Computer Networks Lab

Assignment - Study of Linux Commands

Name : Mihika Dravid

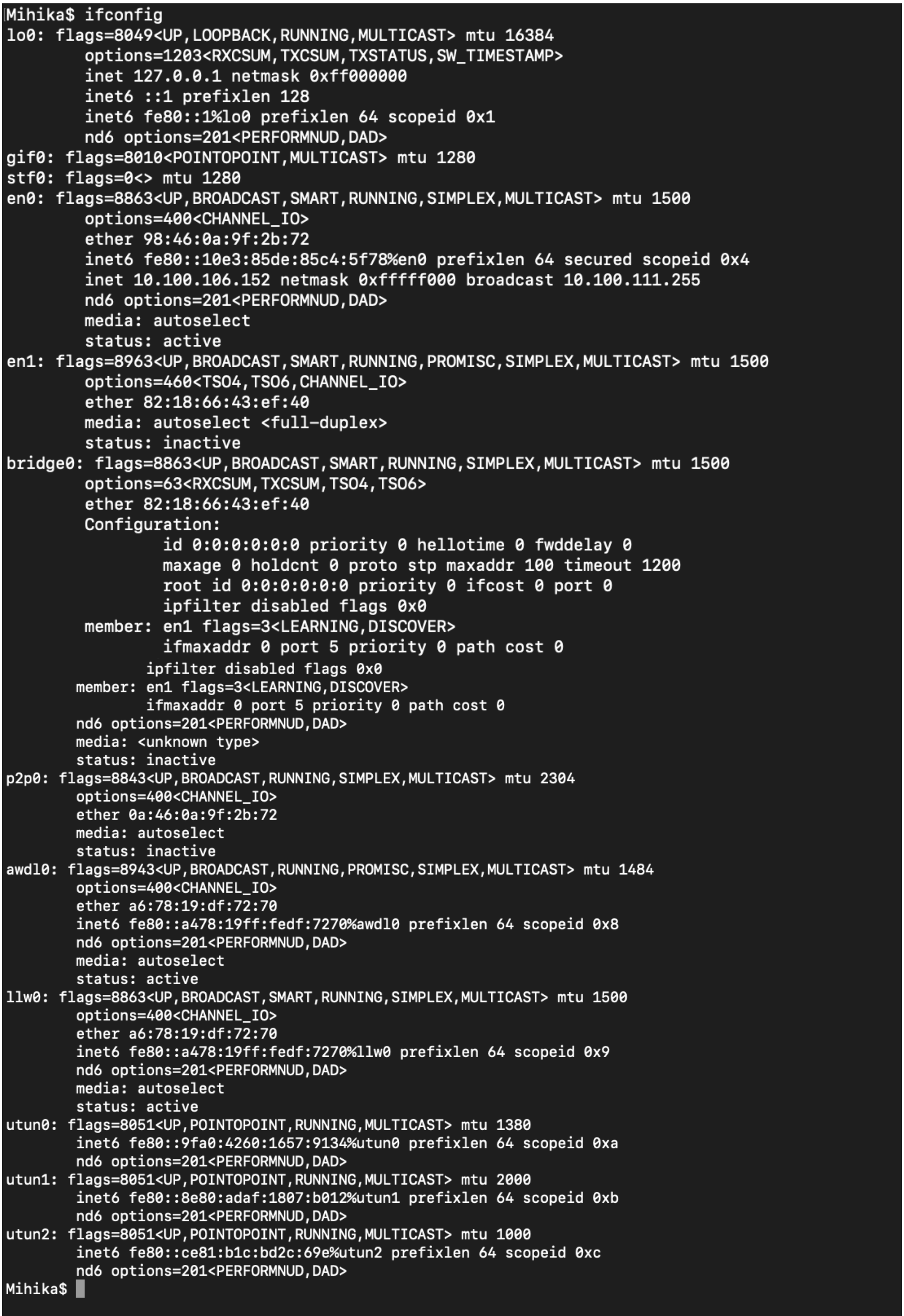
MIS : 112003038

Div : 1

Section : T3

1) ifconfig

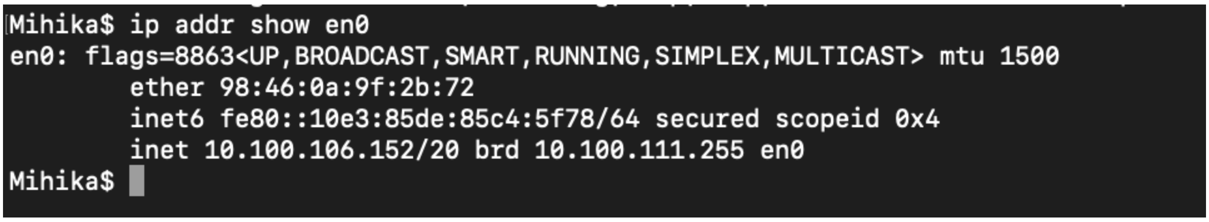
ifconfig is a system administration utility in Unix-like operating systems for network interface configuration. The utility is a command-line interface tool and is also used in the system startup scripts of many operating systems



```
Mihika$ 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
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether 98:46:0a:9f:2b:72
        inet6 fe80::10e3:85de:85c4:5f78%en0 prefixlen 64 secured scopeid 0x4
        inet 10.100.106.152 netmask 0xfffff000 broadcast 10.100.111.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
en1: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
        options=460<TSO4,TSO6,CHANNEL_IO>
        ether 82:18:66:43:ef:40
        media: autoselect <full-duplex>
        status: inactive
bridge0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=63<RXCSUM,TXCSUM,TSO4,TSO6>
        ether 82:18:66:43:ef:40
        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 0x0
        member: en1 flags=3<LEARNING,DISCOVER>
                ifmaxaddr 0 port 5 priority 0 path cost 0
                ipfilter disabled flags 0x0
        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
        options=400<CHANNEL_IO>
        ether 0a:46:0a:9f:2b:72
        media: autoselect
        status: inactive
awdl0: flags=8943<UP,BROADCAST,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1484
        options=400<CHANNEL_IO>
        ether a6:78:19:df:72:70
        inet6 fe80::a478:19ff:fedf:7270%awdl0 prefixlen 64 scopeid 0x8
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
llw0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether a6:78:19:df:72:70
        inet6 fe80::a478:19ff:fedf:7270%llw0 prefixlen 64 scopeid 0x9
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
utun0: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1380
        inet6 fe80::9fa0:4260:1657:9134%utun0 prefixlen 64 scopeid 0xa
        nd6 options=201<PERFORMNUD,DAD>
utun1: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 2000
        inet6 fe80::8e80:adaf:1807:b012%utun1 prefixlen 64 scopeid 0xb
        nd6 options=201<PERFORMNUD,DAD>
utun2: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1000
        inet6 fe80::ce81:b1c:bd2c:69e%utun2 prefixlen 64 scopeid 0xc
        nd6 options=201<PERFORMNUD,DAD>
Mihika$ 
```

2) ip

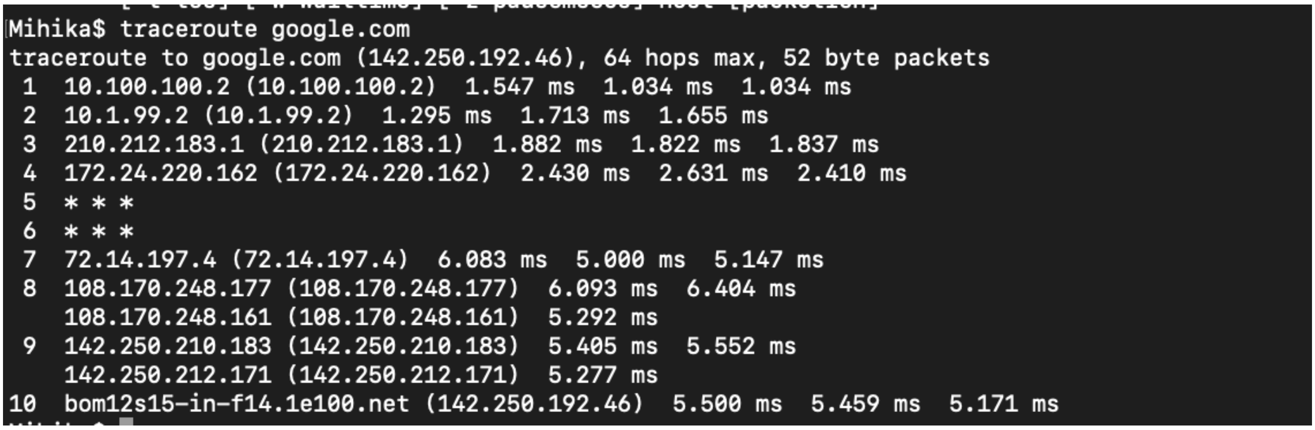
IP stands for Internet Protocol and as the name suggests, the tool is used for configuring network interfaces.



```
Mihika$ ip addr show en0
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        ether 98:46:0a:9f:2b:72
        inet6 fe80::10e3:85de:85c4:5f78/64 secured scopeid 0x4
        inet 10.100.106.152/20 brd 10.100.111.255 en0
Mihika$ 
```

3) *traceroute*

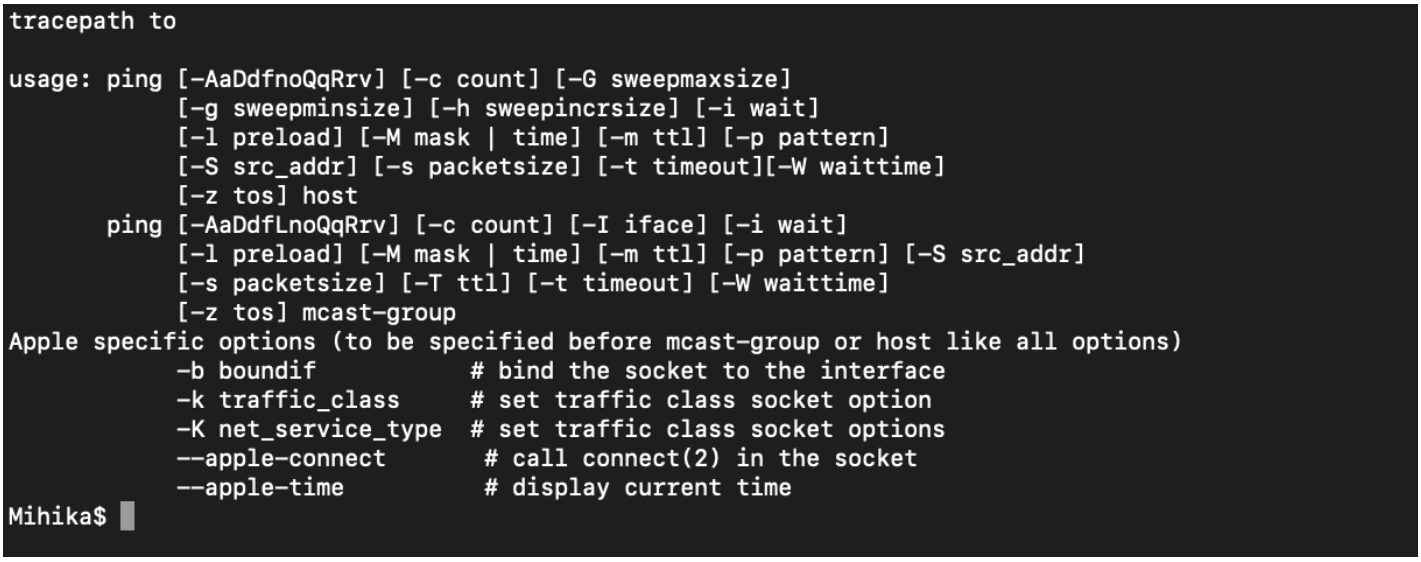
traceroute command in Linux prints the route that a packet takes to reach the host.



```
Mihika$ traceroute google.com
traceroute to google.com (142.250.192.46), 64 hops max, 52 byte packets
 1  10.100.100.2 (10.100.100.2)  1.547 ms  1.034 ms  1.034 ms
 2  10.1.99.2 (10.1.99.2)  1.295 ms  1.713 ms  1.655 ms
 3  210.212.183.1 (210.212.183.1)  1.882 ms  1.822 ms  1.837 ms
 4  172.24.220.162 (172.24.220.162)  2.430 ms  2.631 ms  2.410 ms
 5  * * *
 6  * * *
 7  72.14.197.4 (72.14.197.4)  6.083 ms  5.000 ms  5.147 ms
 8  108.170.248.177 (108.170.248.177)  6.093 ms  6.404 ms
    108.170.248.161 (108.170.248.161)  5.292 ms
 9  142.250.210.183 (142.250.210.183)  5.405 ms  5.552 ms
    142.250.212.171 (142.250.212.171)  5.277 ms
10  bom12s15-in-f14.1e100.net (142.250.192.46)  5.500 ms  5.459 ms  5.171 ms
```

4) *tracepath*

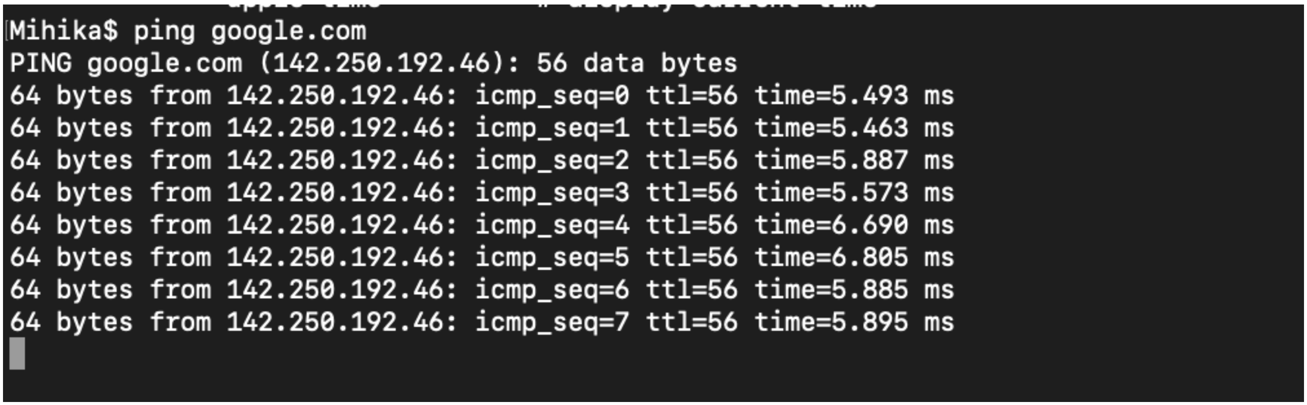
tracepath command in Linux is used to traces path to destination discovering MTU along this path. It uses UDP port or some random port.



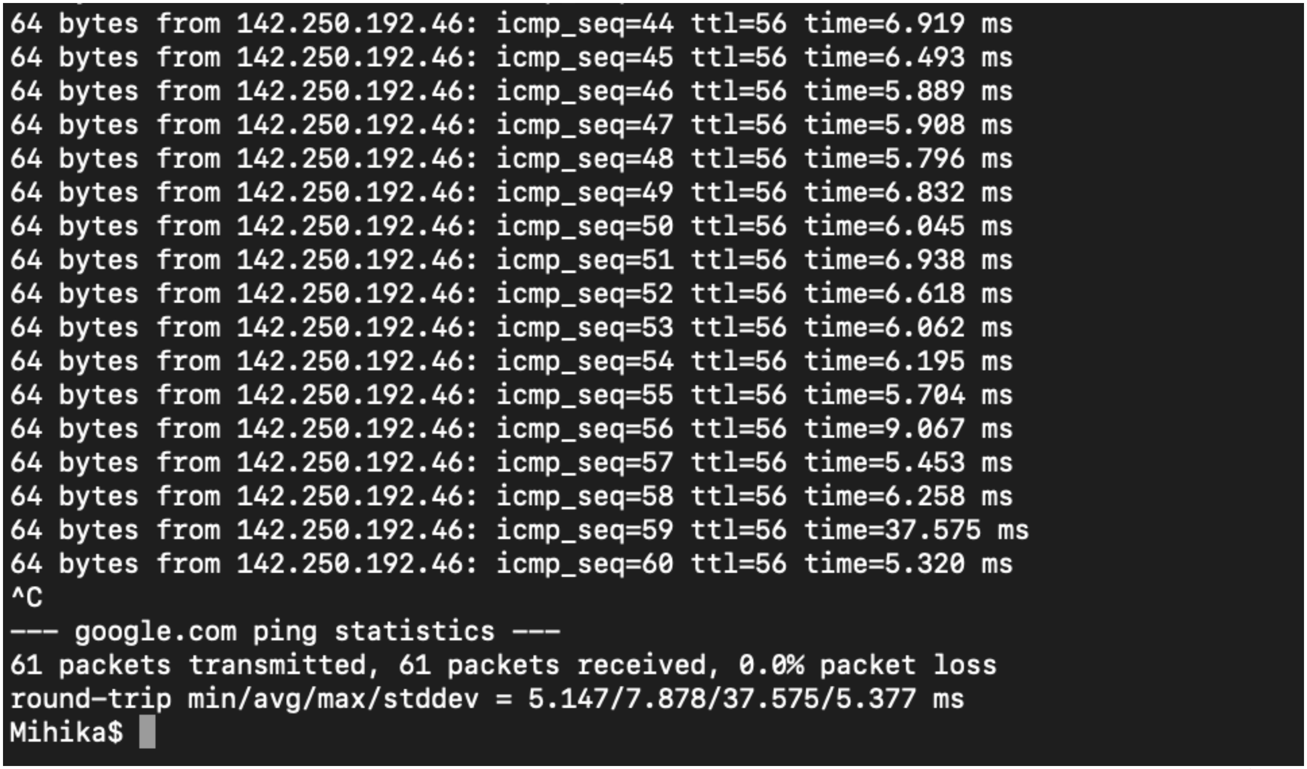
```
tracepath to

usage: ping [-AaDdfnoQqRrv] [-c count] [-G sweepmaxsize]
            [-g sweepminsize] [-h sweepincrsize] [-i wait]
            [-l preload] [-M mask | time] [-m ttl] [-p pattern]
            [-S src_addr] [-s packetsize] [-t timeout][-W waittime]
            [-z tos] host
       ping [-AaDdfLnoQqRrv] [-c count] [-I iface] [-i wait]
            [-l preload] [-M mask | time] [-m ttl] [-p pattern] [-S src_addr]
            [-s packetsize] [-T ttl] [-t timeout] [-W waittime]
            [-z tos] mcast-group
Apple specific options (to be specified before mcast-group or host like all options)
            -b boundif           # bind the socket to the interface
            -k traffic_class     # set traffic class socket option
            -K net_service_type  # set traffic class socket options
            --apple-connect       # call connect(2) in the socket
            --apple-time          # display current time
Mihika$
```

5) *ping*

PING (Packet Internet Groper) command is used to check the network connectivity between host and server/host.



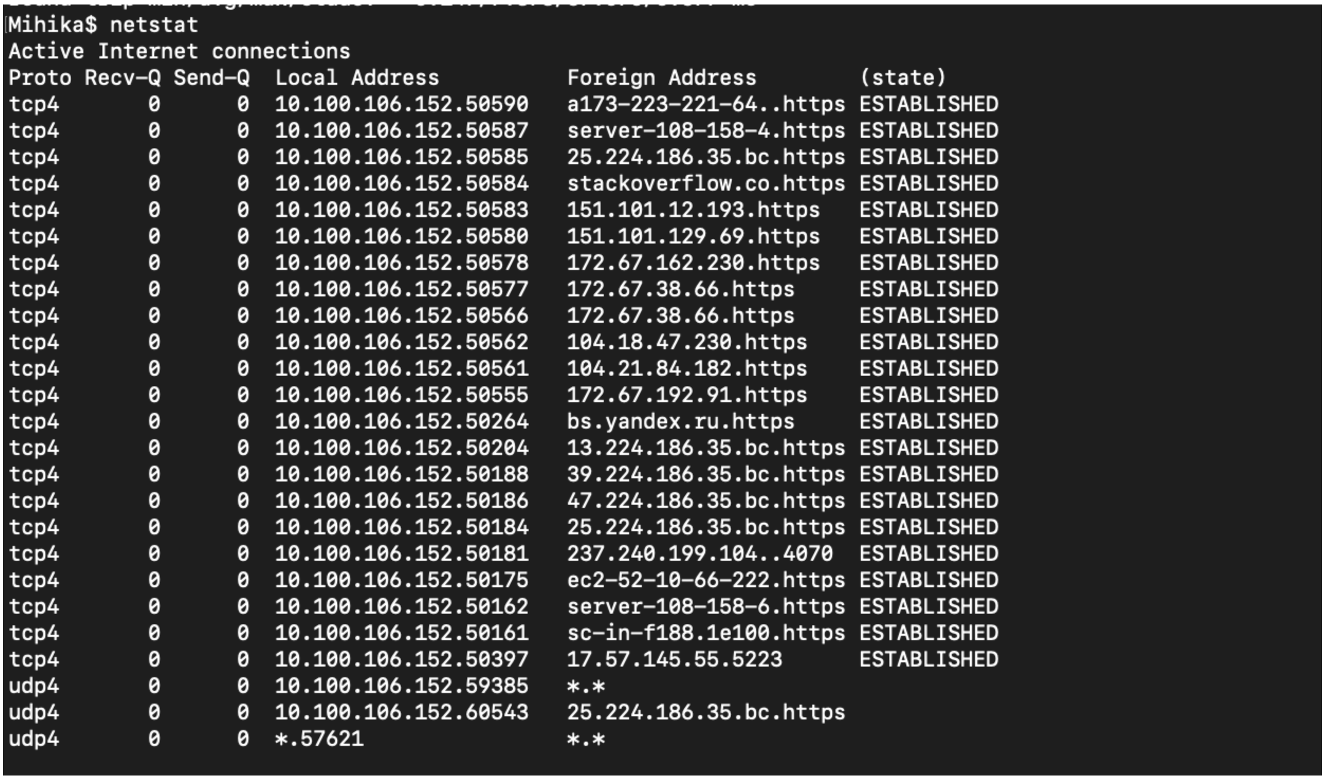
```
Mihika$ ping google.com
PING google.com (142.250.192.46): 56 data bytes
64 bytes from 142.250.192.46: icmp_seq=0 ttl=56 time=5.493 ms
64 bytes from 142.250.192.46: icmp_seq=1 ttl=56 time=5.463 ms
64 bytes from 142.250.192.46: icmp_seq=2 ttl=56 time=5.887 ms
64 bytes from 142.250.192.46: icmp_seq=3 ttl=56 time=5.573 ms
64 bytes from 142.250.192.46: icmp_seq=4 ttl=56 time=6.690 ms
64 bytes from 142.250.192.46: icmp_seq=5 ttl=56 time=6.805 ms
64 bytes from 142.250.192.46: icmp_seq=6 ttl=56 time=5.885 ms
64 bytes from 142.250.192.46: icmp_seq=7 ttl=56 time=5.895 ms
```



```
64 bytes from 142.250.192.46: icmp_seq=44 ttl=56 time=6.919 ms
64 bytes from 142.250.192.46: icmp_seq=45 ttl=56 time=6.493 ms
64 bytes from 142.250.192.46: icmp_seq=46 ttl=56 time=5.889 ms
64 bytes from 142.250.192.46: icmp_seq=47 ttl=56 time=5.908 ms
64 bytes from 142.250.192.46: icmp_seq=48 ttl=56 time=5.796 ms
64 bytes from 142.250.192.46: icmp_seq=49 ttl=56 time=6.832 ms
64 bytes from 142.250.192.46: icmp_seq=50 ttl=56 time=6.045 ms
64 bytes from 142.250.192.46: icmp_seq=51 ttl=56 time=6.938 ms
64 bytes from 142.250.192.46: icmp_seq=52 ttl=56 time=6.618 ms
64 bytes from 142.250.192.46: icmp_seq=53 ttl=56 time=6.062 ms
64 bytes from 142.250.192.46: icmp_seq=54 ttl=56 time=6.195 ms
64 bytes from 142.250.192.46: icmp_seq=55 ttl=56 time=5.704 ms
64 bytes from 142.250.192.46: icmp_seq=56 ttl=56 time=9.067 ms
64 bytes from 142.250.192.46: icmp_seq=57 ttl=56 time=5.453 ms
64 bytes from 142.250.192.46: icmp_seq=58 ttl=56 time=6.258 ms
64 bytes from 142.250.192.46: icmp_seq=59 ttl=56 time=37.575 ms
64 bytes from 142.250.192.46: icmp_seq=60 ttl=56 time=5.320 ms
^C
--- google.com ping statistics ---
61 packets transmitted, 61 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 5.147/7.878/37.575/5.377 ms
Mihika$
```

6) *netstat*

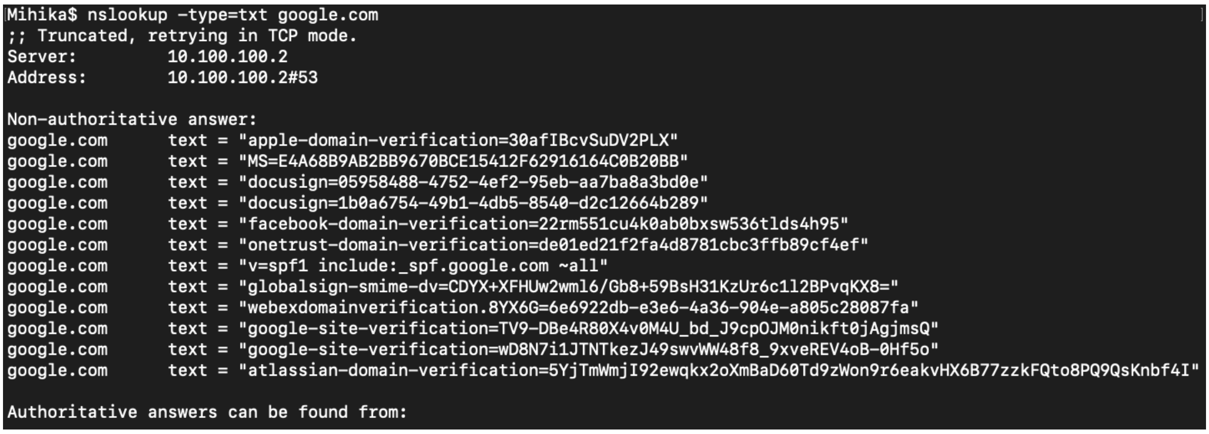
Netstat is a command-line network utility that displays network connections for Transmission Control Protocol, routing tables, and a number of network interface and network protocol statistics.



```
Mihika$ netstat
Active Internet connections
Proto Recv-Q Send-Q  Local Address          Foreign Address        (state)
tcp4       0      0  10.100.106.152.50590   a173-223-221-64..https ESTABLISHED
tcp4       0      0  10.100.106.152.50587   server-108-158-4.https ESTABLISHED
tcp4       0      0  10.100.106.152.50585   25.224.186.35.bc.https ESTABLISHED
tcp4       0      0  10.100.106.152.50584   stackoverflow.co.https ESTABLISHED
tcp4       0      0  10.100.106.152.50583   151.101.12.193.https   ESTABLISHED
tcp4       0      0  10.100.106.152.50580   151.101.129.69.https   ESTABLISHED
tcp4       0      0  10.100.106.152.50578   172.67.162.230.https   ESTABLISHED
tcp4       0      0  10.100.106.152.50577   172.67.38.66.https     ESTABLISHED
tcp4       0      0  10.100.106.152.50566   172.67.38.66.https     ESTABLISHED
tcp4       0      0  10.100.106.152.50562   104.18.47.230.https    ESTABLISHED
tcp4       0      0  10.100.106.152.50561   104.21.84.182.https    ESTABLISHED
tcp4       0      0  10.100.106.152.50555   172.67.192.91.https    ESTABLISHED
tcp4       0      0  10.100.106.152.50264   bs.yandex.ru.https     ESTABLISHED
tcp4       0      0  10.100.106.152.50204   13.224.186.35.bc.https ESTABLISHED
tcp4       0      0  10.100.106.152.50188   39.224.186.35.bc.https ESTABLISHED
tcp4       0      0  10.100.106.152.50186   47.224.186.35.bc.https ESTABLISHED
tcp4       0      0  10.100.106.152.50184   25.224.186.35.bc.https ESTABLISHED
tcp4       0      0  10.100.106.152.50181   237.240.199.104..4070  ESTABLISHED
tcp4       0      0  10.100.106.152.50175   ec2-52-10-66-222.https ESTABLISHED
tcp4       0      0  10.100.106.152.50162   server-108-158-6.https ESTABLISHED
tcp4       0      0  10.100.106.152.50161   sc-in-f188.1e100.https ESTABLISHED
tcp4       0      0  10.100.106.152.50397   17.57.145.55.5223      ESTABLISHED
udp4       0      0  10.100.106.152.59385   *.*
udp4       0      0  10.100.106.152.60543   25.224.186.35.bc.https
udp4       0      0  *.57621                *.*
```

7) *nslookup*

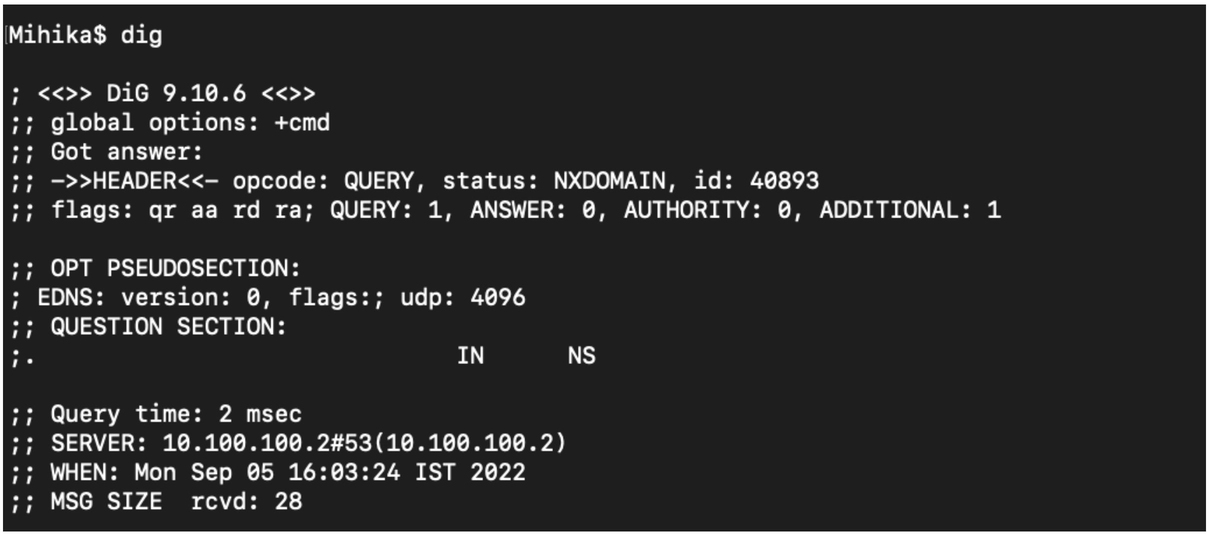
nslookup, which stands for "name server lookup", finds information about a named domain.



```
Mihika$ nslookup -type=txt google.com
;; Truncated, retrying in TCP mode.
Server:         10.100.100.2
Address:        10.100.100.2#53

Non-authoritative answer:
google.com      text = "apple-domain-verification=30afIBcvSuDV2PLX"
google.com      text = "MS=E4A68B9AB2BB9670BCE15412F62916164C0B20BB"
google.com      text = "docusign=05958488-4752-4ef2-95eb-aa7ba8a3bd0e"
google.com      text = "docusign=1b0a6754-49b1-4db5-8540-d2c12664b289"
google.com      text = "facebook-domain-verification=22rm551cu4k0ab0bxsw536tlds4h95"
google.com      text = "onetrust-domain-verification=de01ed21f2fa4d8781cbc3ffb89cf4ef"
google.com      text = "v=spf1 include:_spf.google.com ~all"
google.com      text = "globalsign-smime-dv=CDYX+XFHUw2wml6/Gb8+59BsH31KzUr6c1l2BPvqKX8="
google.com      text = "webexdomainverification.8YX6G=6e6922db-e3e6-4a36-904e-a805c28087fa"
google.com      text = "google-site-verification=TV9-DBe4R80X4v0M4U_bd_J9cpOJM0nikft0jAgjmsQ"
google.com      text = "google-site-verification=wD8N7i1JTNTkezJ49swvWW48f8_9xveREV4oB-0Hf5o"
google.com      text = "atlassian-domain-verification=5YjTmWmjI92ewqkx2oXmBaD60Td9zWon9r6eakvHX6B77zzkFQto8PQ9QsKnbf4I"

Authoritative answers can be found from:
```

8) *dig*

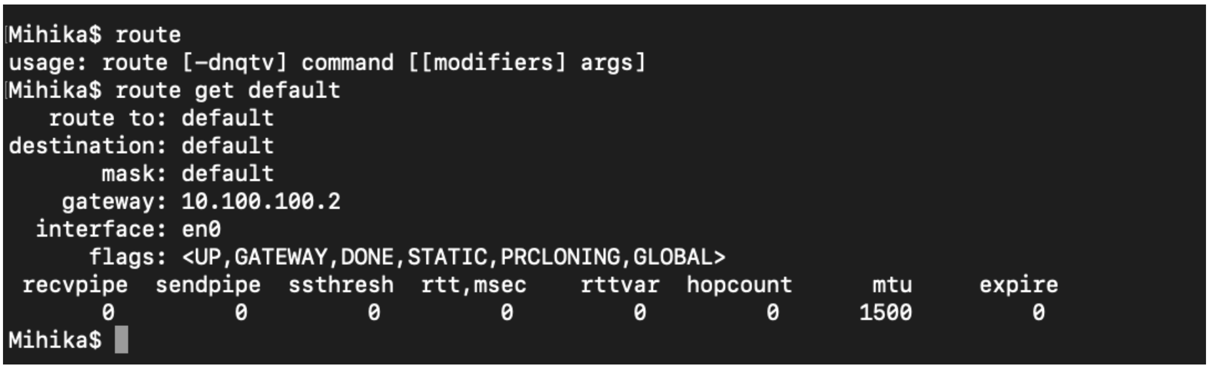
dig command stands for Domain Information Groper. It is used for retrieving information about DNS name servers. It is basically used by network administrators



```
Mihika$ dig

; <<>> DiG 9.10.6 <<>>
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 40893
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;.                             IN      NS

;; Query time: 2 msec
;; SERVER: 10.100.100.2#53(10.100.100.2)
;; WHEN: Mon Sep 05 16:03:24 IST 2022
;; MSG SIZE  rcvd: 28
```

9) *route*

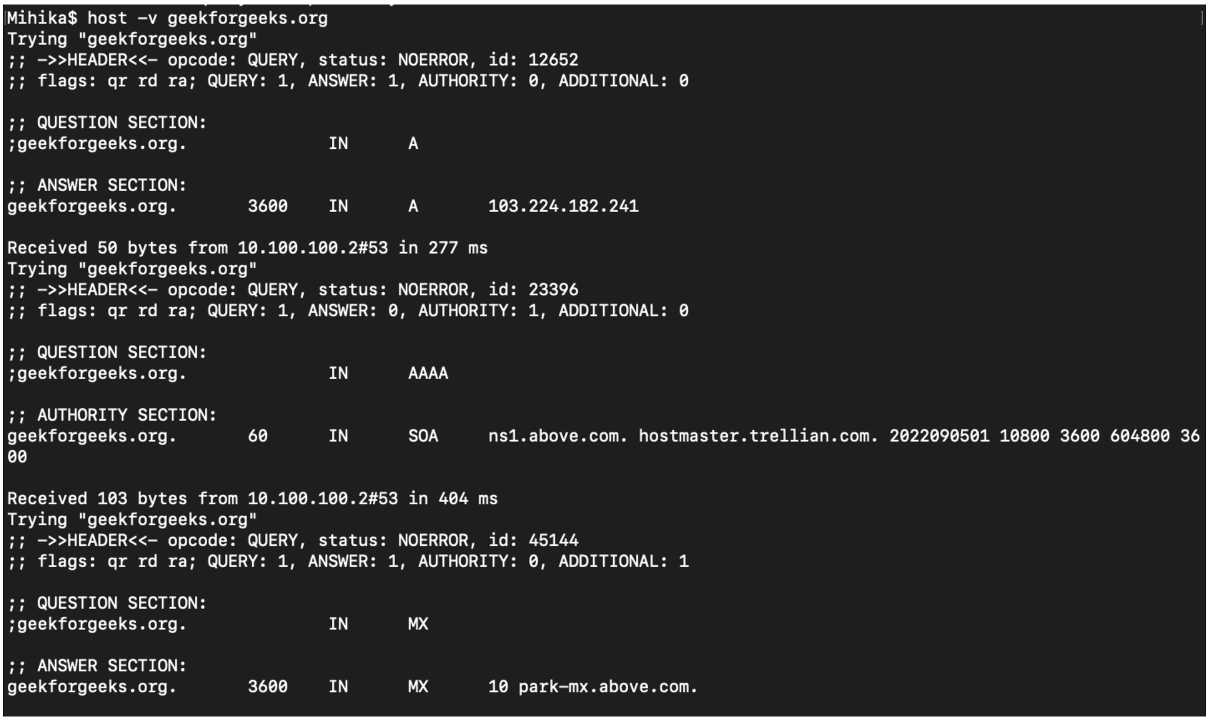
Route is a command used to view and manipulate the IP routing table in Unix-like and Microsoft Windows operating systems. Manual manipulation of the routing table is characteristic of static routing.



```
Mihika$ route
usage: route [-dnqtv] command [[modifiers] args]
Mihika$ route get default
   route to: default
destination: default
       mask: default
    gateway: 10.100.100.2
  interface: en0
      flags: <UP,GATEWAY,DONE,STATIC,PRCLONING,GLOBAL>
 recvpipe  sendpipe  ssthresh  rtt,msec    rttvar  hopcount      mtu     expire
       0         0         0         0         0         0      1500         0
Mihika$ 
```

10) *Host*

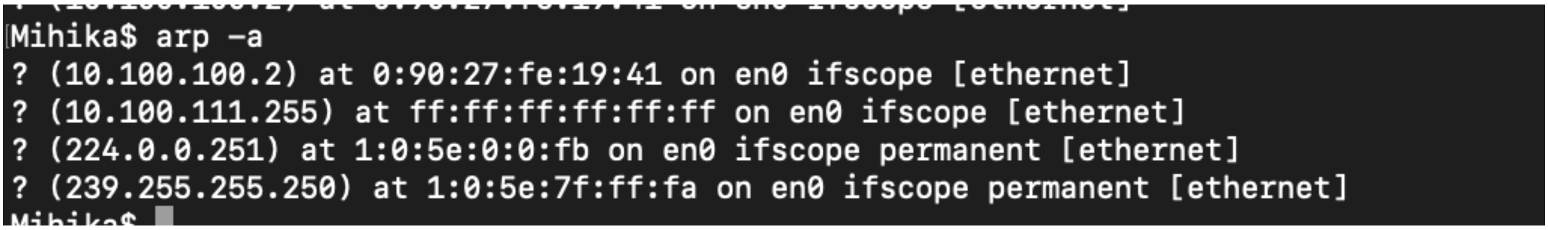
host command in Linux system is used for DNS (Domain Name System) lookup operations. In simple words, this command is used to find the IP address of a particular domain name or if you want to find out the domain name of a particular IP address the host command becomes handy.



```
Mihika$ host -v geekforgeeks.org
Trying "geekforgeeks.org"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 12652
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;geekforgeeks.org.              IN      A

;; ANSWER SECTION:
geekforgeeks.org.       3600    IN      A       103.224.182.241

Received 50 bytes from 10.100.100.2#53 in 277 ms
Trying "geekforgeeks.org"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 23396
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;geekforgeeks.org.              IN      AAAA

;; AUTHORITY SECTION:
geekforgeeks.org.       60      IN      SOA     ns1.above.com. hostmaster.trellian.com. 2022090501 10800 3600 604800 36
00

Received 103 bytes from 10.100.100.2#53 in 404 ms
Trying "geekforgeeks.org"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 45144
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; QUESTION SECTION:
;geekforgeeks.org.              IN      MX

;; ANSWER SECTION:
geekforgeeks.org.       3600    IN      MX      10 park-mx.above.com.
```

11) *arp*

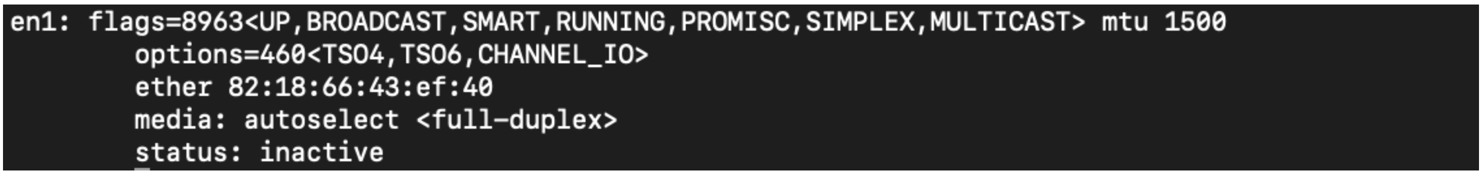
The arp command allows users to manipulate the neighbor cache or ARP table. It is contained in the Net-tools package along with many other notable networking commands (such as ifconfig)



```
Mihika$ arp -a
? (10.100.100.2) at 0:90:27:fe:19:41 on en0 ifscope [ethernet]
? (10.100.111.255) at ff:ff:ff:ff:ff:ff on en0 ifscope [ethernet]
? (224.0.0.251) at 1:0:5e:0:0:fb on en0 ifscope permanent [ethernet]
? (239.255.255.250) at 1:0:5e:7f:ff:fa on en0 ifscope permanent [ethernet]
Mihika$
```

12) *iwconfig*

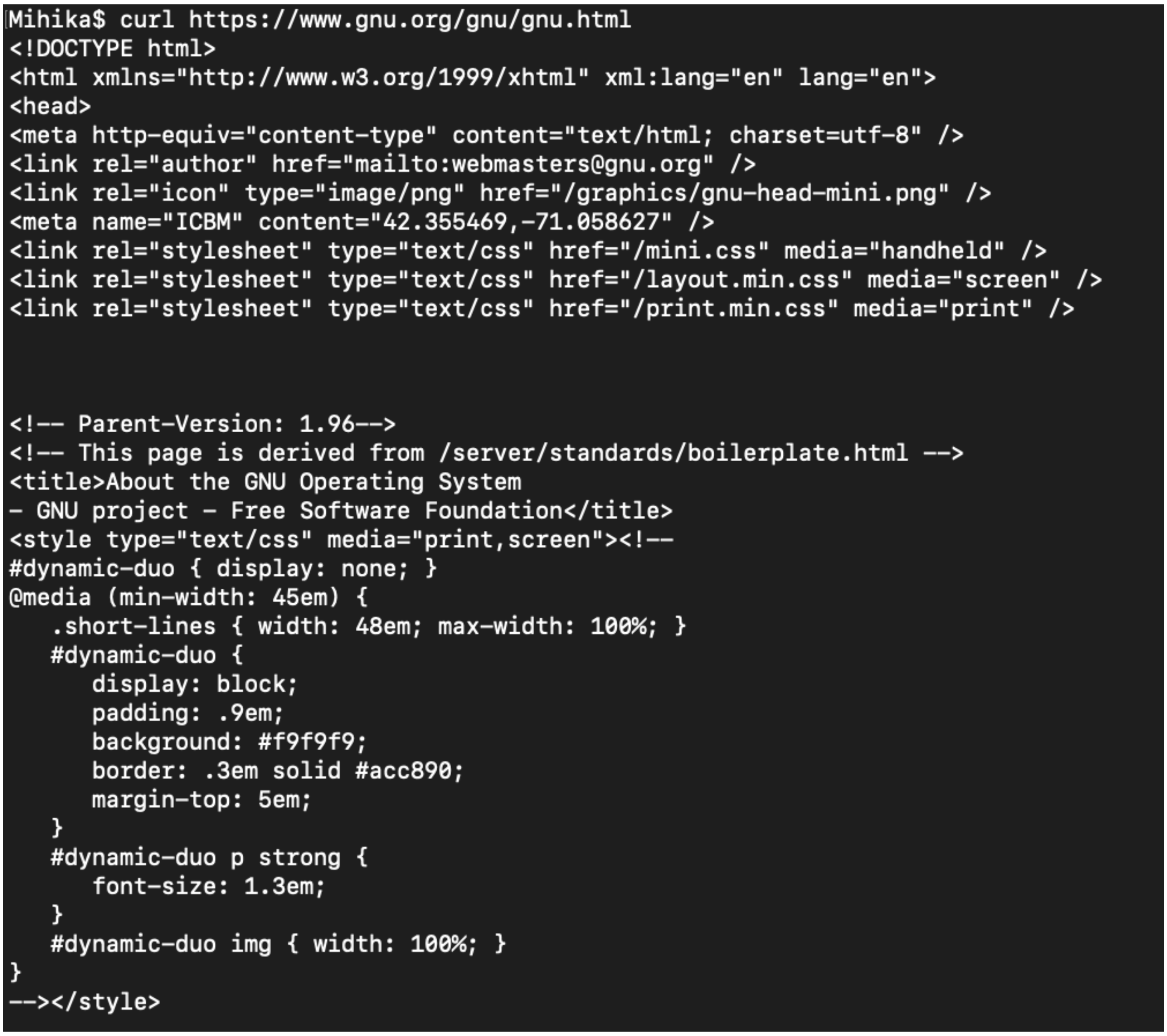
iwconfig command in Linux is like ifconfig command, in the sense it works with kernel-resident network interface but it is dedicated to wireless networking interfaces only. It is used to set the parameters of the network interface that are particular to the wireless operation like SSID, frequency etc.



```
en1: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
        options=460<TSO4,TSO6,CHANNEL_IO>
        ether 82:18:66:43:ef:40
        media: autoselect <full-duplex>
        status: inactive
```

13) *curl*

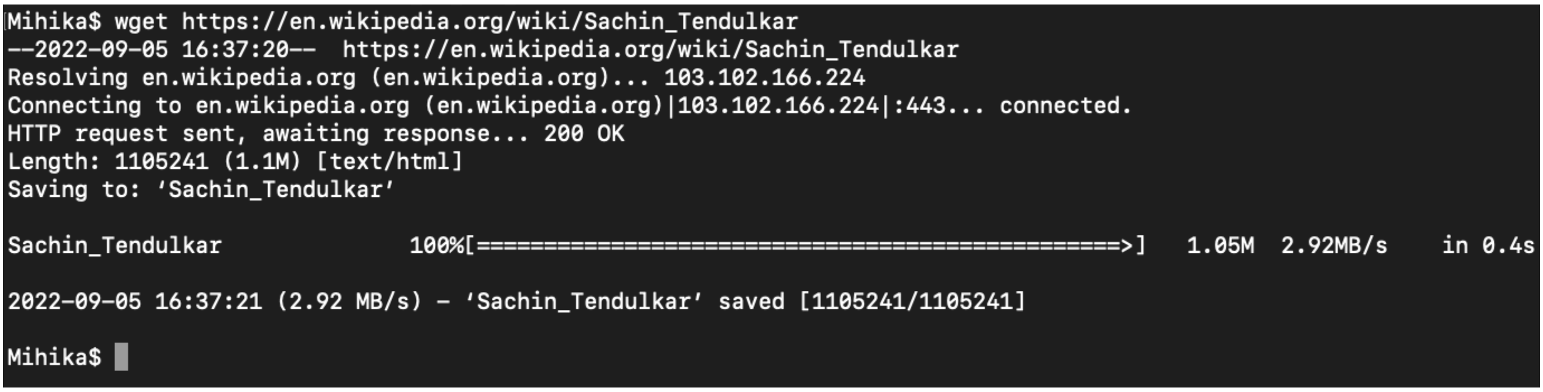
curl is a command-line tool to transfer data to or from a server, using any of the supported protocols (HTTP, FTP, IMAP, POP3, SCP, SFTP, etc)



```
Mihika$ curl https://www.gnu.org/gnu/gnu.html
<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
<head>
<meta http-equiv="content-type" content="text/html; charset=utf-8" />
<link rel="author" href="mailto:webmasters@gnu.org" />
<link rel="icon" type="image/png" href="/graphics/gnu-head-mini.png" />
<meta name="ICBM" content="42.355469,-71.058627" />
<link rel="stylesheet" type="text/css" href="/mini.css" media="handheld" />
<link rel="stylesheet" type="text/css" href="/layout.min.css" media="screen" />
<link rel="stylesheet" type="text/css" href="/print.min.css" media="print" />



<!-- Parent-Version: 1.96-->
<!-- This page is derived from /server/standards/boilerplate.html -->
<title>About the GNU Operating System
- GNU project - Free Software Foundation</title>
<style type="text/css" media="print,screen"><!--
#dynamic-duo { display: none; }
@media (min-width: 45em) {
   .short-lines { width: 48em; max-width: 100%; }
   #dynamic-duo {
      display: block;
      padding: .9em;
      background: #f9f9f9;
      border: .3em solid #acc890;
      margin-top: 5em;
   }
   #dynamic-duo p strong {
      font-size: 1.3em;
   }
   #dynamic-duo img { width: 100%; }
}
--></style>
```

14) *wget*

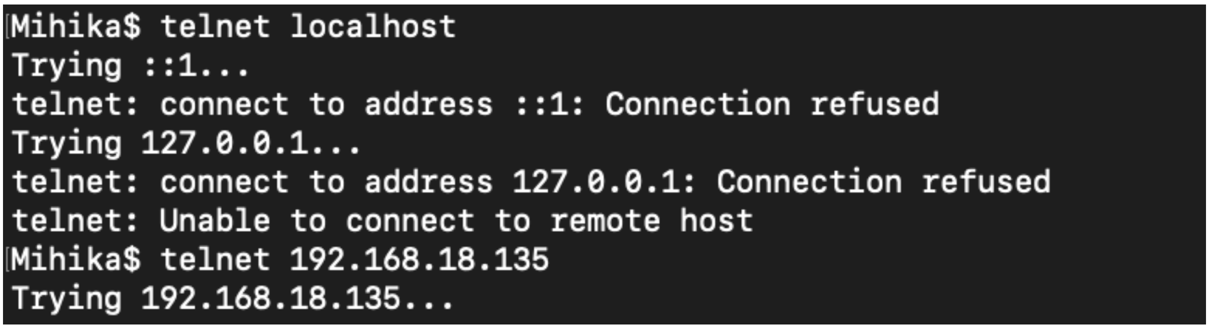
wget is a free utility for non-interactive download of files from the web. wget is non-interactive, meaning that it can work in the background, while the user is not logged on, which allows you to start a retrieval and disconnect from the system, letting wget finish the work.



```
Mihika$ wget https://en.wikipedia.org/wiki/Sachin_Tendulkar
--2022-09-05 16:37:20--  https://en.wikipedia.org/wiki/Sachin_Tendulkar
Resolving en.wikipedia.org (en.wikipedia.org)... 103.102.166.224
Connecting to en.wikipedia.org (en.wikipedia.org)|103.102.166.224|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1105241 (1.1M) [text/html]
Saving to: ‘Sachin_Tendulkar’

Sachin_Tendulkar            100%[===============================================>]   1.05M  2.92MB/s    in 0.4s

2022-09-05 16:37:21 (2.92 MB/s) - ‘Sachin_Tendulkar’ saved [1105241/1105241]

Mihika$ 
```

15) *telnet*

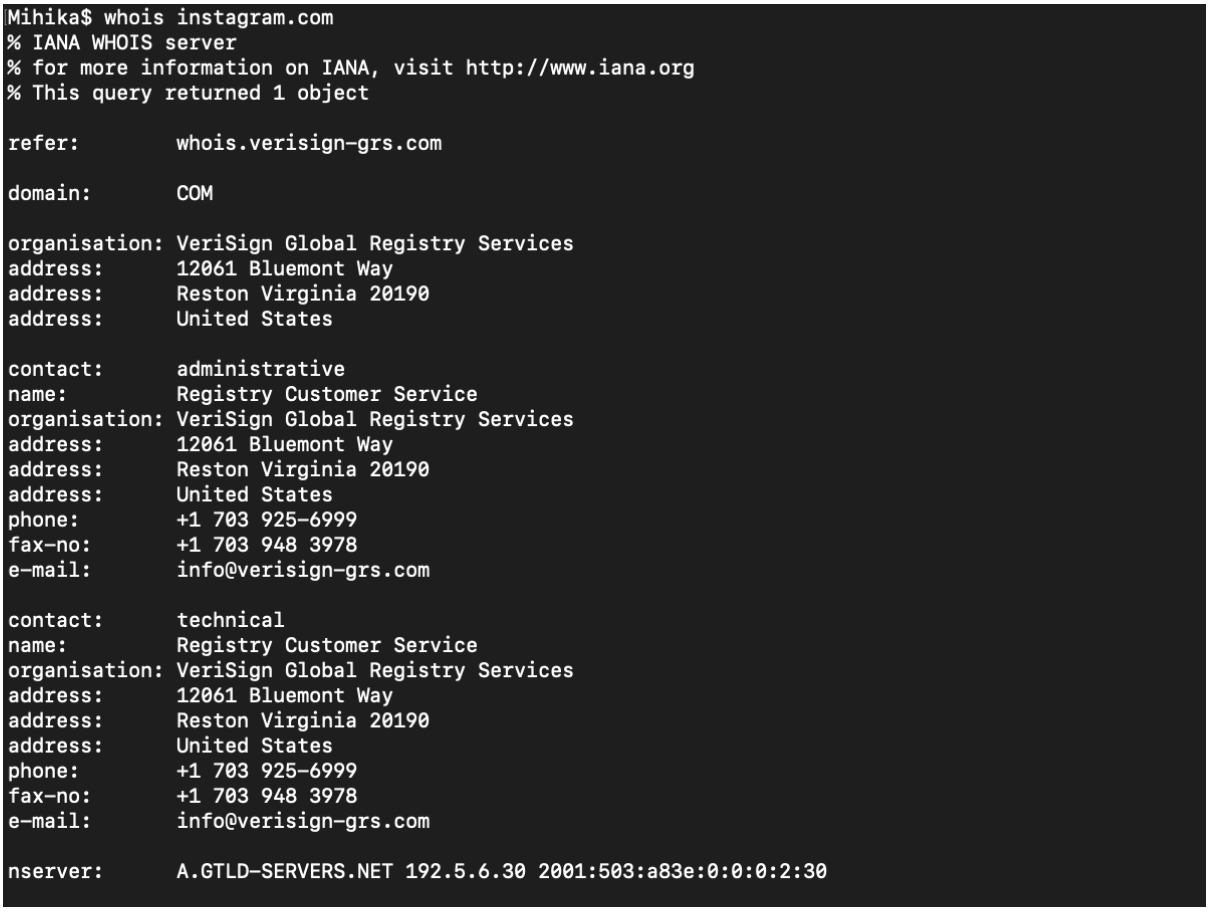
In Linux, the telnet command is used to create a remote connection with a system over a TCP/IP network. It allows us to administrate other systems by the terminal. We can run a program to conduct administration.



```
Mihika$ telnet localhost
Trying ::1...
telnet: connect to address ::1: Connection refused
Trying 127.0.0.1...
telnet: connect to address 127.0.0.1: Connection refused
telnet: Unable to connect to remote host
Mihika$ telnet 192.168.18.135
Trying 192.168.18.135...
```

16) *whois*

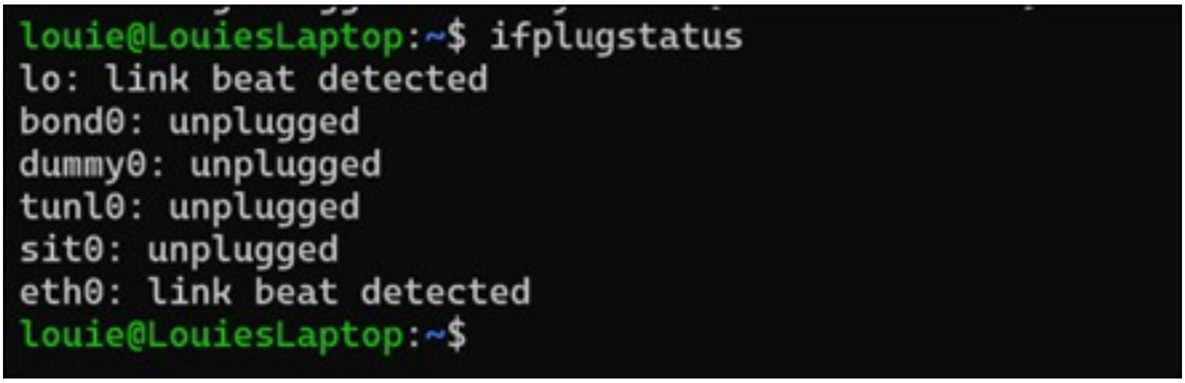
whois searches for an object in a WHOIS database. WHOIS is a query and response protocol that is widely used for querying databases that store the registered users of an Internet resource, such as a domain name or an IP address block, but is also used for a wider range of other information.



```
Mihika$ whois instagram.com
% IANA WHOIS server
% for more information on IANA, visit http://www.iana.org
% This query returned 1 object

refer:        whois.verisign-grs.com

domain:       COM

organisation: VeriSign Global Registry Services
address:      12061 Bluemont Way
address:      Reston Virginia 20190
address:      United States

contact:      administrative
name:         Registry Customer Service
organisation: VeriSign Global Registry Services
address:      12061 Bluemont Way
address:      Reston Virginia 20190
address:      United States
phone:        +1 703 925-6999
fax-no:       +1 703 948 3978
e-mail:       info@verisign-grs.com

contact:      technical
name:         Registry Customer Service
organisation: VeriSign Global Registry Services
address:      12061 Bluemont Way
address:      Reston Virginia 20190
address:      United States
phone:        +1 703 925-6999
fax-no:       +1 703 948 3978
e-mail:       info@verisign-grs.com

nserver:      A.GTLD-SERVERS.NET 192.5.6.30 2001:503:a83e:0:0:0:2:30
```

17) *ifplugstatus*

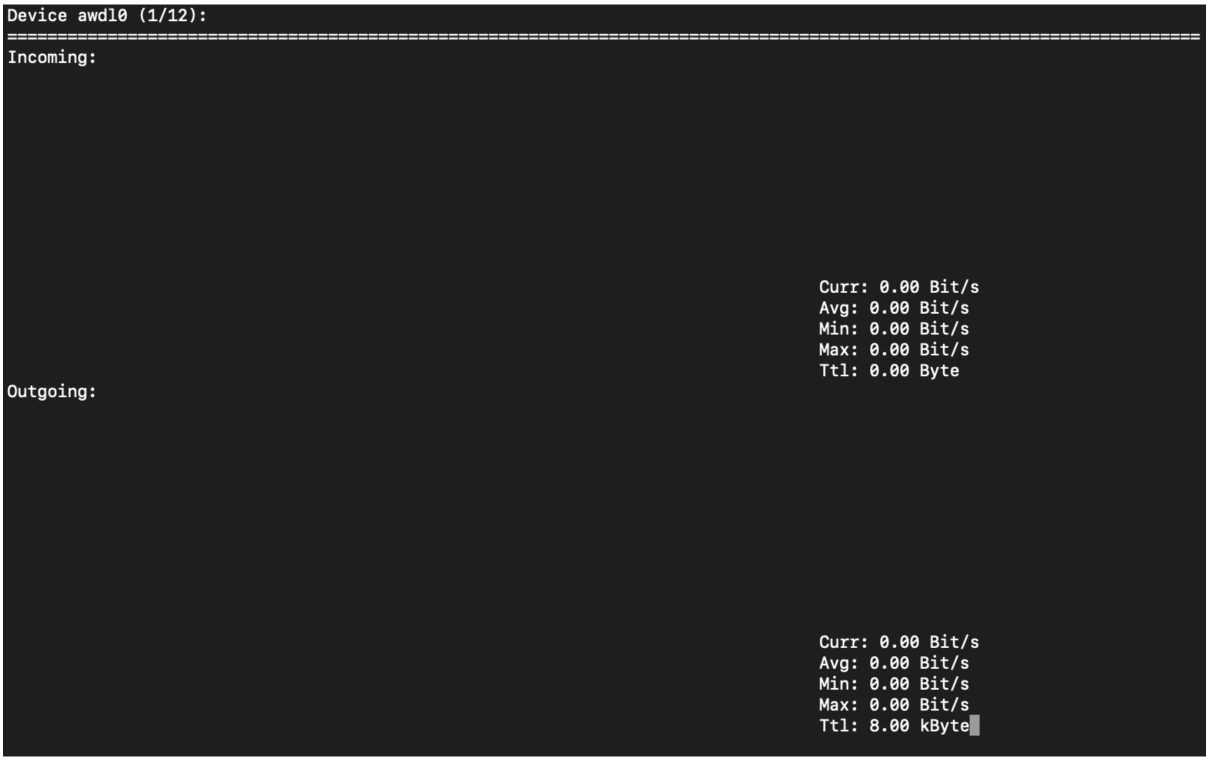
This command tells us whether a cable is plugged into our network interface or not.



```
louie@LouiesLaptop:~$ ifplugstatus
lo: link beat detected
bond0: unplugged
dummy0: unplugged
tunl0: unplugged
sit0: unplugged
eth0: link beat detected
louie@LouiesLaptop:~$
```

18) *nload*

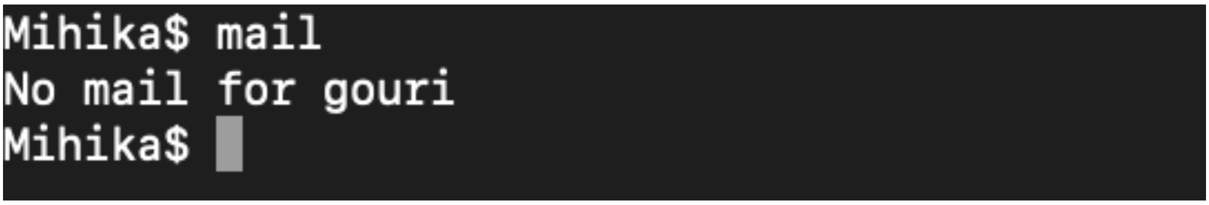
nload is a command-line tool to keep an eye on network traffic and bandwidth usage in real time.



```
Device awdl0 (1/12):
================================================================================================================
Incoming:





                                                                                         Curr: 0.00 Bit/s
                                                                                         Avg: 0.00 Bit/s
                                                                                         Min: 0.00 Bit/s
                                                                                         Max: 0.00 Bit/s
                                                                                         Ttl: 0.00 Byte
Outgoing:





                                                                                         Curr: 0.00 Bit/s
                                                                                         Avg: 0.00 Bit/s
                                                                                         Min: 0.00 Bit/s
                                                                                         Max: 0.00 Bit/s
                                                                                         Ttl: 8.00 kByte
```

20) *mail*

In Linux, the mail command is a command-line utility that is used to send and manage the emails from the command line.



```
Mihika$ mail
No mail for gouri
Mihika$ 
```