DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Data Communication & Computer Networks **(CS302)**

Lab Task 01/08/2022

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120CS0005

Submitted To:
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Contents

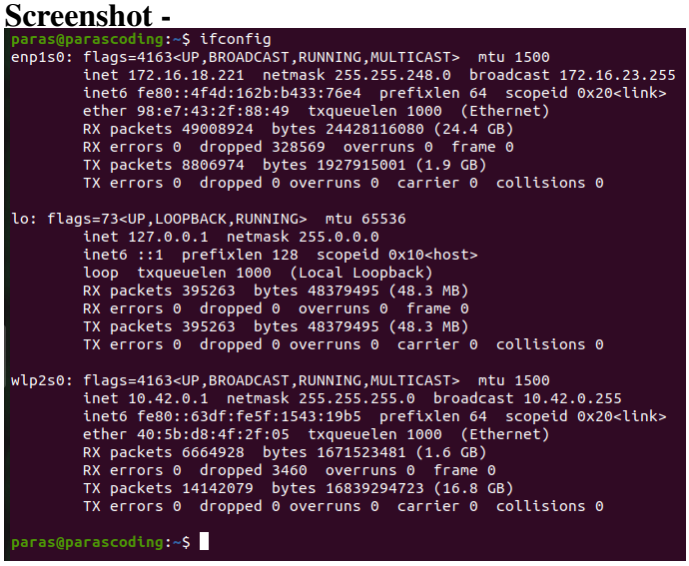
1 ifconfig

Definition - ifconfig stands for "interface configuration." It is used to view and change the configuration of the network interfaces on your system.

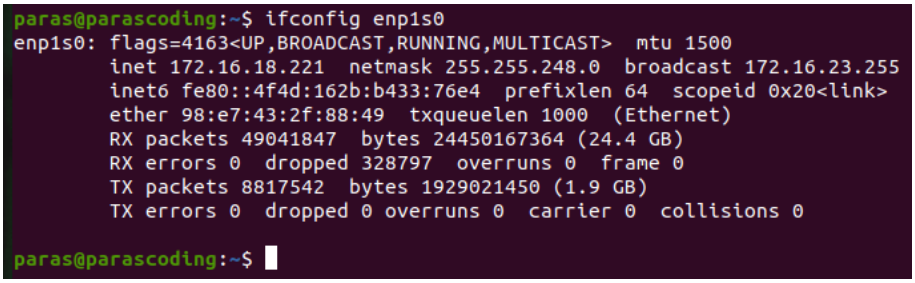
Syntax -

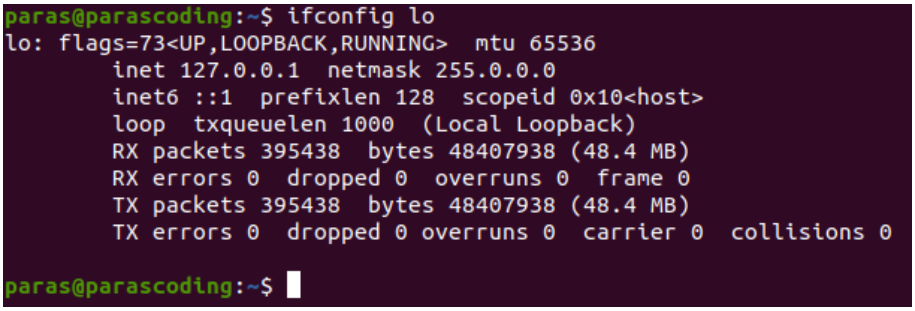
```
$ ifconfig
```

Screenshot -



Other Variations

- 

- 

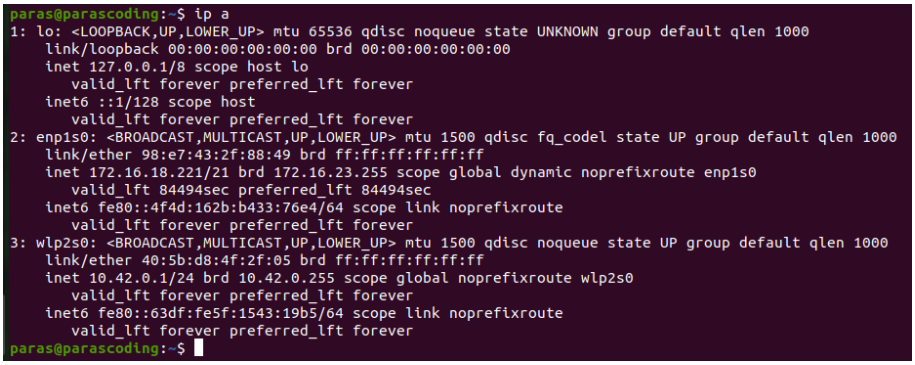
2 ip

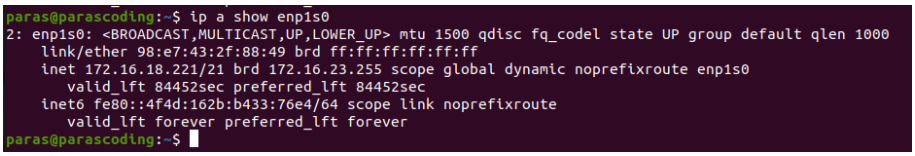
Definition - This is the latest and updated version of ifconfig command.

Syntax -

```
$ ip a
$ ip addr
```

Screenshots -

- 

- 

3 traceroute

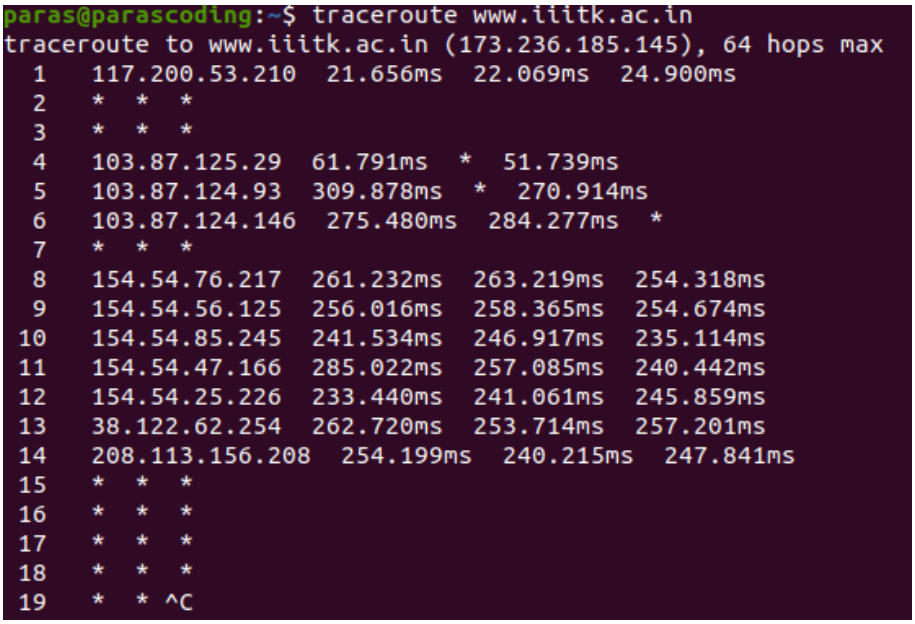
Definition - Linux traceroute is one of the most useful commands in networking. It is used to troubleshoot the network. It detects the delay and determines the pathway to your target. It basically helps in the following ways:

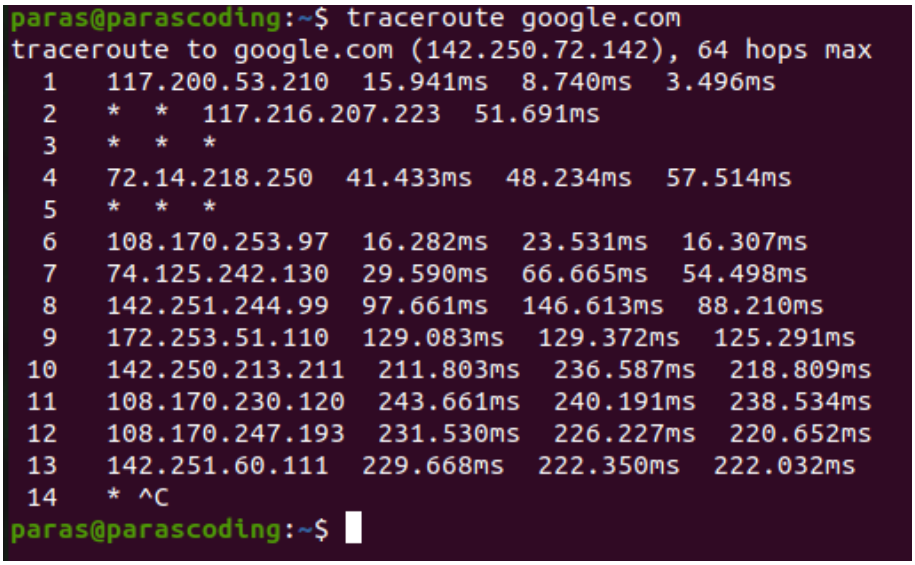
- It provides the names and identifies every device on the path.
- It follows the route to the destination
- It determines where the network latency comes from and reports it.

Syntax -

```
$ traceroute <detination>
```

Screenshots

- 

- 

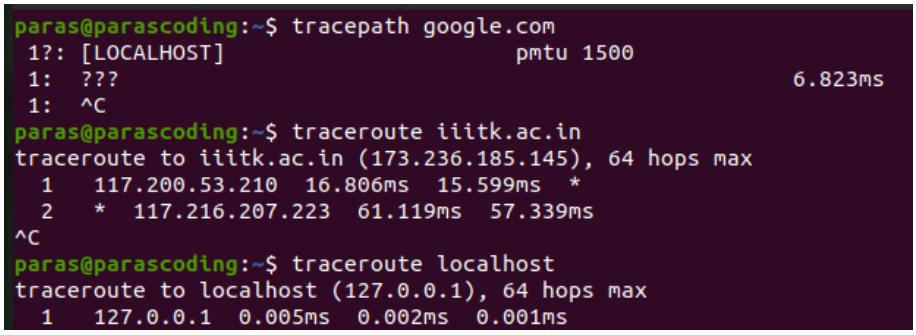
4 tracepath

Definition - Linux tracepath is similar to traceroute command. It is used to detect networkdelays. However, it doesn't require root privileges

Syntax -

```
$ tracepath <destination>
```

Screenshots -

- 

5 ping

Definition -

Linux ping is one of the most used network troubleshooting commands. It basically checks for the network connectivity between two nodes.

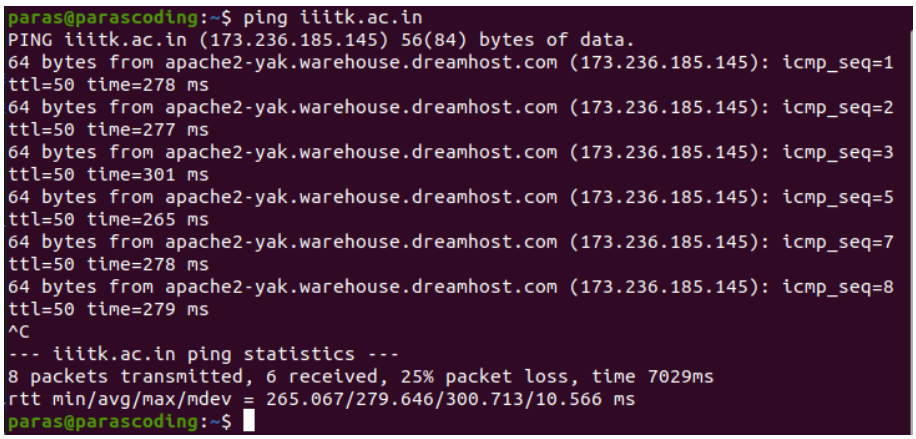
Ping stands for Packet INternet Groper.

The ping command sends the ICMP echo request to check the network connectivity. It keeps executing until it is interrupted. Use Ctrl+C Key to interrupt the execution.

Syntax -

```
$ ping <destination>
```

Screenshots -

- 

```
paras@parascoding:~$ ping -c 5 -s 1 google.com
PING google.com (142.250.189.14) 1(29) bytes of data.
9 bytes from lax31s16-in-f14.1e100.net (142.250.189.14): icmp_seq=1 ttl=60
9 bytes from lax31s16-in-f14.1e100.net (142.250.189.14): icmp_seq=2 ttl=60
9 bytes from lax31s16-in-f14.1e100.net (142.250.189.14): icmp_seq=3 ttl=60
9 bytes from lax31s16-in-f14.1e100.net (142.250.189.14): icmp_seq=4 ttl=60
9 bytes from lax31s16-in-f14.1e100.net (142.250.189.14): icmp_seq=5 ttl=60

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
```

- ```
  paras@parascoding:~$
  ```

6 netstat

Definition -

Linux netstat command refers to the network statistics. It provides statistical figures about different interfaces which include open sockets, routing tables, and connection information.

Syntax -

Screenshots -

- ```
  paras@parascoding:~$ netstat -p
  (Not all processes could be identified, non-owned process info
   will not be shown, you would have to be root to see it all.)
  Active Internet connections (w/o servers)
  Proto Recv-Q Send-Q Local Address           Foreign Address         State
  PID/Program name
  tcp        0      0 parascoding:55936       64.52.120.34.bc.g:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:39538       a29-04-02-vip.rec:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:54136       n30-03-09-vip.lb.:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:55934       64.52.120.34.bc.g:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:45466       maa05s16-in-f5.1e:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:39536       a29-04-02-vip.rec:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:54138       n30-03-09-vip.lb.:https ESTABLISHED
  1410581/opera-beta
  tcp        0      0 parascoding:45464       maa05s16-in-f5.1e:https ESTABLISHED
  ```

- ```
  paras@parascoding:~$ netstat -s
  Ip:
      Forwarding: 1
      38934725 total packets received
      44 with invalid headers
      77 with invalid addresses
      20709707 forwarded
      3037 with unknown protocol
      0 incoming packets discarded
      16724620 incoming packets delivered
      24326891 requests sent out
      220 outgoing packets dropped
      978 dropped because of missing route
      747 fragments dropped after timeout
      147547 reassemblies required
      72665 packets reassembled ok
      747 packet reassemblies failed
      22194 fragments received ok
      44489 fragments created
  Icmp:
      33153 ICMP messages received
      1893 input ICMP message failed
  ```
  ```

```
paras@parascoding:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
default         172.16.16.1     0.0.0.0         UG        0 0          0 enp1s0
10.42.0.0       0.0.0.0         255.255.255.0   U         0 0          0 wlp2s0
link-local      0.0.0.0         255.255.0.0     U         0 0          0 enp1s0
172.16.16.0     0.0.0.0         255.255.248.0   U         0 0          0 enp1s0
paras@parascoding:~$
```

7 ss

Definition -

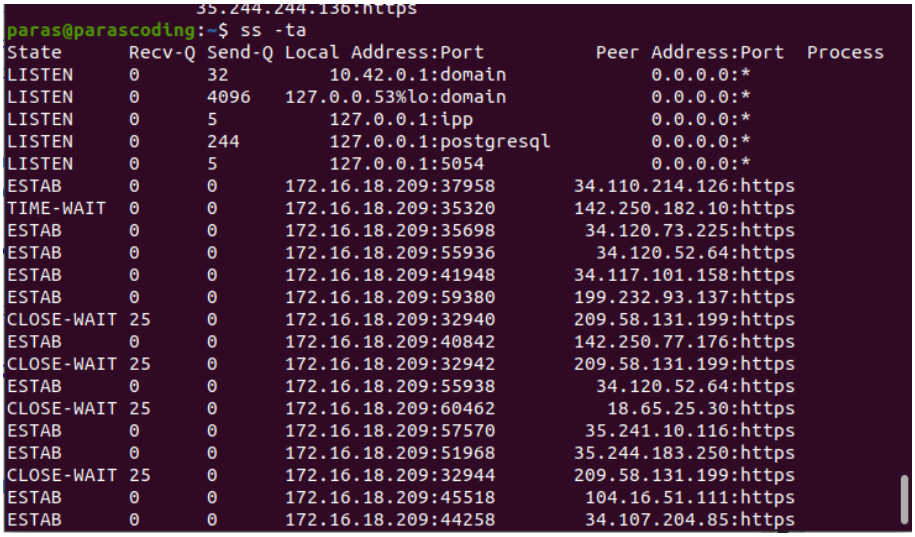
Linux ss command is the replacement for netstat command. It is regarded as a much faster and more informative command than netstat. The faster response of ss is possible as it fetches all the information from within the kernel userspace.

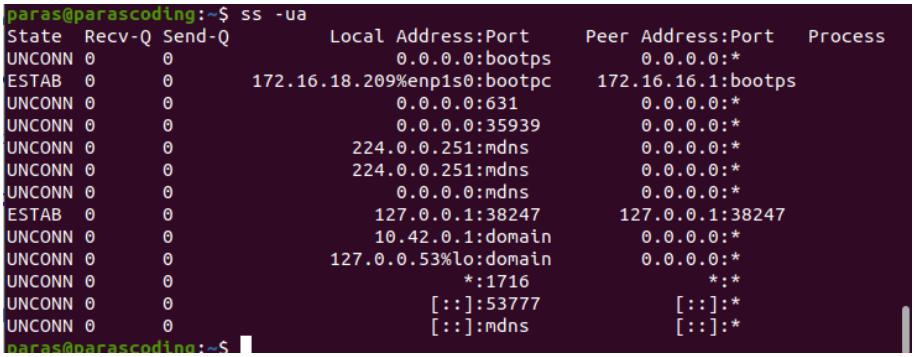
Syntax -

```
$ ss
$ ss -ta
$ ss -ua
```

Screenshots -

```
paras@parascoding:~$ ss
Netid State      Recv-Q Send-Q                          Local Address:Port
                   Peer Address:Port                    Process
u_seq ESTAB      0      0                                      @000b9 4235146
                       * 4235147
u_seq ESTAB      0      0                                      @000ba 4235148
                       * 4235149
u_dgr ESTAB      0      0                            /run/systemd/notify 21789
                       * 0
u_dgr ESTAB      0      0                   /run/systemd/journal/dev-log 21813
                       * 0
u_dgr ESTAB      0      0                    /run/systemd/journal/socket 21817
                       * 0
u_str ESTAB      0      0                                              * 4061575
                       * 4057040
u_str ESTAB      0      0                                              * 4241984
                       * 4241983
u_str ESTAB      0      0                                              * 4239716
                       * 4239717
u_str ESTAB      0      0                                              * 3297388
                       * 3294945
u_str ESTAB      0      0                              /run/user/1000/bus 57456
                       * 55508
u_str ESTAB      0      0                    /run/dbus/system_bus_socket 53336
```

- 

- 

8 dig

Definition -

Linux dig command stands for Domain Information Groper. This command is used in DNS lookup to query the DNS name server. It is also used to troubleshoot DNS related issues.

It is mainly used to verify DNS mappings, MX Records, host addresses, and all other DNS records for a better understanding of the DNS topography.

Syntax -

Screenshot -

```
paras@parascoding:~$ dig iiitk.ac.in

; <<>> DiG 9.16.1-Ubuntu <<>> iiitk.ac.in
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 4744
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;iiitk.ac.in.                   IN      A

;; ANSWER SECTION:
iiitk.ac.in.            267     IN      A       173.236.185.145

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Sun Aug 07 13:49:50 IST 2022
;; MSG SIZE  rcvd: 56

paras@parascoding:~$
```

9 nslookup

Definition -

Linux nslookup is also a command used for DNS related queries. It is the older version of dig.

Syntax -

Screenshot -

```
paras@parascoding:~$ nslookup iiitk.ac.in
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   iiitk.ac.in
Address: 173.236.185.145

paras@parascoding:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.110
Name:   google.com
Address: 2404:6800:4007:825::200e

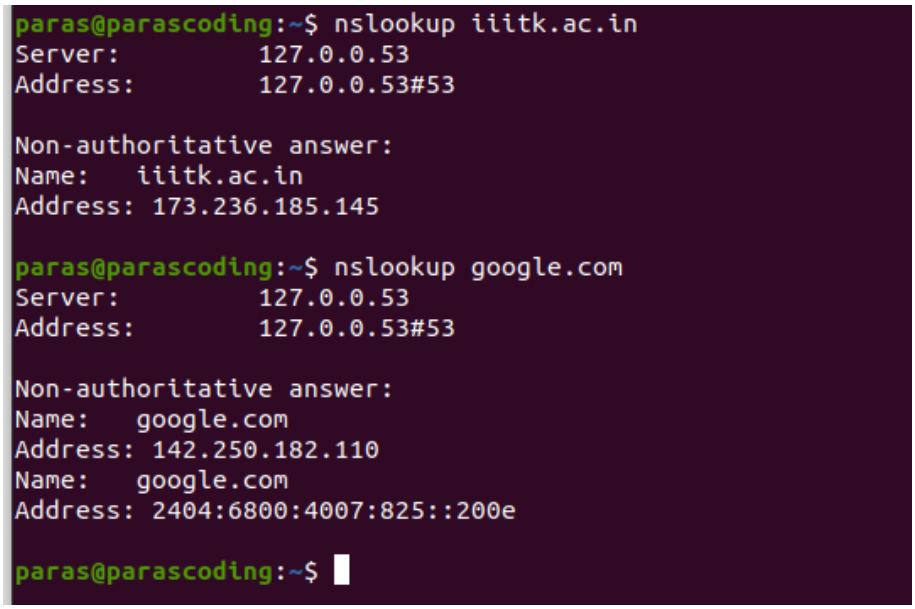
paras@parascoding:~$
```

10 nslookup

Definition -

Linux nslookup is also a command used for DNS related queries. It is the older version of dig.

Syntax -
Screenshot -

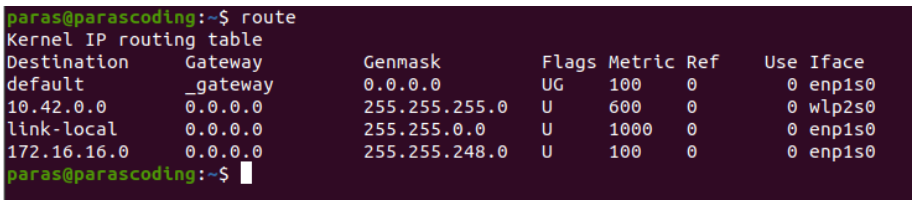
- 

11 route

Definition -

Linux route command displays and manipulates the routing table existing for your system. A router is basically used to find the best way to send the packets across to a destination.

Syntax -
Screenshot -

- 

12 host

Definition -

Linux host command displays the domain name for a given IP address and IP address for a given hostname. It is also used to fetch DNS lookup for DNS related query. **Syntax -**

Screenshot -

```
paras@parascoding:~$ host iiitk.ac.in
iiitk.ac.in has address 173.236.185.145
iiitk.ac.in mail is handled by 5 ALT2.ASPMX.L.GOOGLE.COM.
iiitk.ac.in mail is handled by 5 ALT1.ASPMX.L.GOOGLE.COM.
iiitk.ac.in mail is handled by 10 ALT4.ASPMX.L.GOOGLE.COM.
iiitk.ac.in mail is handled by 1 ASPMX.L.GOOGLE.COM.
iiitk.ac.in mail is handled by 10 ALT3.ASPMX.L.GOOGLE.COM.
paras@parascoding:~$ host google.com
google.com has address 142.250.68.46
google.com has IPv6 address 2607:f8b0:4007:815::200e
google.com mail is handled by 10 smtp.google.com.
paras@parascoding:~$ host localhost
localhost has address 127.0.0.1
localhost has IPv6 address ::1
paras@parascoding:~$
```

13 arp

Definition -

Linux arp command stands for Address Resolution Protocol. It is used to view and add content to the kernel's ARP table.Linux arp command stands for Address Resolution Protocol. It is used to view and add content to the kernel's ARP table. **Syntax -**

Screenshot -

```
paras@parascoding:~$ arp
Address                  HWtype  HWaddress           Flags Mask            Iface
172.16.16.63             ether   64:db:8b:a4:60:e1   C                     enp1s
0
172.16.16.61             ether   fe:f6:0c:30:8e:ed   C                     enp1s
0
172.16.16.42             ether   60:38:e0:d1:2b:8c   C                     enp1s
0
172.16.16.32                     (incomplete)                              enp1s
0
172.16.16.33                     (incomplete)                              enp1s
0
10.42.0.213              ether   fc:19:99:ed:1f:88   C                     wlp2s
0
172.16.16.26                     (incomplete)                              enp1s
0
172.16.16.27             ether   b0:7b:25:19:b9:0d   C                     enp1s
0
172.16.16.24             ether   e4:54:e8:7a:1f:fb   C                     enp1s
0
172.16.16.25                     (incomplete)                              enp1s
0
172.16.16.30                     (incomplete)                              enp1s
```

14 iwconfig

Definition -

Linux iwconfig is used to configure the wireless network interface. It is used to set and view the basic WI-FI details like SSID and encryption. To knowmore about this command, refer to the man page. **Syntax -**

Screenshot -

- figures/22.png

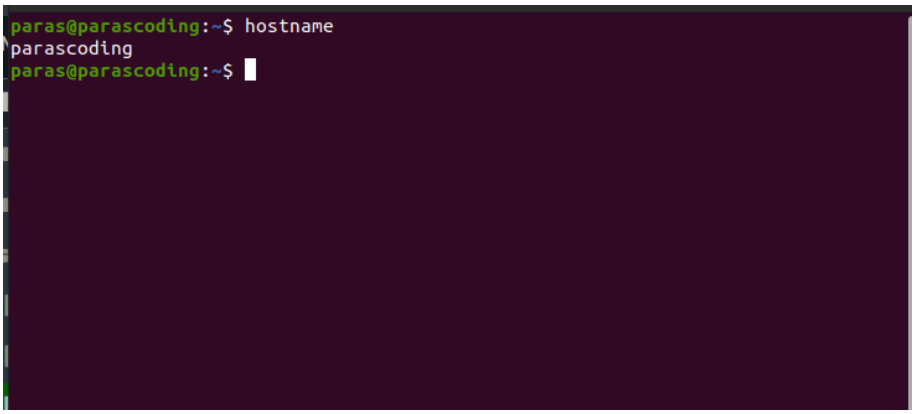
15 hostname

Definition -

Linux hostname is the simple command used to view and set the hostname of a system.

Syntax -

Screenshot -

- 

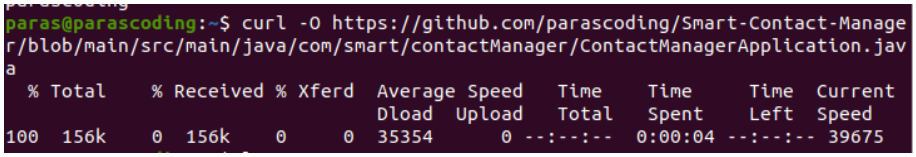
16 curl

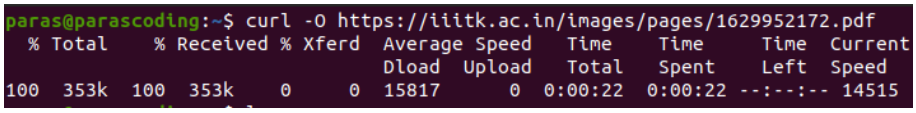
Definition -

Curl (short for "Client URL") is a command line tool that enables data transfer over various network protocols. It communicates with a web or application server by specifying a relevant URL and the data that need to be sent or received.

Syntax -

Screenshot -

- 

- 

17 wget

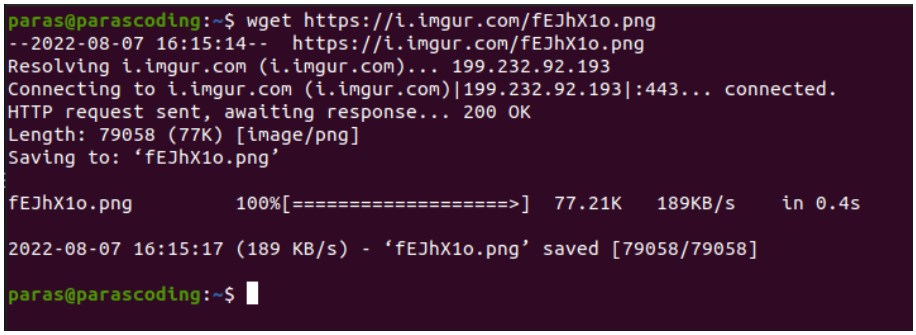
Definition -

Wget is the non-interactive network downloader which is used to download files from the server even when the user has not logged on to the system and it can work in the background without hindering the current process.

Syntax -

Screenshot -

- 

- 

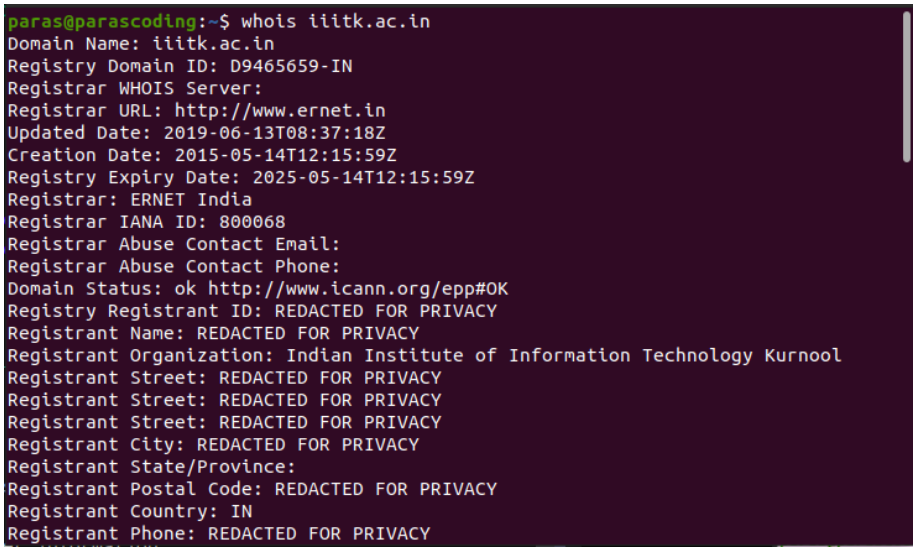
18 whois

Definition -

Linux whois command is used to fetch all the information related to a website. You can get all the information about a website including the registration and the owner information.

Syntax -

Screenshot -

- 

19 ifplugstatus

Definition -

Linux ifplugstatus command is used to check if a cable is plugged into the network interface. This command is not directly available on Ubuntu. **Syntax -**

Screenshot -

-