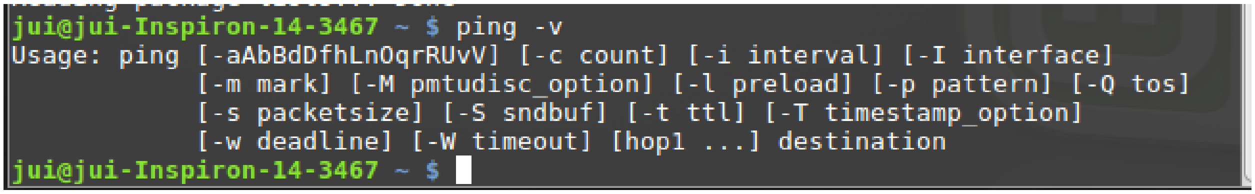
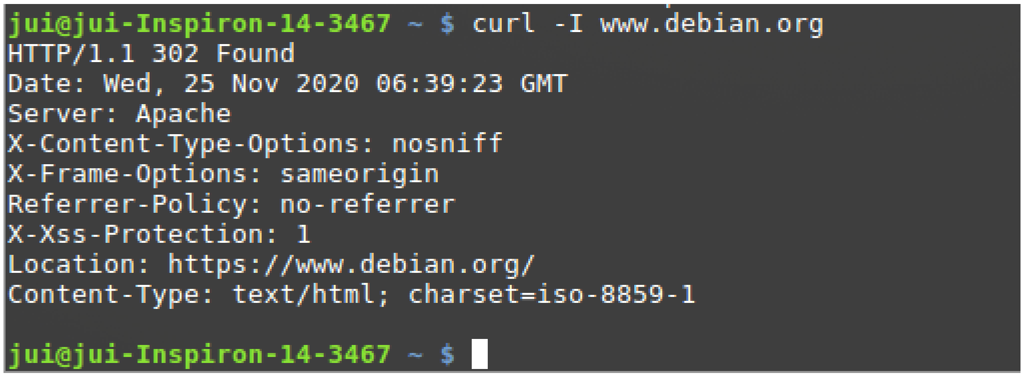
**1.Ping:** The Linux ping command is used to check whether a network is available and if a host is reachable. With this command, you can test if a server is up and running. It also helps with troubleshooting various connectivity issues.



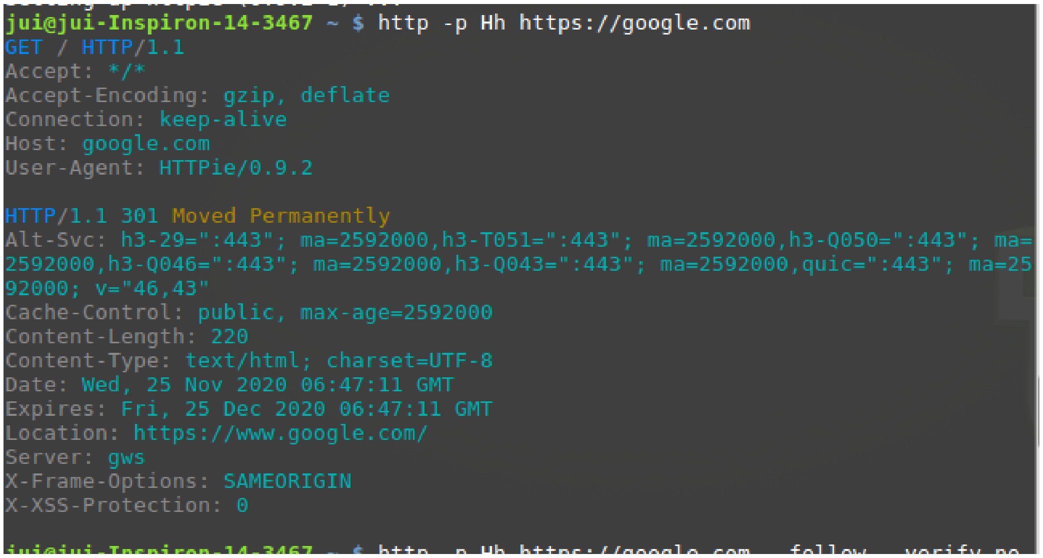
```
jui@jui-Inspiron-14-3467 ~ $ ping -v
Usage: ping [-aAbBdDfhLnOqrRUvV] [-c count] [-i interval] [-I interface]
            [-m mark] [-M pmtudisc_option] [-l preload] [-p pattern] [-Q tos]
            [-s packetsize] [-S sndbuf] [-t ttl] [-T timestamp_option]
            [-w deadline] [-W timeout] [hop1 ...] destination
jui@jui-Inspiron-14-3467 ~ $
```

**2.Curl:** curl is a command-line utility for transferring data from or to a server designed to work without user interaction.

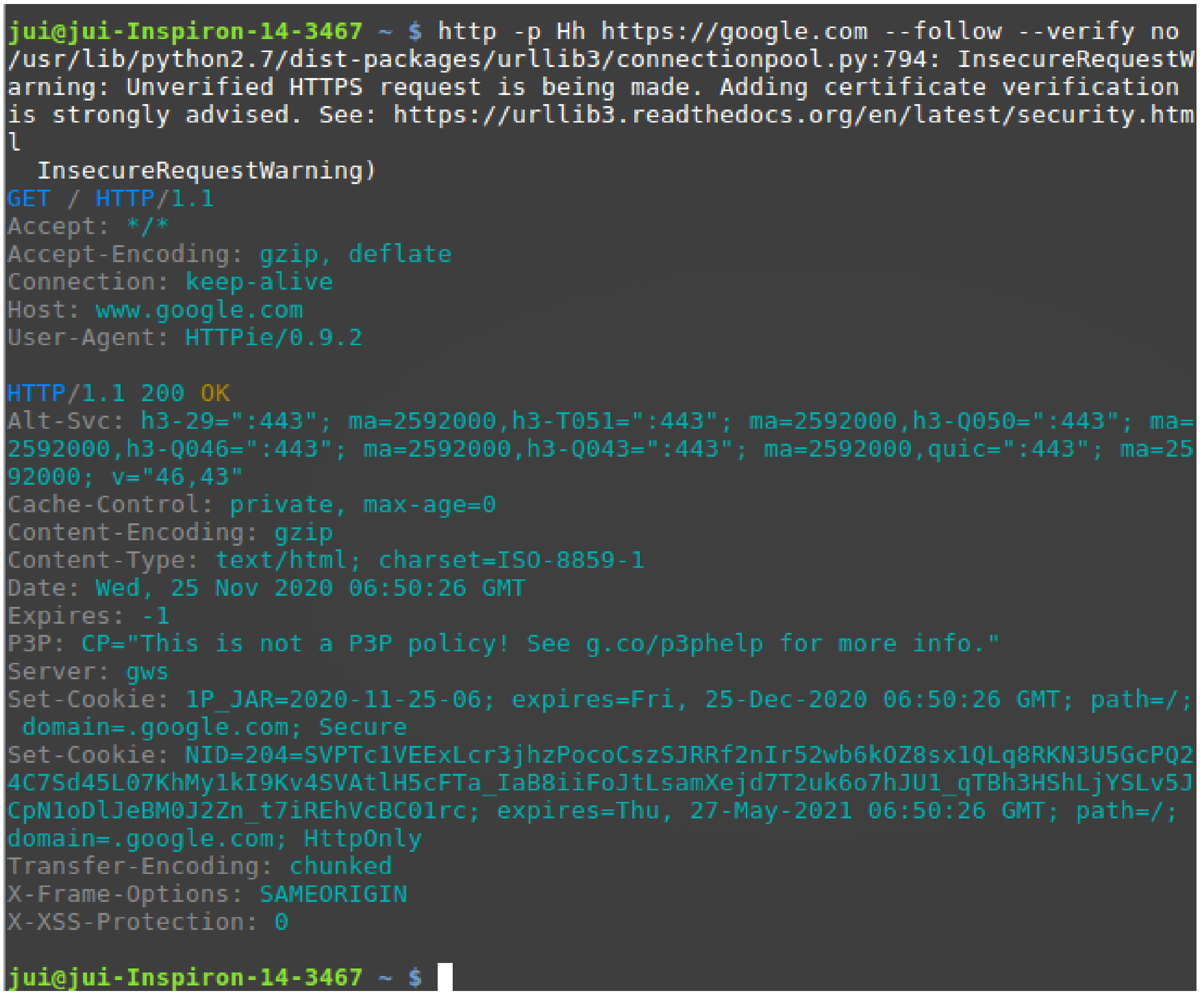


```
jui@jui-Inspiron-14-3467 ~ $ curl -I www.debian.org
HTTP/1.1 302 Found
Date: Wed, 25 Nov 2020 06:39:23 GMT
Server: Apache
X-Content-Type-Options: nosniff
X-Frame-Options: sameorigin
Referrer-Policy: no-referrer
X-Xss-Protection: 1
Location: https://www.debian.org/
Content-Type: text/html; charset=iso-8859-1

jui@jui-Inspiron-14-3467 ~ $
```

3.HTTPie: HTTPie is a command line HTTP client. Its goal is to make CLI interaction with web services as human-friendly as possible.

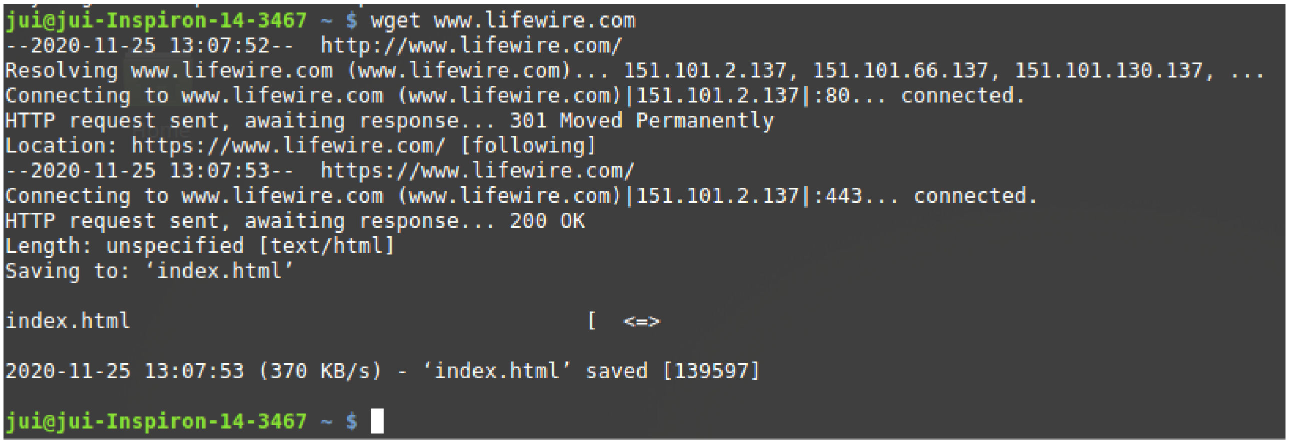


```
jui@jui-Inspiron-14-3467 ~ $ http -p Hh https://google.com
GET / HTTP/1.1
Accept: */*
Accept-Encoding: gzip, deflate
Connection: keep-alive
Host: google.com
User-Agent: HTTPie/0.9.2

HTTP/1.1 301 Moved Permanently
Alt-Svc: h3-29=":443"; ma=2592000,h3-T051=":443"; ma=2592000,h3-Q050=":443"; ma=
2592000,h3-Q046=":443"; ma=2592000,h3-Q043=":443"; ma=2592000,quic=":443"; ma=25
92000; v="46,43"
Cache-Control: public, max-age=2592000
Content-Length: 220
Content-Type: text/html; charset=UTF-8
Date: Wed, 25 Nov 2020 06:47:11 GMT
Expires: Fri, 25 Dec 2020 06:47:11 GMT
Location: https://www.google.com/
Server: gws
X-Frame-Options: SAMEORIGIN
X-XSS-Protection: 0

jui@jui-Inspiron-14-3467 ~ $ http -p Hh https://google.com --follow --verify no
```



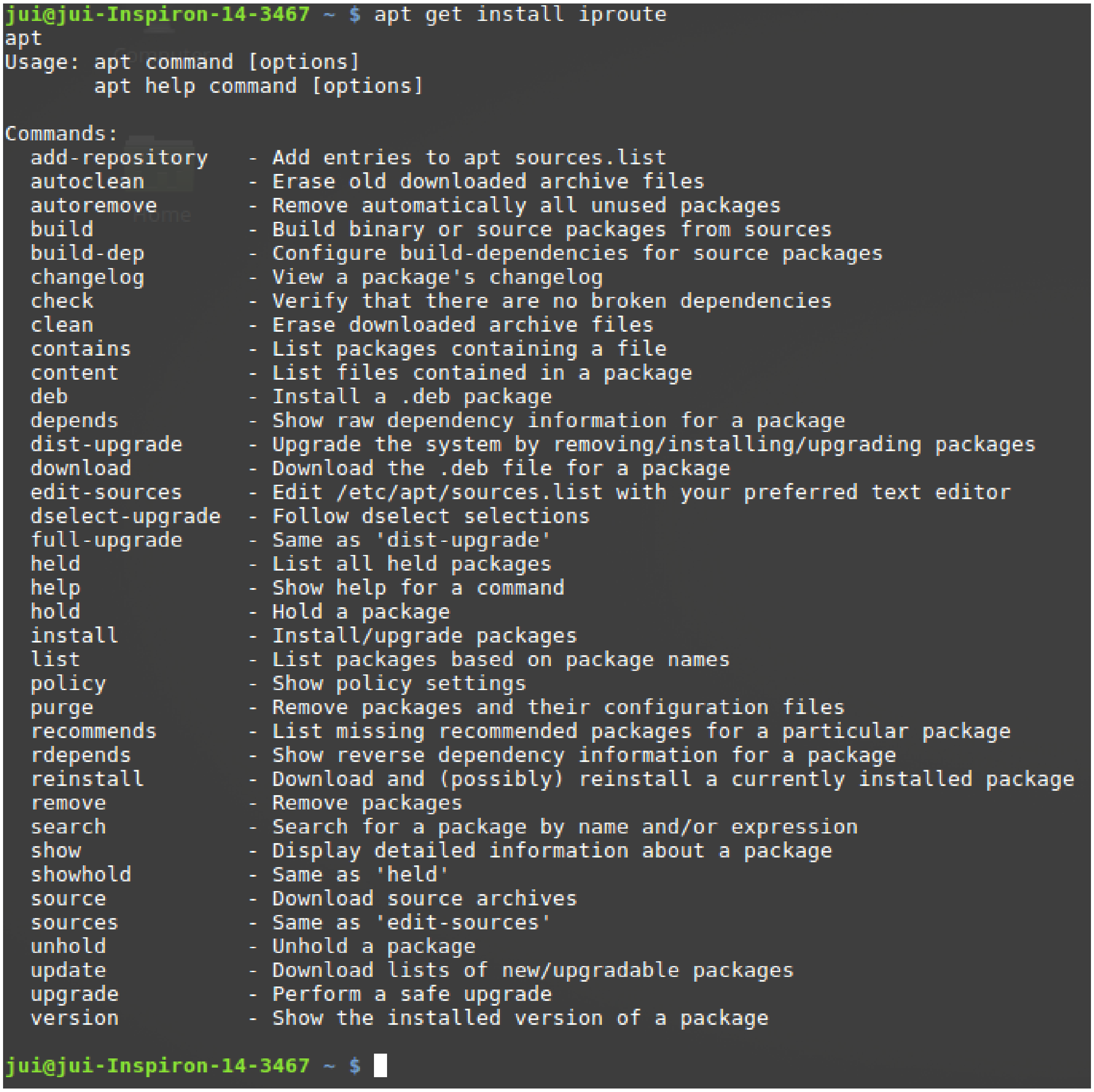
```
jui@jui-Inspiron-14-3467 ~ $ http -p Hh https://google.com --follow --verify no
/usr/lib/python2.7/dist-packages/urllib3/connectionpool.py:794: InsecureRequestW
arning: Unverified HTTPS request is being made. Adding certificate verification
is strongly advised. See: https://urllib3.readthedocs.org/en/latest/security.htm
l
  InsecureRequestWarning)
GET / HTTP/1.1
Accept: */*
Accept-Encoding: gzip, deflate
Connection: keep-alive
Host: www.google.com
User-Agent: HTTPie/0.9.2

HTTP/1.1 200 OK
Alt-Svc: h3-29=":443"; ma=2592000,h3-T051=":443"; ma=2592000,h3-Q050=":443"; ma=
2592000,h3-Q046=":443"; ma=2592000,h3-Q043=":443"; ma=2592000,quic=":443"; ma=25
92000; v="46,43"
Cache-Control: private, max-age=0
Content-Encoding: gzip
Content-Type: text/html; charset=ISO-8859-1
Date: Wed, 25 Nov 2020 06:50:26 GMT
Expires: -1
P3P: CP="This is not a P3P policy! See g.co/p3phelp for more info."
Server: gws
Set-Cookie: 1P_JAR=2020-11-25-06; expires=Fri, 25-Dec-2020 06:50:26 GMT; path=/;
 domain=.google.com; Secure
Set-Cookie: NID=204=SVPTc1VEExLcr3jhzPocoCszSJRRf2nIr52wb6kOZ8sx1QLq8RKN3U5GcPQ2
4C7Sd45L07KhMy1kI9Kv4SVAtlH5cFTa_IaB8iiFoJtLsamXejd7T2uk6o7hJU1_qTBh3HShLjYSLv5J
CpN1oDlJeBM0J2Zn_t7iREhVcBC01rc; expires=Thu, 27-May-2021 06:50:26 GMT; path=/;
domain=.google.com; HttpOnly
Transfer-Encoding: chunked
X-Frame-Options: SAMEORIGIN
X-XSS-Protection: 0

jui@jui-Inspiron-14-3467 ~ $ 
```

**4.wget:** It supports downloading multiple files, downloading in the background, resuming downloads, limiting the bandwidth used for downloads and viewing headers.

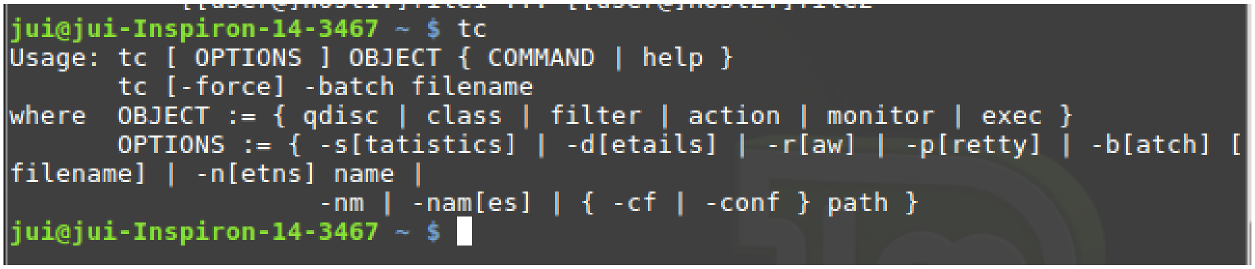


```
jui@jui-Inspiron-14-3467 ~ $ wget www.lifewire.com
--2020-11-25 13:07:52--  http://www.lifewire.com/
Resolving www.lifewire.com (www.lifewire.com)... 151.101.2.137, 151.101.66.137, 151.101.130.137, ...
Connecting to www.lifewire.com (www.lifewire.com)|151.101.2.137|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://www.lifewire.com/ [following]
--2020-11-25 13:07:53--  https://www.lifewire.com/
Connecting to www.lifewire.com (www.lifewire.com)|151.101.2.137|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: ‘index.html’

index.html                              [  <=>

2020-11-25 13:07:53 (370 KB/s) - ‘index.html’ saved [139597]

jui@jui-Inspiron-14-3467 ~ $ 
```

**5.TC:** Tc is used to configure Traffic Control in the Linux kernel.

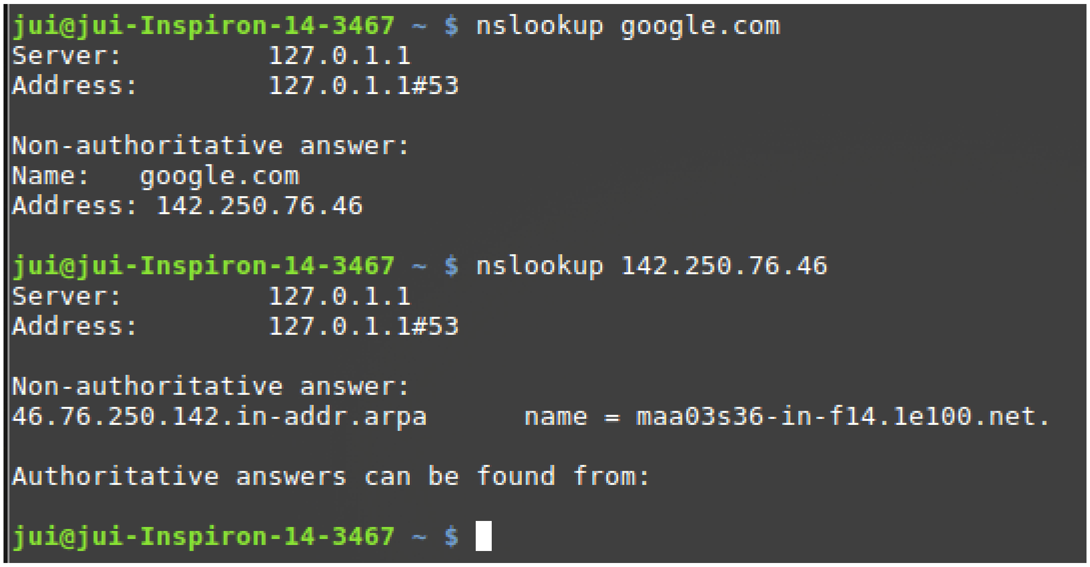


```
jui@jui-Inspiron-14-3467 ~ $ apt get install iproute
apt
Usage: apt command [options]
       apt help command [options]

Commands:
  add-repository   - Add entries to apt sources.list
  autoclean        - Erase old downloaded archive files
  autoremove       - Remove automatically all unused packages
  build            - Build binary or source packages from sources
  build-dep        - Configure build-dependencies for source packages
  changelog        - View a package's changelog
  check            - Verify that there are no broken dependencies
  clean            - Erase downloaded archive files
  contains         - List packages containing a file
  content          - List files contained in a package
  deb              - Install a .deb package
  depends          - Show raw dependency information for a package
  dist-upgrade     - Upgrade the system by removing/installing/upgrading packages
  download         - Download the .deb file for a package
  edit-sources     - Edit /etc/apt/sources.list with your preferred text editor
  dselect-upgrade  - Follow dselect selections
  full-upgrade     - Same as 'dist-upgrade'
  held             - List all held packages
  help             - Show help for a command
  hold             - Hold a package
  install          - Install/upgrade packages
  list             - List packages based on package names
  policy           - Show policy settings
  purge            - Remove packages and their configuration files
  recommends       - List missing recommended packages for a particular package
  rdepends         - Show reverse dependency information for a package
  reinstall        - Download and (possibly) reinstall a currently installed package
  remove           - Remove packages
  search           - Search for a package by name and/or expression
  show             - Display detailed information about a package
  showhold         - Same as 'held'
  source           - Download source archives
  sources          - Same as 'edit-sources'
  unhold           - Unhold a package
  update           - Download lists of new/upgradable packages
  upgrade          - Perform a safe upgrade
  version          - Show the installed version of a package

jui@jui-Inspiron-14-3467 ~ $
```



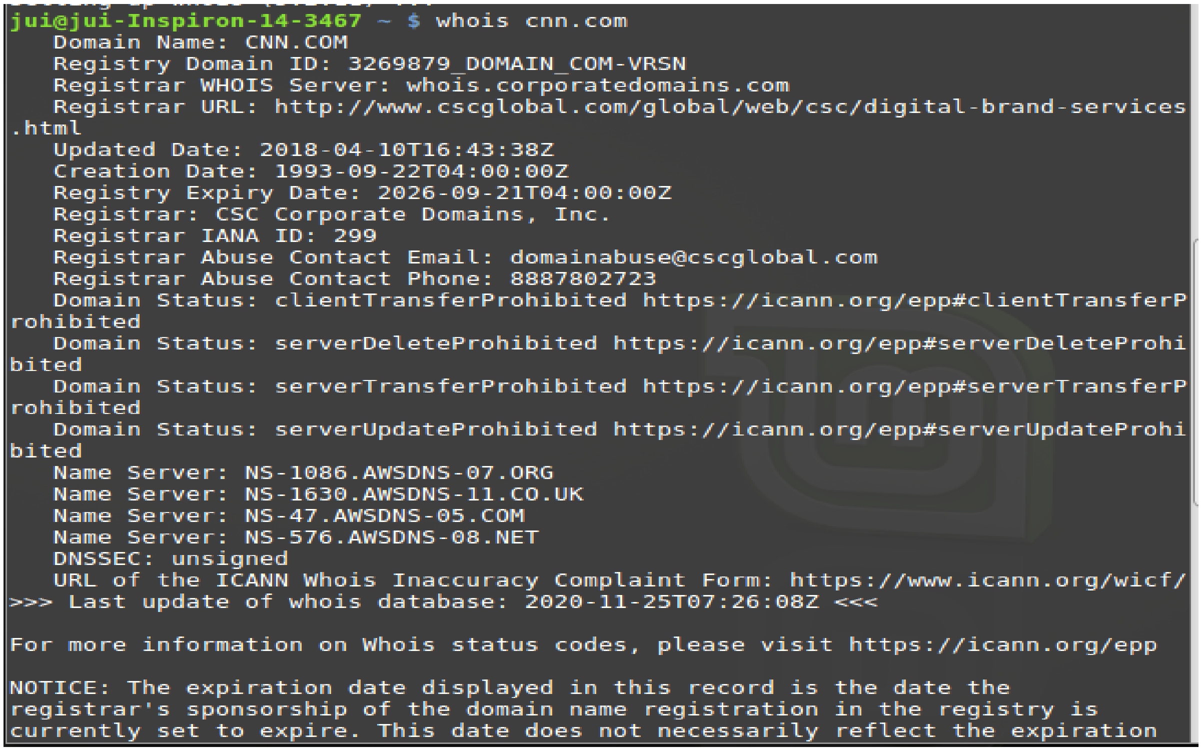
```
            [[user@]host1:]file1 ... [[user@]host2:]file2
jui@jui-Inspiron-14-3467 ~ $ tc
Usage: tc [ OPTIONS ] OBJECT { COMMAND | help }
       tc [-force] -batch filename
where  OBJECT := { qdisc | class | filter | action | monitor | exec }
       OPTIONS := { -s[tatistics] | -d[etails] | -r[aw] | -p[retty] | -b[atch] [
filename] | -n[etns] name |
                    -nm | -nam[es] | { -cf | -conf } path }
jui@jui-Inspiron-14-3467 ~ $
```

**6.nslookup:** It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record.



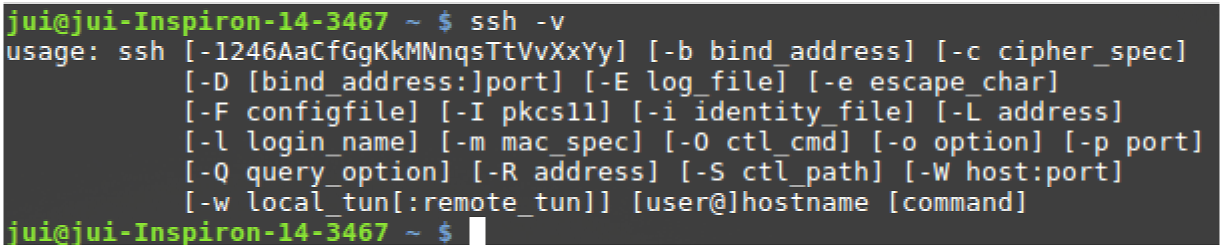
```
jui@jui-Inspiron-14-3467 ~ $ nslookup google.com
Server:         127.0.1.1
Address:        127.0.1.1#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.76.46

jui@jui-Inspiron-14-3467 ~ $ nslookup 142.250.76.46
Server:         127.0.1.1
Address:        127.0.1.1#53

Non-authoritative answer:
46.76.250.142.in-addr.arpa      name = maa03s36-in-f14.1e100.net.

Authoritative answers can be found from:

jui@jui-Inspiron-14-3467 ~ $ 
```

**7.whois:** The whois system is a listing of records that contains details about both the ownership of domains and the owners.



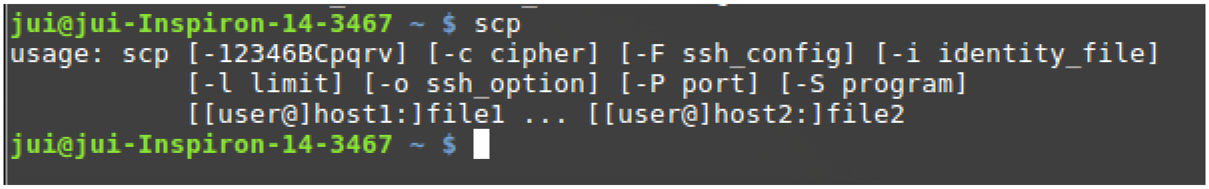
```
jui@jui-Inspiron-14-3467 ~ $ whois cnn.com
   Domain Name: CNN.COM
   Registry Domain ID: 3269879_DOMAIN_COM-VRSN
   Registrar WHOIS Server: whois.corporatedomains.com
   Registrar URL: http://www.cscglobal.com/global/web/csc/digital-brand-services
.html
   Updated Date: 2018-04-10T16:43:38Z
   Creation Date: 1993-09-22T04:00:00Z
   Registry Expiry Date: 2026-09-21T04:00:00Z
   Registrar: CSC Corporate Domains, Inc.
   Registrar IANA ID: 299
   Registrar Abuse Contact Email: domainabuse@cscglobal.com
   Registrar Abuse Contact Phone: 8887802723
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferP
rohibited
   Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhi
bited
   Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferP
rohibited
   Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhi
bited
   Name Server: NS-1086.AWSDNS-07.ORG
   Name Server: NS-1630.AWSDNS-11.CO.UK
   Name Server: NS-47.AWSDNS-05.COM
   Name Server: NS-576.AWSDNS-08.NET
   DNSSEC: unsigned
   URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2020-11-25T07:26:08Z <<<

For more information on Whois status codes, please visit https://icann.org/epp

NOTICE: The expiration date displayed in this record is the date the
registrar's sponsorship of the domain name registration in the registry is
currently set to expire. This date does not necessarily reflect the expiration
```

**8.ssh:** SSH, or *Secure Shell*, is a protocol used to securely log onto remote systems. It is the most common way to access remote Linux servers.



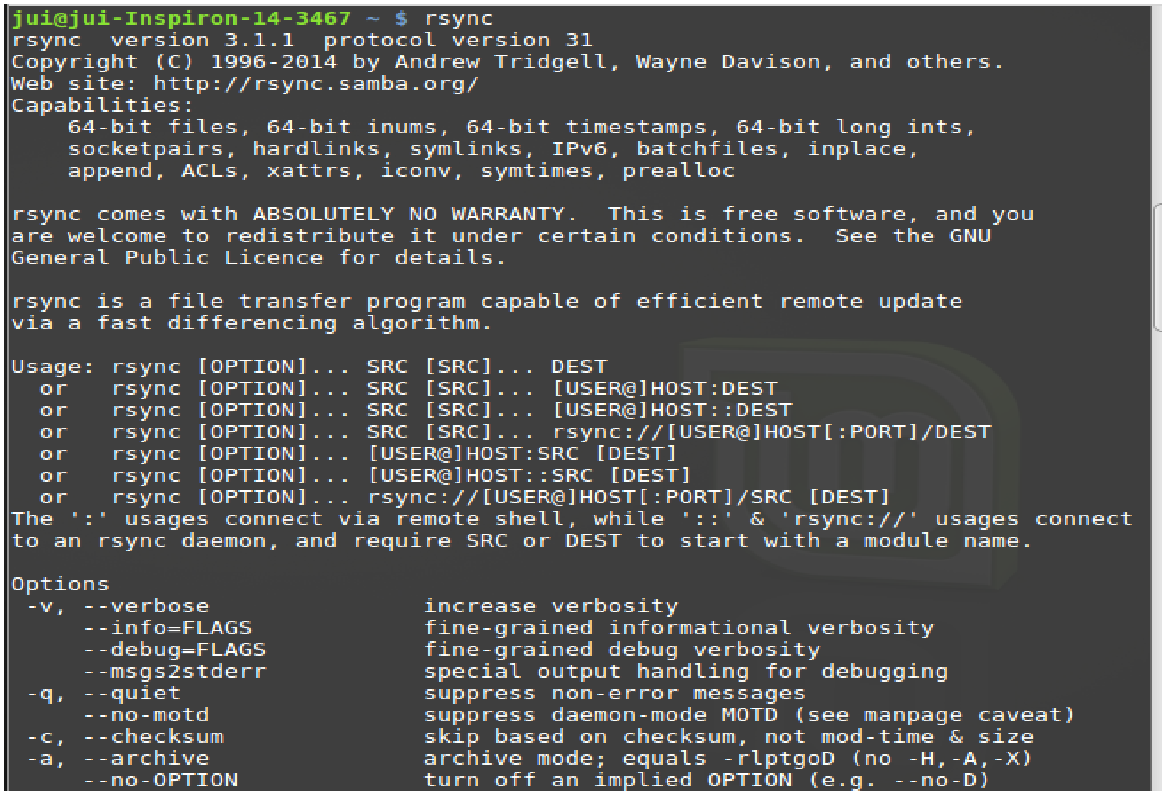
```
jui@jui-Inspiron-14-3467 ~ $ ssh -v
usage: ssh [-1246AaCfGgKkMNnqsTtVvXxYy] [-b bind_address] [-c cipher_spec]
           [-D [bind_address:]port] [-E log_file] [-e escape_char]
           [-F configfile] [-I pkcs11] [-i identity_file] [-L address]
           [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
           [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
           [-w local_tun[:remote_tun]] [user@]hostname [command]
jui@jui-Inspiron-14-3467 ~ $ 
```

**9.scp:** SCP is used to copy file(s) between servers in secure way.



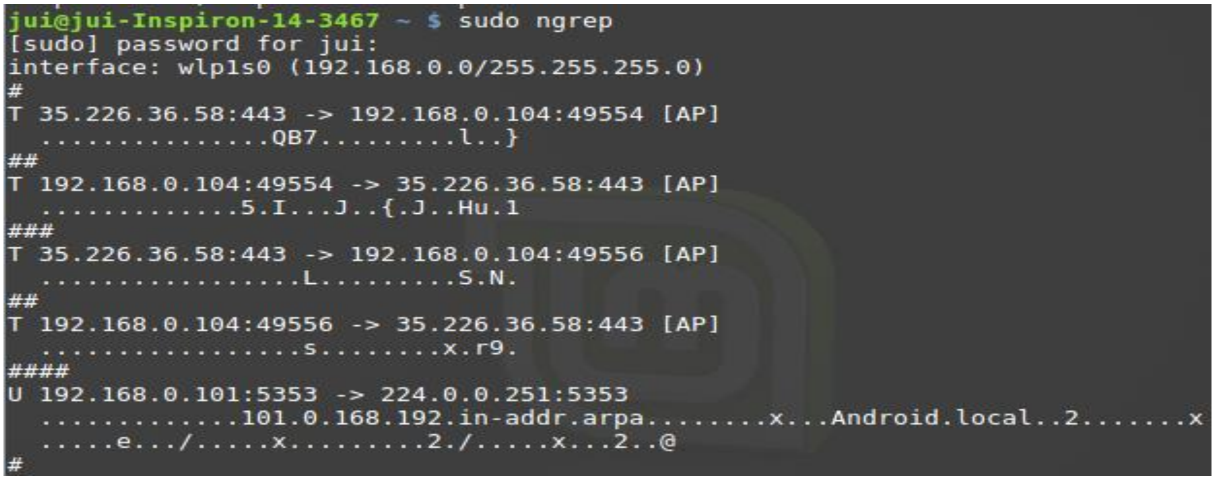
```
jui@jui-Inspiron-14-3467 ~ $ scp
usage: scp [-12346BCpqrv] [-c cipher] [-F ssh_config] [-i identity_file]
           [-l limit] [-o ssh_option] [-P port] [-S program]
           [[user@]host1:]file1 ... [[user@]host2:]file2
jui@jui-Inspiron-14-3467 ~ $ 
```

**10.rsync:** The rsync command synchronizes files from a source to a destination, on a local machine or over a secure network connection.

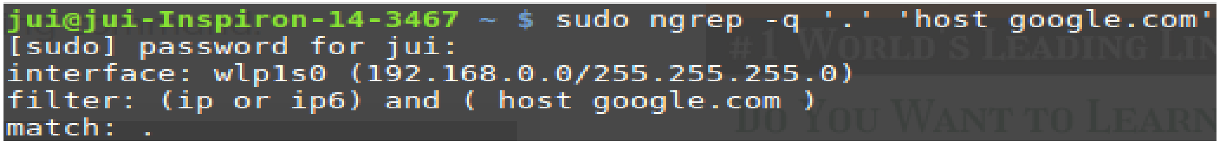


```
jui@jui-Inspiron-14-3467 ~ $ rsync
rsync  version 3.1.1  protocol version 31
Copyright (C) 1996-2014 by Andrew Tridgell, Wayne Davison, and others.
Web site: http://rsync.samba.org/
Capabilities:
    64-bit files, 64-bit inums, 64-bit timestamps, 64-bit long ints,
    socketpairs, hardlinks, symlinks, IPv6, batchfiles, inplace,
    append, ACLs, xattrs, iconv, symtimes, prealloc

rsync comes with ABSOLUTELY NO WARRANTY.  This is free software, and you
are welcome to redistribute it under certain conditions.  See the GNU
General Public Licence for details.

rsync is a file transfer program capable of efficient remote update
via a fast differencing algorithm.

Usage: rsync [OPTION]... SRC [SRC]... DEST
  or   rsync [OPTION]... SRC [SRC]... [USER@]HOST:DEST
  or   rsync [OPTION]... SRC [SRC]... [USER@]HOST::DEST
  or   rsync [OPTION]... SRC [SRC]... rsync://[USER@]HOST[:PORT]/DEST
  or   rsync [OPTION]... [USER@]HOST:SRC [DEST]
  or   rsync [OPTION]... [USER@]HOST::SRC [DEST]
  or   rsync [OPTION]... rsync://[USER@]HOST[:PORT]/SRC [DEST]
The ':' usages connect via remote shell, while '::' & 'rsync://' usages connect
to an rsync daemon, and require SRC or DEST to start with a module name.

Options
 -v, --verbose               increase verbosity
     --info=FLAGS            fine-grained informational verbosity
     --debug=FLAGS           fine-grained debug verbosity
     --msgs2stderr           special output handling for debugging
 -q, --quiet                 suppress non-error messages
     --no-motd               suppress daemon-mode MOTD (see manpage caveat)
 -c, --checksum              skip based on checksum, not mod-time & size
 -a, --archive               archive mode; equals -rlptgoD (no -H,-A,-X)
     --no-OPTION             turn off an implied OPTION (e.g. --no-D)
```

**11.ngrep:** This command can be used to debug plain text protocols interactions like HTTP, SMTP, FTP, DNS, among others, or to search for a specific string or pattern, using a grep regular expression syntax.

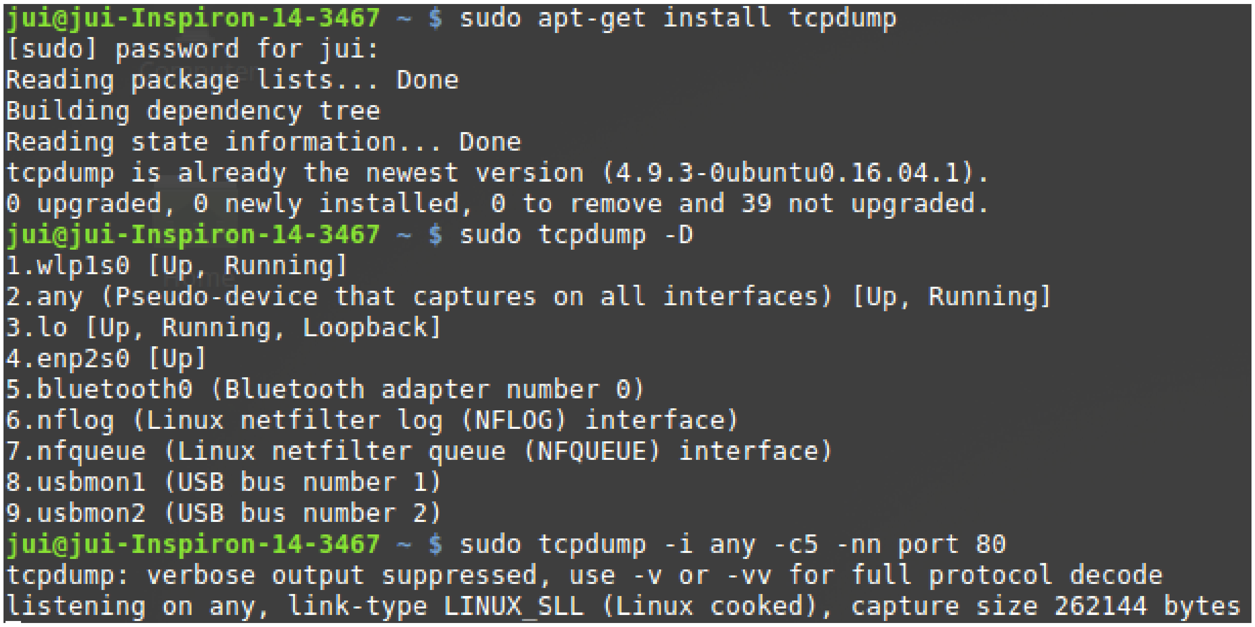


```
jui@jui-Inspiron-14-3467 ~ $ sudo ngrep
[sudo] password for jui:
interface: wlp1s0 (192.168.0.0/255.255.255.0)
#
T 35.226.36.58:443 -> 192.168.0.104:49554 [AP]
  ...............QB7.........l..}
##
T 192.168.0.104:49554 -> 35.226.36.58:443 [AP]
  .............5.I...J..{.J..Hu.1
###
T 35.226.36.58:443 -> 192.168.0.104:49556 [AP]
  .................L.........S.N.
##
T 192.168.0.104:49556 -> 35.226.36.58:443 [AP]
  .................s........x.r9.
####
U 192.168.0.101:5353 -> 224.0.0.251:5353
  .............101.0.168.192.in-addr.arpa........x...Android.local..2.......x
  .....e.../.....x.........2./.....x...2..@
#
```



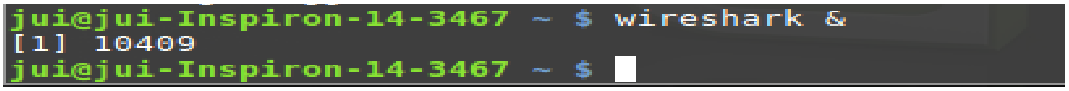
```
jui@jui-Inspiron-14-3467 ~ $ sudo ngrep -q '.' 'host google.com'
[sudo] password for jui:
interface: wlp1s0 (192.168.0.0/255.255.255.0)
filter: (ip or ip6) and ( host google.com )
match: .
```

**12.tcpdump:** tcpdump is a command-line packets sniffer or package analyzer tool which is used to capture or filter TCP/IP packets that received or transferred over a network on a specific interface.

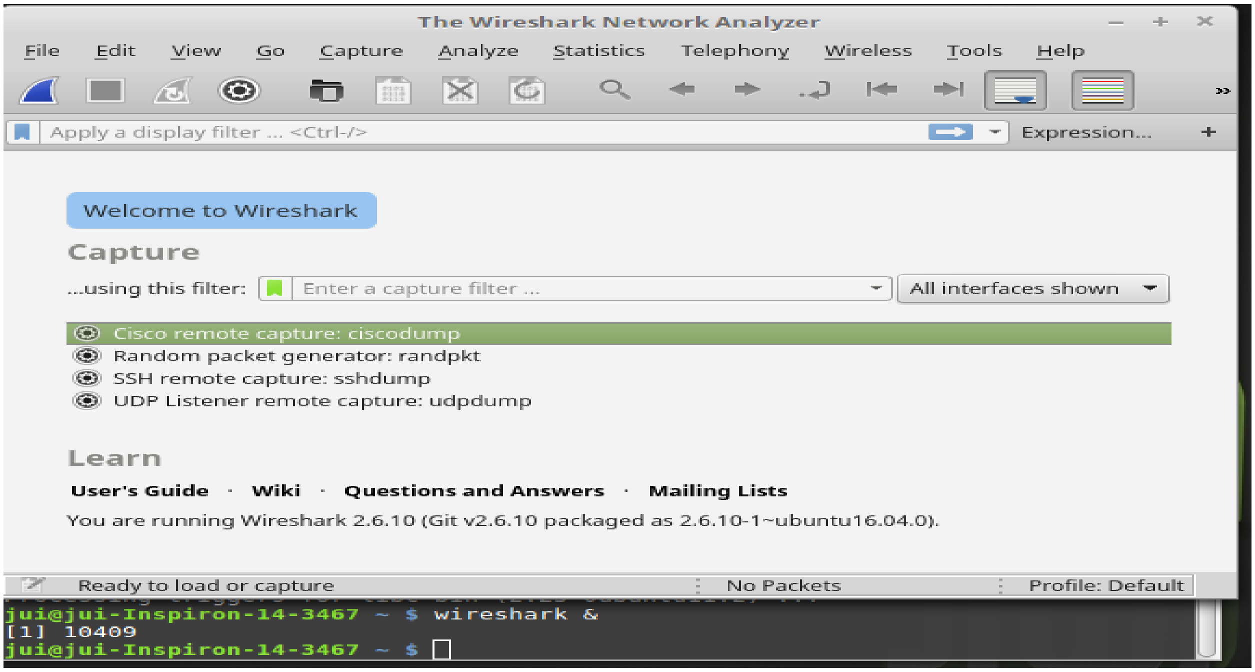


```
jui@jui-Inspiron-14-3467 ~ $ sudo apt-get install tcpdump
[sudo] password for jui:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tcpdump is already the newest version (4.9.3-0ubuntu0.16.04.1).
0 upgraded, 0 newly installed, 0 to remove and 39 not upgraded.
jui@jui-Inspiron-14-3467 ~ $ sudo tcpdump -D
1.wlp1s0 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.enp2s0 [Up]
5.bluetooth0 (Bluetooth adapter number 0)
6.nflog (Linux netfilter log (NFLOG) interface)
7.nfqueue (Linux netfilter queue (NFQUEUE) interface)
8.usbmon1 (USB bus number 1)
9.usbmon2 (USB bus number 2)
jui@jui-Inspiron-14-3467 ~ $ sudo tcpdump -i any -c5 -nn port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on any, link-type LINUX_SLL (Linux cooked), capture size 262144 bytes
```

**13.wireshark:** Wireshark can capture traffic from many different network media types, including Ethernet, Wireless LAN, Bluetooth, USB, and more. It can open packet captures from a large number of capture programs.



```
jui@jui-Inspiron-14-3467 ~ $ wireshark &
[1] 10409
jui@jui-Inspiron-14-3467 ~ $ 
```

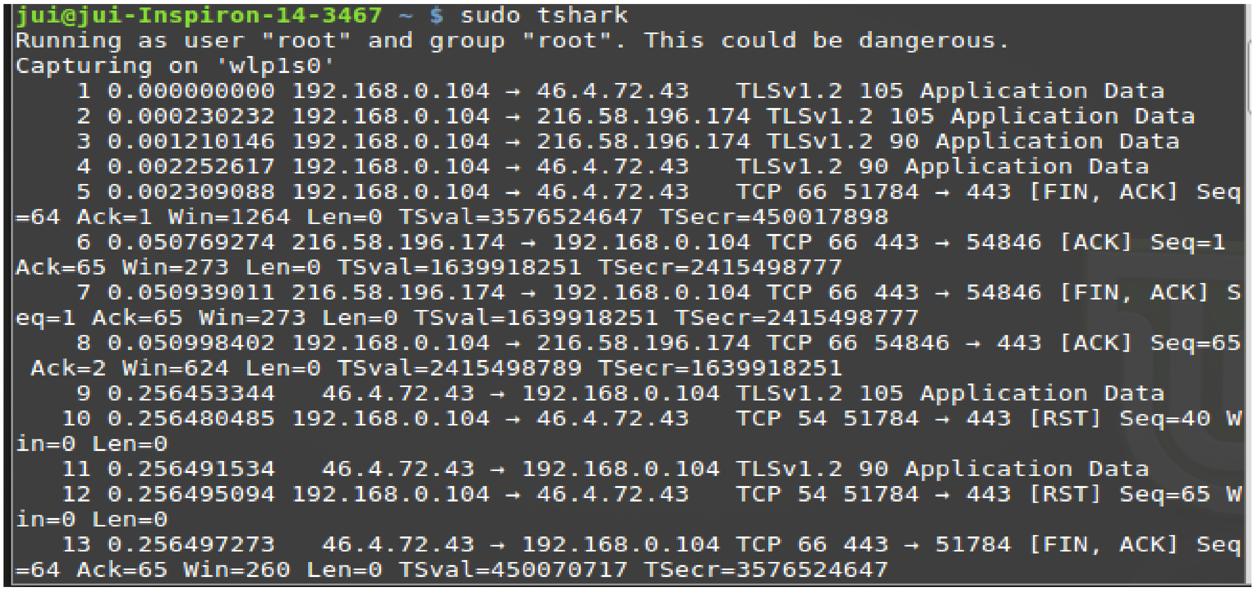


The Wireshark Network Analyzer
File
Edit
View
Go
Capture
Analyze
Statistics
Telephony
Wireless
Tools
Help
Apply a display filter ... <Ctrl-/>
Expression...
Welcome to Wireshark
Capture
...using this filter:
Enter a capture filter ...
All interfaces shown
Cisco remote capture: ciscodump
Random packet generator: randpkt
SSH remote capture: sshdump
UDP Listener remote capture: udpdump
Learn
User's Guide · Wiki · Questions and Answers · Mailing Lists
Ready to load or capture
No Packets
Profile: Default

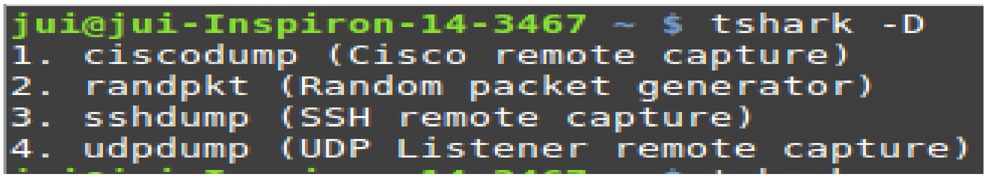
You are running Wireshark 2.6.10 (Git v2.6.10 packaged as 2.6.10-1~ubuntu16.04.0).

```
jui@jui-Inspiron-14-3467 ~ $ wireshark &
[1] 10409
jui@jui-Inspiron-14-3467 ~ $ 
```

**14.tshark:** TShark is a network protocol analyzer. It lets you capture packet data from a live network, or read packets from a previously saved capture file, either printing a decoded form of those packets to the standard output or writing the packets to a file.

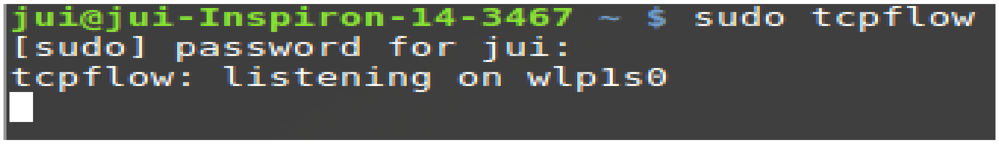


```
jui@jui-Inspiron-14-3467 ~ $ sudo tshark
Running as user "root" and group "root". This could be dangerous.
Capturing on 'wlp1s0'
    1 0.000000000 192.168.0.104 → 46.4.72.43   TLSv1.2 105 Application Data
    2 0.000230232 192.168.0.104 → 216.58.196.174 TLSv1.2 105 Application Data
    3 0.001210146 192.168.0.104 → 216.58.196.174 TLSv1.2 90 Application Data
    4 0.002252617 192.168.0.104 → 46.4.72.43   TLSv1.2 90 Application Data
    5 0.002309088 192.168.0.104 → 46.4.72.43   TCP 66 51784 → 443 [FIN, ACK] Seq
=64 Ack=1 Win=1264 Len=0 TSval=3576524647 TSecr=450017898
    6 0.050769274 216.58.196.174 → 192.168.0.104 TCP 66 443 → 54846 [ACK] Seq=1
Ack=65 Win=273 Len=0 TSval=1639918251 TSecr=2415498777
    7 0.050939011 216.58.196.174 → 192.168.0.104 TCP 66 443 → 54846 [FIN, ACK] S
eq=1 Ack=65 Win=273 Len=0 TSval=1639918251 TSecr=2415498777
    8 0.050998402 192.168.0.104 → 216.58.196.174 TCP 66 54846 → 443 [ACK] Seq=65
 Ack=2 Win=624 Len=0 TSval=2415498789 TSecr=1639918251
    9 0.256453344   46.4.72.43 → 192.168.0.104 TLSv1.2 105 Application Data
   10 0.256480485 192.168.0.104 → 46.4.72.43   TCP 54 51784 → 443 [RST] Seq=40 W
in=0 Len=0
   11 0.256491534   46.4.72.43 → 192.168.0.104 TLSv1.2 90 Application Data
   12 0.256495094 192.168.0.104 → 46.4.72.43   TCP 54 51784 → 443 [RST] Seq=65 W
in=0 Len=0
   13 0.256497273   46.4.72.43 → 192.168.0.104 TCP 66 443 → 51784 [FIN, ACK] Seq
=64 Ack=65 Win=260 Len=0 TSval=450070717 TSecr=3576524647
```



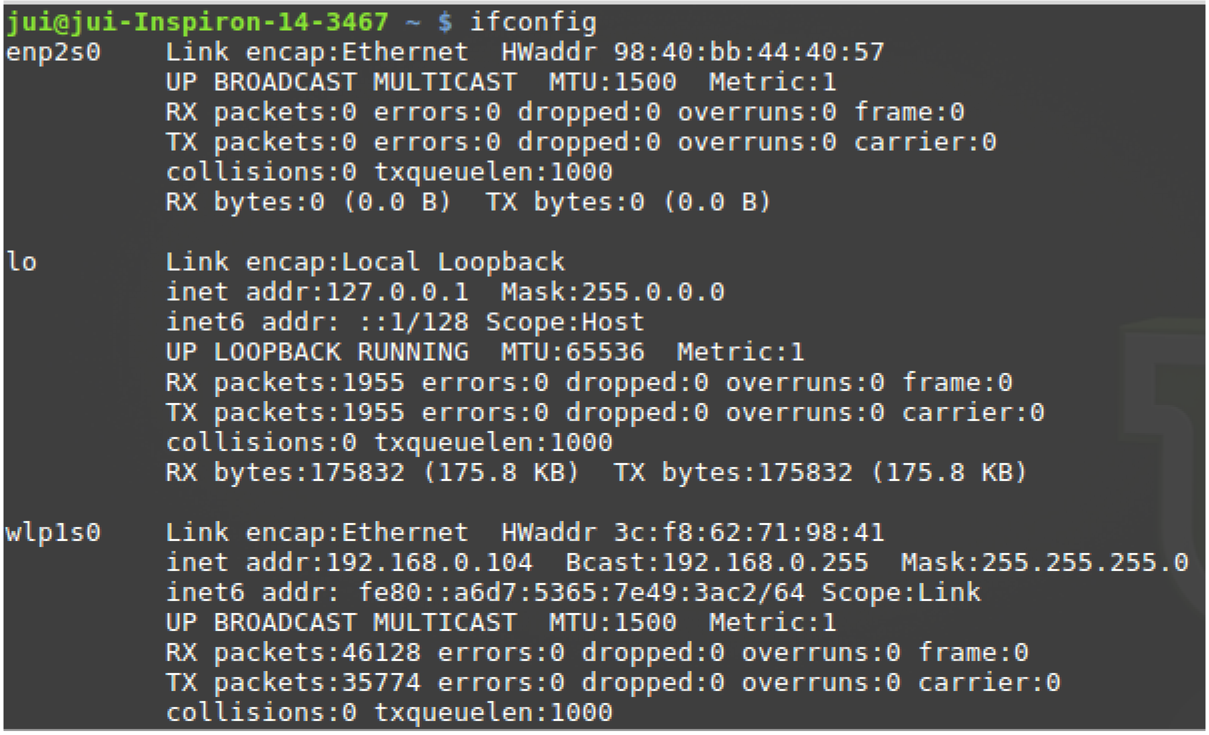
```
jui@jui-Inspiron-14-3467 ~ $ tshark -D
1. ciscodump (Cisco remote capture)
2. randpkt (Random packet generator)
3. sshdump (SSH remote capture)
4. udpdump (UDP Listener remote capture)
```

**15.tcpflow:** Capture and assembles TCP streams.



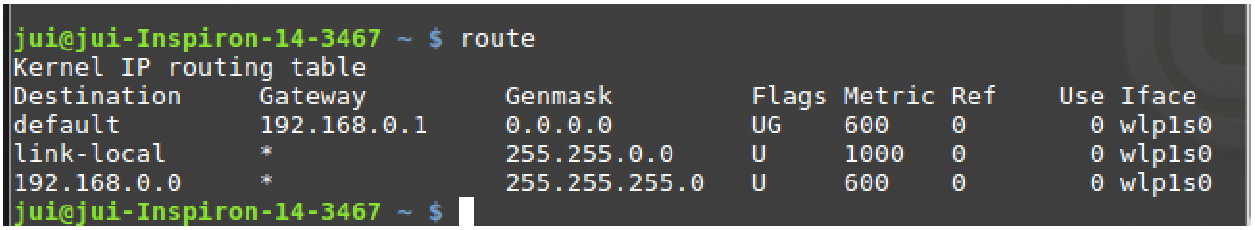
```
jui@jui-Inspiron-14-3467 ~ $ sudo tcpflow
[sudo] password for jui:
tcpflow: listening on wlp1s0
```

**16.ifconfig:** ifconfig command is used for displaying current network configuration information, setting up an ip address, netmask or broadcast address to an network interface, creating an alias for network interface, setting up hardware address and enable or disable network interfaces.



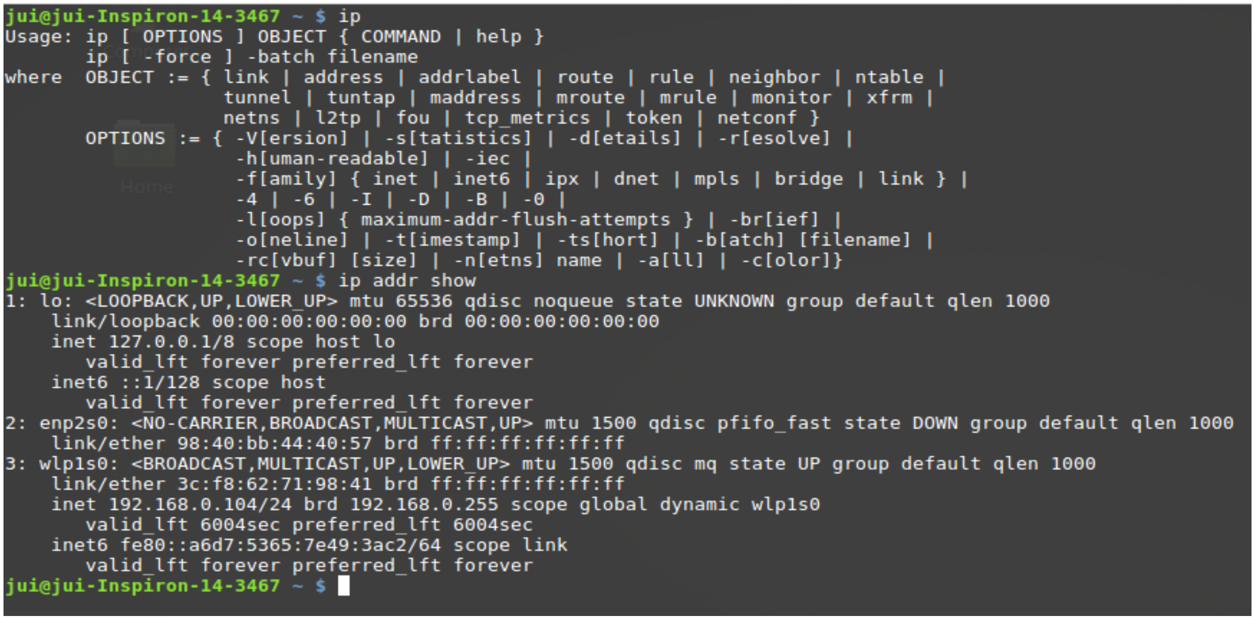
```
jui@jui-Inspiron-14-3467 ~ $ ifconfig
enp2s0    Link encap:Ethernet  HWaddr 98:40:bb:44:40:57
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

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:1955 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1955 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:175832 (175.8 KB)  TX bytes:175832 (175.8 KB)

wlp1s0    Link encap:Ethernet  HWaddr 3c:f8:62:71:98:41
          inet addr:192.168.0.104  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::a6d7:5365:7e49:3ac2/64 Scope:Link
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:46128 errors:0 dropped:0 overruns:0 frame:0
          TX packets:35774 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
```

**17.route:** View and change the route table.



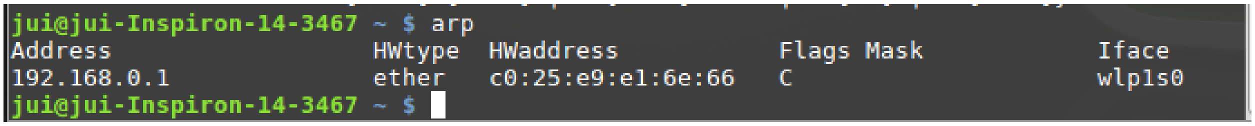
```
jui@jui-Inspiron-14-3467 ~ $ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         192.168.0.1     0.0.0.0         UG    600    0        0 wlp1s0
link-local      *               255.255.0.0     U     1000   0        0 wlp1s0
192.168.0.0     *               255.255.255.0   U     600    0        0 wlp1s0
jui@jui-Inspiron-14-3467 ~ $ 
```

**18.IP:** Replaces ifconfig, route and more.

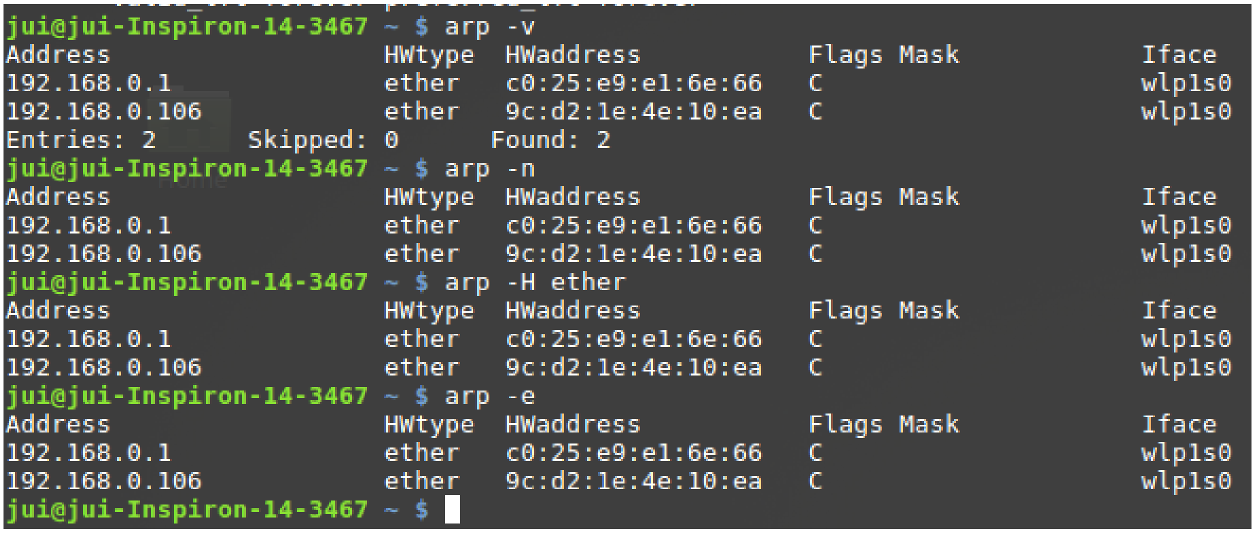


```
jui@jui-Inspiron-14-3467 ~ $ ip
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
       ip [ -force ] -batch filename
where  OBJECT := { link | address | addrlabel | route | rule | neighbor | ntable |
                   tunnel | tuntap | maddress | mroute | mrule | monitor | xfrm |
                   netns | l2tp | fou | tcp_metrics | token | netconf }
       OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
                    -h[uman-readable] | -iec |
                    -f[amily] { inet | inet6 | ipx | dnet | mpls | bridge | link } |
                    -4 | -6 | -I | -D | -B | -0 |
                    -l[oops] { maximum-addr-flush-attempts } | -br[ief] |
                    -o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
                    -rc[vbuf] [size] | -n[etns] name | -a[ll] | -c[olor]}
jui@jui-Inspiron-14-3467 ~ $ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp2s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qlen 1000
    link/ether 98:40:bb:44:40:57 brd ff:ff:ff:ff:ff:ff
3: wlp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 3c:f8:62:71:98:41 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.104/24 brd 192.168.0.255 scope global dynamic wlp1s0
       valid_lft 6004sec preferred_lft 6004sec
    inet6 fe80::a6d7:5365:7e49:3ac2/64 scope link
       valid_lft forever preferred_lft forever
jui@jui-Inspiron-14-3467 ~ $ 
```

**19.arp:** This protocol is used by network nodes to match IP addresses to MAC addresses.

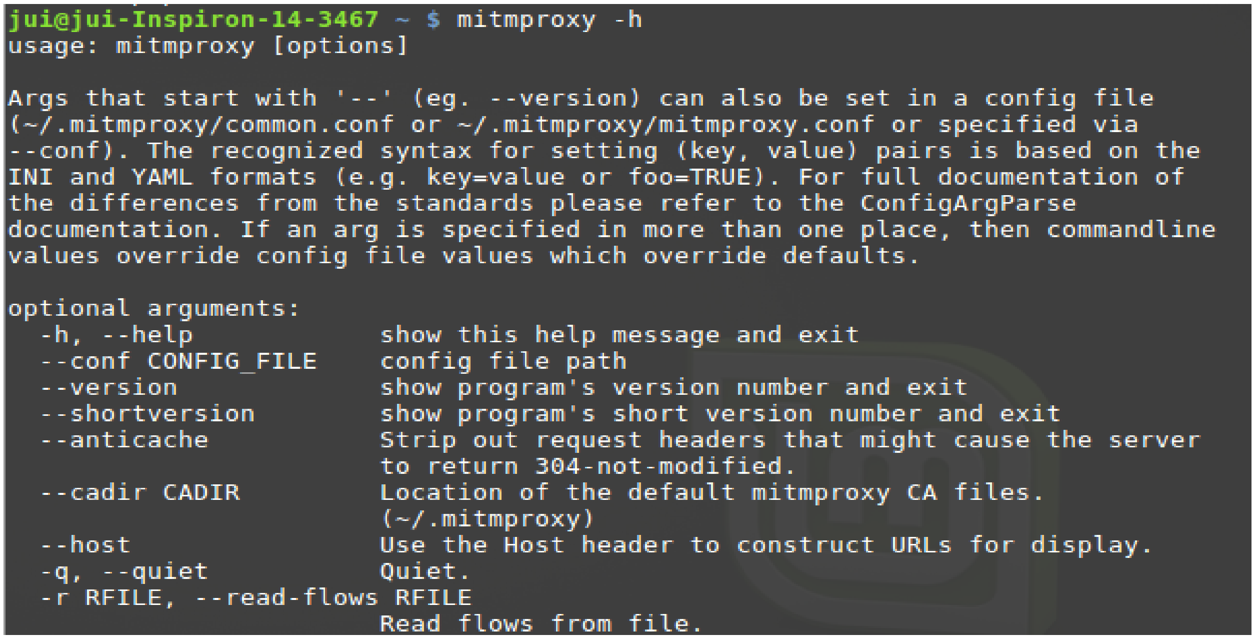


```
jui@jui-Inspiron-14-3467 ~ $ arp
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.0.1              ether   c0:25:e9:e1:6e:66   C                     wlp1s0
jui@jui-Inspiron-14-3467 ~ $ 
```



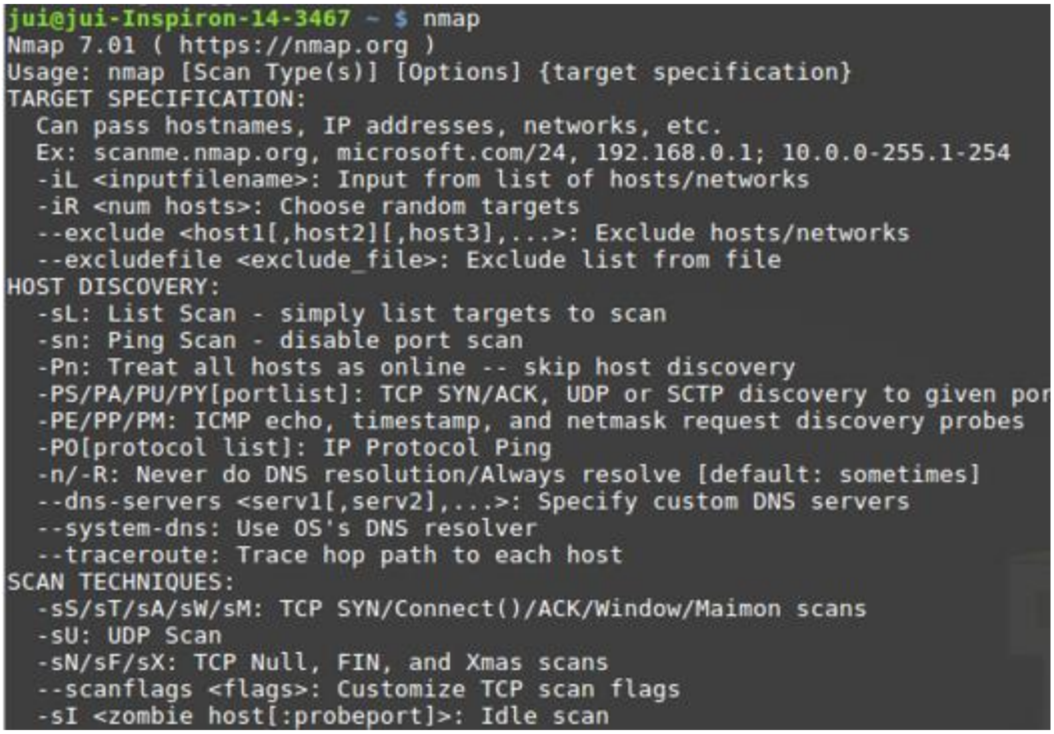
```
jui@jui-Inspiron-14-3467 ~ $ arp -v
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.0.1              ether   c0:25:e9:e1:6e:66   C                     wlp1s0
192.168.0.106            ether   9c:d2:1e:4e:10:ea   C                     wlp1s0
Entries: 2      Skipped: 0      Found: 2
jui@jui-Inspiron-14-3467 ~ $ arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.0.1              ether   c0:25:e9:e1:6e:66   C                     wlp1s0
192.168.0.106            ether   9c:d2:1e:4e:10:ea   C                     wlp1s0
jui@jui-Inspiron-14-3467 ~ $ arp -H ether
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.0.1              ether   c0:25:e9:e1:6e:66   C                     wlp1s0
192.168.0.106            ether   9c:d2:1e:4e:10:ea   C                     wlp1s0
jui@jui-Inspiron-14-3467 ~ $ arp -e
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.0.1              ether   c0:25:e9:e1:6e:66   C                     wlp1s0
192.168.0.106            ether   9c:d2:1e:4e:10:ea   C                     wlp1s0
jui@jui-Inspiron-14-3467 ~ $ 
```

**20.mitmproxy:** mitmproxy is a proxy recorder that provides record-and-play functionality for **use** in mobile performance engineering.



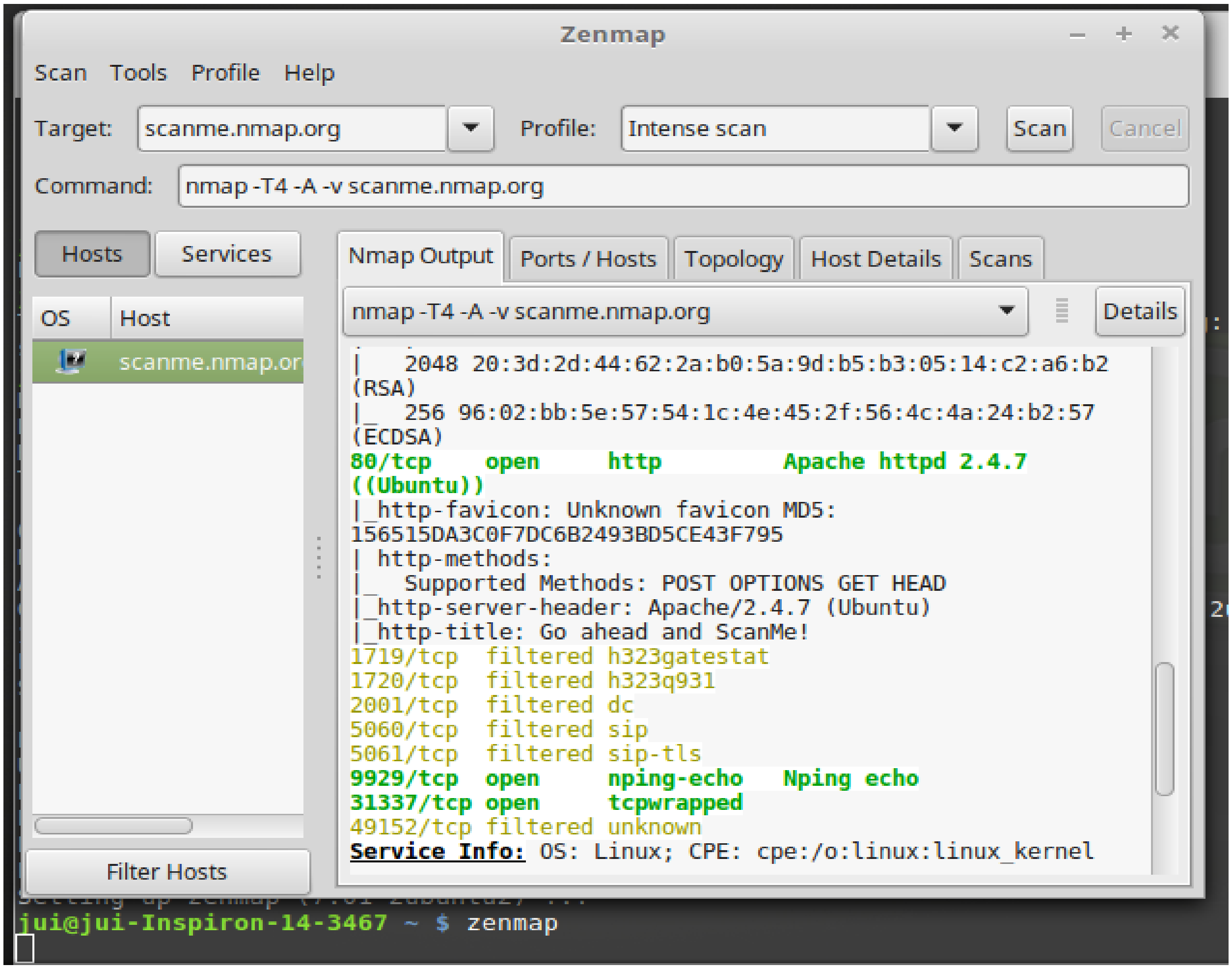
```
jui@jui-Inspiron-14-3467 ~ $ mitmproxy -h
usage: mitmproxy [options]

Args that start with '--' (eg. --version) can also be set in a config file
(~/.mitmproxy/common.conf or ~/.mitmproxy/mitmproxy.conf or specified via
--conf). The recognized syntax for setting (key, value) pairs is based on the
INI and YAML formats (e.g. key=value or foo=TRUE). For full documentation of
the differences from the standards please refer to the ConfigArgParse
documentation. If an arg is specified in more than one place, then commandline
values override config file values which override defaults.

optional arguments:
  -h, --help            show this help message and exit
  --conf CONFIG_FILE    config file path
  --version             show program's version number and exit
  --shortversion        show program's short version number and exit
  --anticache           Strip out request headers that might cause the server
                        to return 304-not-modified.
  --cadir CADIR         Location of the default mitmproxy CA files.
                        (~/.mitmproxy)
  --host                Use the Host header to construct URLs for display.
  -q, --quiet           Quiet.
  -r RFILE, --read-flows RFILE
                        Read flows from file.
```

**21.nmap:** With Nmap, server administrators can quickly reveal hosts and services, search for security issues, and scan for open ports.



```
jui@jui-Inspiron-14-3467 ~ $ nmap
Nmap 7.01 ( https://nmap.org )
Usage: nmap [Scan Type(s)] [Options] {target specification}
TARGET SPECIFICATION:
  Can pass hostnames, IP addresses, networks, etc.
  Ex: scanme.nmap.org, microsoft.com/24, 192.168.0.1; 10.0.0-255.1-254
  -iL <inputfilename>: Input from list of hosts/networks
  -iR <num hosts>: Choose random targets
  --exclude <host1[,host2][,host3],...>: Exclude hosts/networks
  --excludefile <exclude_file>: Exclude list from file
HOST DISCOVERY:
  -sL: List Scan - simply list targets to scan
  -sn: Ping Scan - disable port scan
  -Pn: Treat all hosts as online -- skip host discovery
  -PS/PA/PU/PY[portlist]: TCP SYN/ACK, UDP or SCTP discovery to given por
  -PE/PP/PM: ICMP echo, timestamp, and netmask request discovery probes
  -PO[protocol list]: IP Protocol Ping
  -n/-R: Never do DNS resolution/Always resolve [default: sometimes]
  --dns-servers <serv1[,serv2],...>: Specify custom DNS servers
  --system-dns: Use OS's DNS resolver
  --traceroute: Trace hop path to each host
SCAN TECHNIQUES:
  -sS/sT/sA/sW/sM: TCP SYN/Connect()/ACK/Window/Maimon scans
  -sU: UDP Scan
  -sN/sF/sX: TCP Null, FIN, and Xmas scans
  --scanflags <flags>: Customize TCP scan flags
  -sI <zombie host[:probeport]>: Idle scan
```

**22.zenmap:** Zenmap is a GUI the most popular network scanner called Nmap (Network Mapper).



Target: scanme.nmap.org

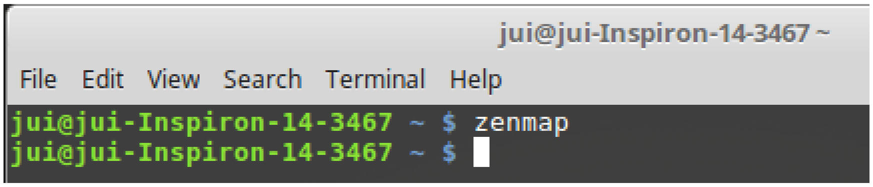
Profile: Intense scan

Command: nmap -T4 -A -v scanme.nmap.org

scanme.nmap.org

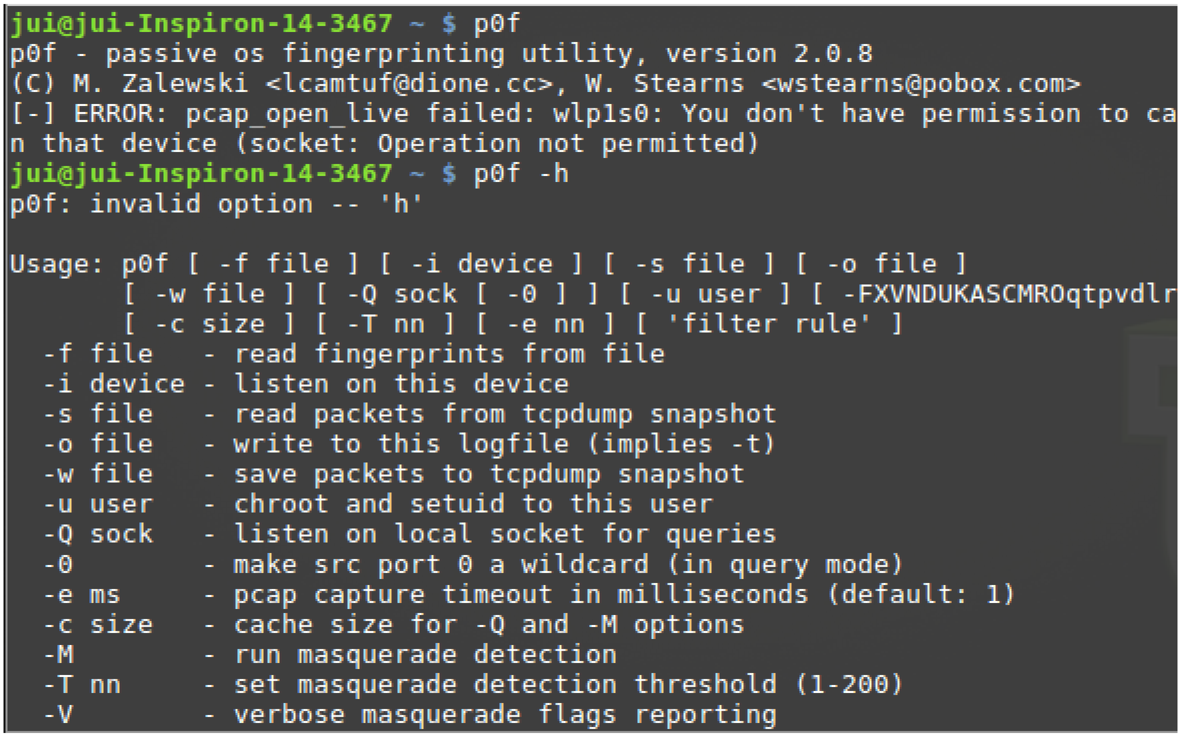
```
nmap -T4 -A -v scanme.nmap.org
|   2048 20:3d:2d:44:62:2a:b0:5a:9d:b5:b3:05:14:c2:a6:b2
(RSA)
|_  256 96:02:bb:5e:57:54:1c:4e:45:2f:56:4c:4a:24:b2:57
(ECDSA)
80/tcp    open     http         Apache httpd 2.4.7
((Ubuntu))
|_http-favicon: Unknown favicon MD5:
156515DA3C0F7DC6B2493BD5CE43F795
| http-methods:
|_  Supported Methods: POST OPTIONS GET HEAD
|_http-server-header: Apache/2.4.7 (Ubuntu)
|_http-title: Go ahead and ScanMe!
1719/tcp  filtered h323gatestat
1720/tcp  filtered h323q931
2001/tcp  filtered dc
5060/tcp  filtered sip
5061/tcp  filtered sip-tls
9929/tcp  open     nping-echo   Nping echo
31337/tcp open     tcpwrapped
49152/tcp filtered unknown
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

```
jui@jui-Inspiron-14-3467 ~ $ zenmap
```



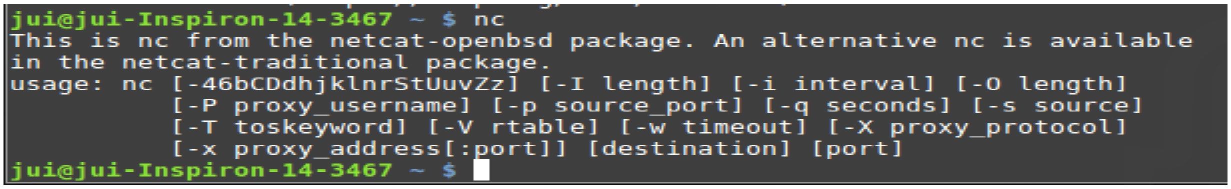
```
jui@jui-Inspiron-14-3467 ~ $ zenmap
jui@jui-Inspiron-14-3467 ~ $ 
```

**23.p0f:** Identifies OS hosts connecting to you.

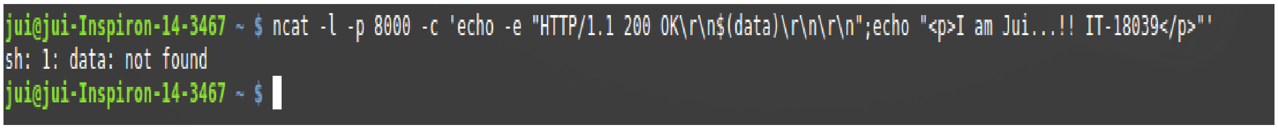


```
jui@jui-Inspiron-14-3467 ~ $ p0f
p0f - passive os fingerprinting utility, version 2.0.8
(C) M. Zalewski <lcamtuf@dione.cc>, W. Stearns <wstearns@pobox.com>
[-] ERROR: pcap_open_live failed: wlp1s0: You don't have permission to ca
n that device (socket: Operation not permitted)
jui@jui-Inspiron-14-3467 ~ $ p0f -h
p0f: invalid option -- 'h'

Usage: p0f [ -f file ] [ -i device ] [ -s file ] [ -o file ]
       [ -w file ] [ -Q sock [ -0 ] ] [ -u user ] [ -FXVNDUKASCMROqtpvdlr
       [ -c size ] [ -T nn ] [ -e nn ] [ 'filter rule' ]
  -f file    - read fingerprints from file
  -i device  - listen on this device
  -s file    - read packets from tcpdump snapshot
  -o file    - write to this logfile (implies -t)
  -w file    - save packets to tcpdump snapshot
  -u user    - chroot and setuid to this user
  -Q sock    - listen on local socket for queries
  -0         - make src port 0 a wildcard (in query mode)
  -e ms      - pcap capture timeout in milliseconds (default: 1)
  -c size    - cache size for -Q and -M options
  -M         - run masquerade detection
  -T nn      - set masquerade detection threshold (1-200)
  -V         - verbose masquerade flags reporting
```

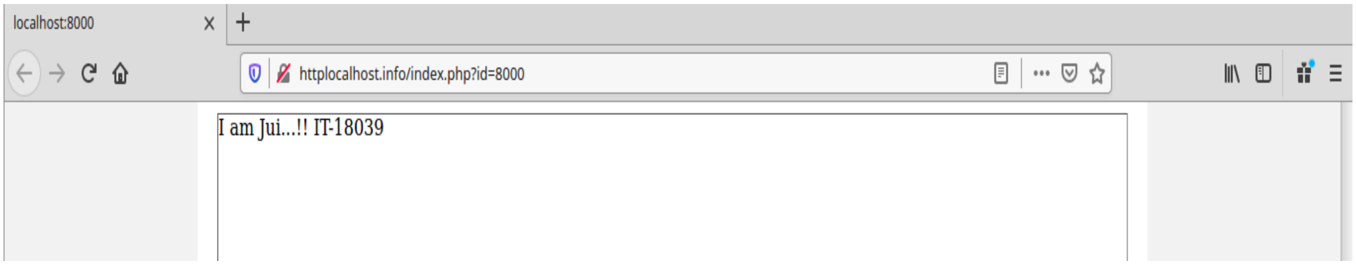
**24.nc(netcat):** Netcat (or nc in short) is a simple yet powerful networking command-line tool used for performing any operation in Linux related to TCP, UDP, or UNIX-domain sockets. Netcat is used for a command line chat server,to create basic web server.



```
jui@jui-Inspiron-14-3467 ~ $ nc
This is nc from the netcat-openbsd package. An alternative nc is available
in the netcat-traditional package.
usage: nc [-46bCDdhjklnrStUuvZz] [-I length] [-i interval] [-O length]
          [-P proxy_username] [-p source_port] [-q seconds] [-s source]
          [-T toskeyword] [-V rtable] [-w timeout] [-X proxy_protocol]
          [-x proxy_address[:port]] [destination] [port]
jui@jui-Inspiron-14-3467 ~ $
```



```
jui@jui-Inspiron-14-3467 ~ $ ncat -l -p 8000 -c 'echo -e "HTTP/1.1 200 OK\r\n$(data)\r\n\r\n";echo "<p>I am Jui...!! IT-18039</p>"'
sh: 1: data: not found
jui@jui-Inspiron-14-3467 ~ $
```



I am Jui...!! IT-18039