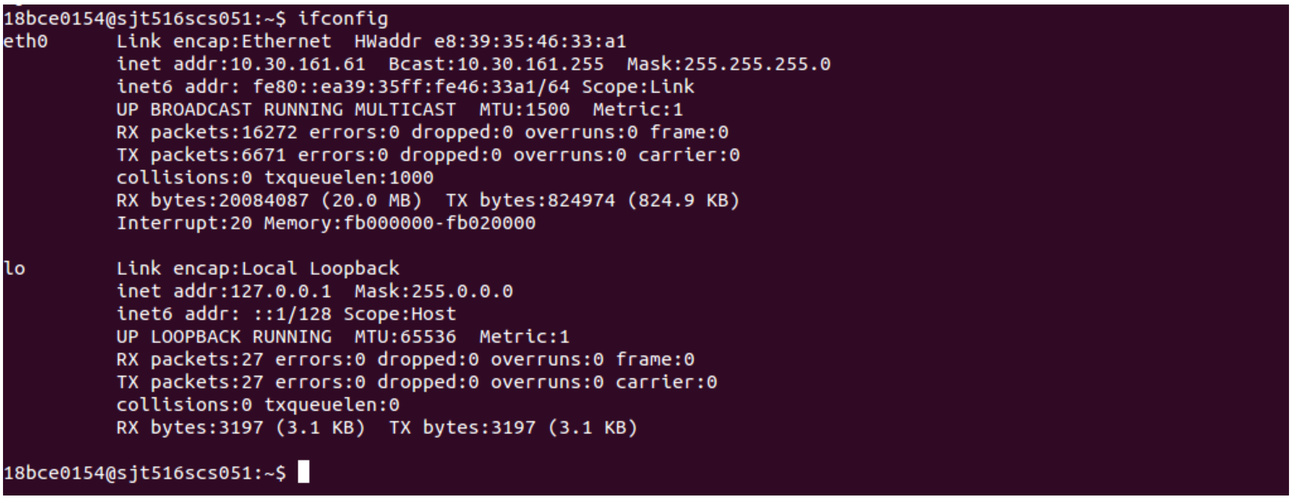
5)ifconfig

This command is used to configure network interfaces, or to display their current configuration.

e.g **/sbin/ifconfig**

/sbin/ifconfig -a

OUTPUT



```
18bce0154@sjt516scs051:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr e8:39:35:46:33:a1
          inet addr:10.30.161.61  Bcast:10.30.161.255  Mask:255.255.255.0
          inet6 addr: fe80::ea39:35ff:fe46:33a1/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:16272 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6671 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:20084087 (20.0 MB)  TX bytes:824974 (824.9 KB)
          Interrupt:20 Memory:fb000000-fb020000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:27 errors:0 dropped:0 overruns:0 frame:0
          TX packets:27 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:3197 (3.1 KB)  TX bytes:3197 (3.1 KB)

18bce0154@sjt516scs051:~$ 
```

INTERPRETATION OF IFCONFIG COMMAND:

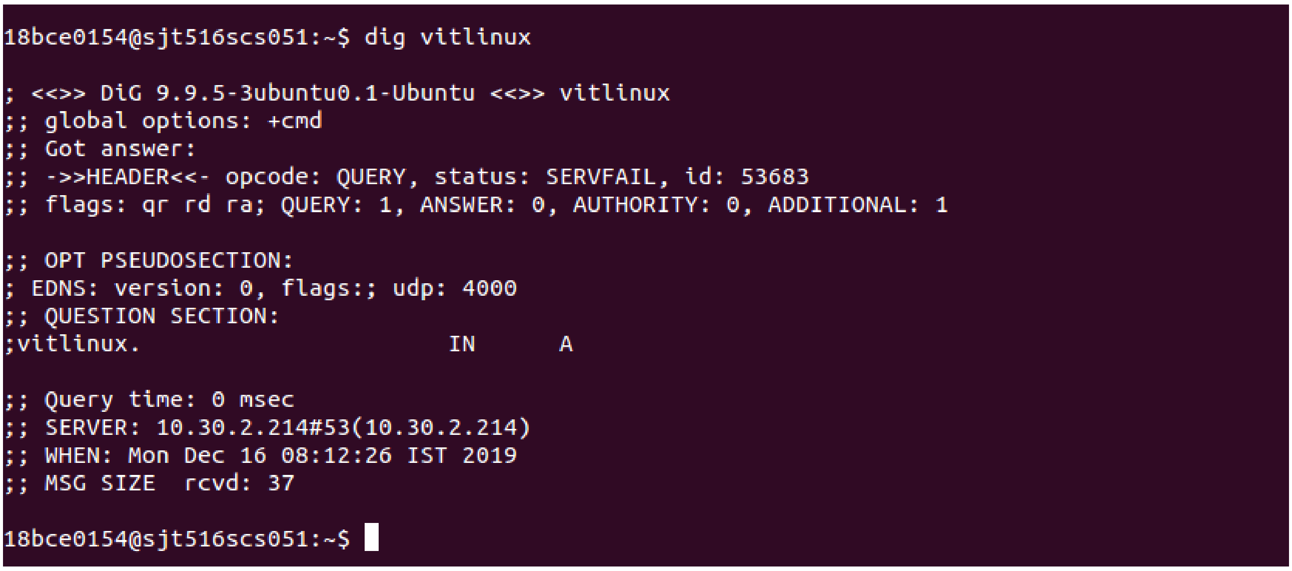
We can use ifconfig command to configure network interfaces, or to display their current configuration.

6)dig

The "domain information groper" tool. If a hostname is given as an argument, it outputs information about that host, including it's IP address, hostname and various other information.

e.g **dig vitlinux**

OUTPUT



```
18bce0154@sjt516scs051:~$ dig vitlinux

; <<>> DiG 9.9.5-3ubuntu0.1-Ubuntu <<>> vitlinux
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: SERVFAIL, id: 53683
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4000
;; QUESTION SECTION:
;vitlinux.                      IN      A

;; Query time: 0 msec
;; SERVER: 10.30.2.214#53(10.30.2.214)
;; WHEN: Mon Dec 16 08:12:26 IST 2019
;; MSG SIZE  rcvd: 37

18bce0154@sjt516scs051:~$
```

INTERPRETATION OF DIG COMMAND:

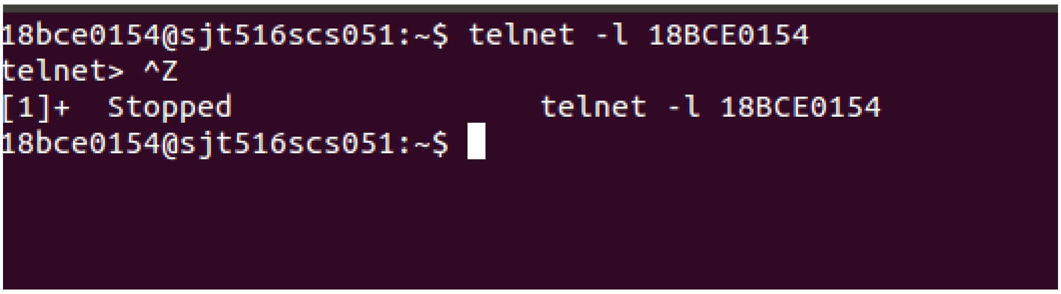
The command dig is a tool for querying DNS nameservers for information about host addresses, mail exchanges, nameservers, and related information.

7) telnet

telnet allows you to log in to a computer, just as if you were sitting at the terminal. Once your username and password are verified, you are given a shell prompt. From here, you can do anything requiring a text console.

e.g **telnet 18BCE0154**

OUTPUT



```
18bce0154@sjt516scs051:~$ telnet -l 18BCE0154
telnet> ^Z
[1]+  Stopped                 telnet -l 18BCE0154
18bce0154@sjt516scs051:~$
```

INTERPRETATION OF TELNET COMMAND:

Telnet is a client/server based program. Our operating system takes the role of a client, while the telnet server is installed on most internet servers. This allows you to log onto the server and perform basic tasks.

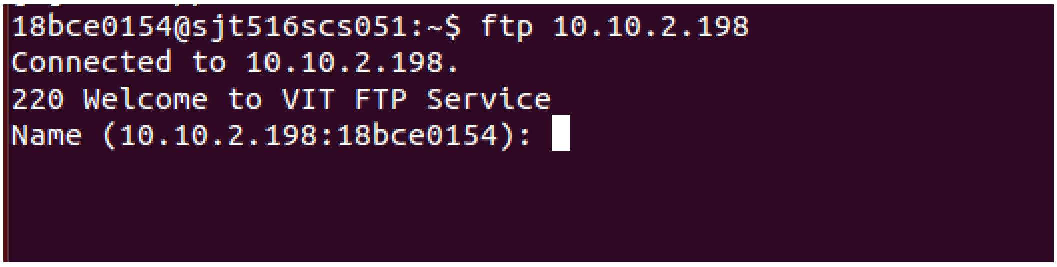
8) ftp

To connect to an FTP server.

Syntax: ftp ipaddress

e.g **ftp 192.168.0.15**

OUTPUT



```
18bce0154@sjt516scs051:~$ ftp 10.10.2.198
Connected to 10.10.2.198.
220 Welcome to VIT FTP Service
Name (10.10.2.198:18bce0154): 
```

INTERPRETATION OF FTP COMMAND:

The FTP (File Transfer Protocol) utility program is commonly used for copying files to and from other computers. These computers may be at the same site or at different sites thousands of miles apart. FTP is a general protocol that works on UNIX systems as well as a variety of other (non-UNIX) systems.

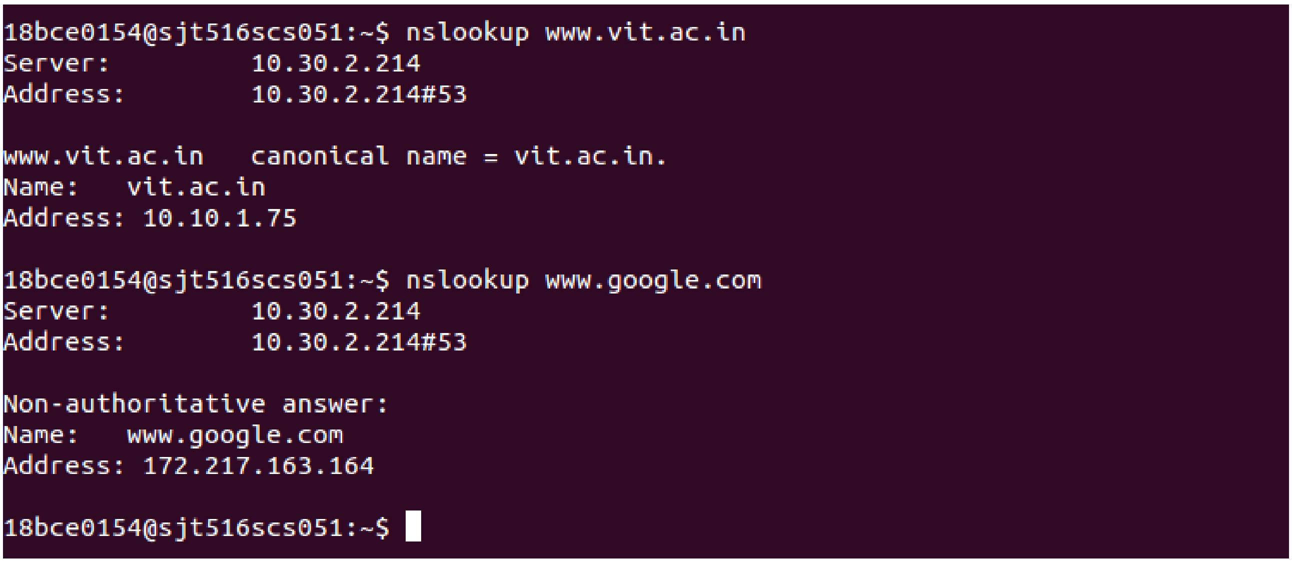
9) nslookup

nslookup nslookup returns the ipaddress of the given hostname and vice versa.

e.g **nslookup www.vit.ac.in**

nslookpup www.google.com

OUTPUT



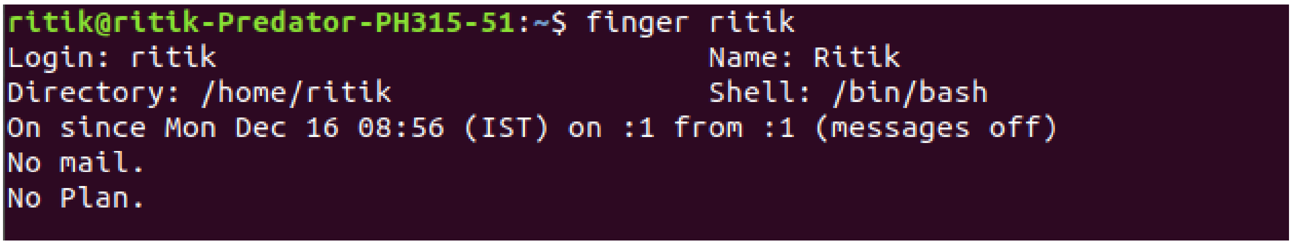
```
18bce0154@sjt516scs051:~$ nslookup www.vit.ac.in
Server:         10.30.2.214
Address:        10.30.2.214#53

www.vit.ac.in   canonical name = vit.ac.in.
Name:   vit.ac.in
Address: 10.10.1.75

18bce0154@sjt516scs051:~$ nslookup www.google.com
Server:         10.30.2.214
Address:        10.30.2.214#53

Non-authoritative answer:
Name:   www.google.com
Address: 172.217.163.164

18bce0154@sjt516scs051:~$
```

INTERPRETATION OF NSLOOKUP COMMAND:

It is used for querying the Domain Name System (DNS) to obtain domain name or IP address mapping information.

10 FINGER

Retrieves information about the specified user.
Syntax: finger ritik



```
ritik@ritik-Predator-PH315-51:~$ finger ritik
Login: ritik                            Name: Ritik
Directory: /home/ritik                  Shell: /bin/bash
On since Mon Dec 16 08:56 (IST) on :1 from :1 (messages off)
No mail.
No Plan.
```

INTERPRETATION OF FINGER COMMAND:

In Unix, finger is a program you can use to find information about computer users. It usually lists the login name, the full name, and possibly other details about the user you are fingering.