# Mawlana Bhashani Science and Technology University

**Assignment No : 01**

**Assignment Name : Linux Commands**

**Course Title:  Computer Network**

## Submitted by

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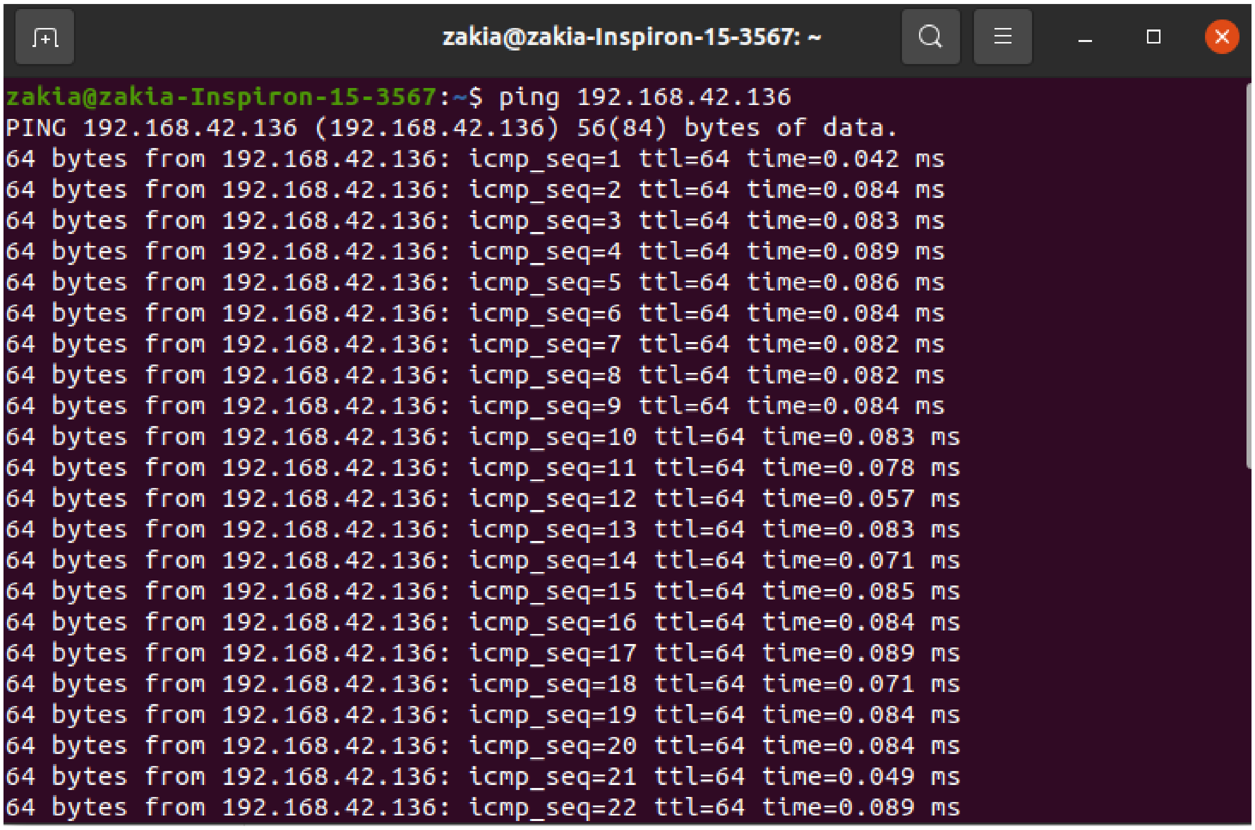
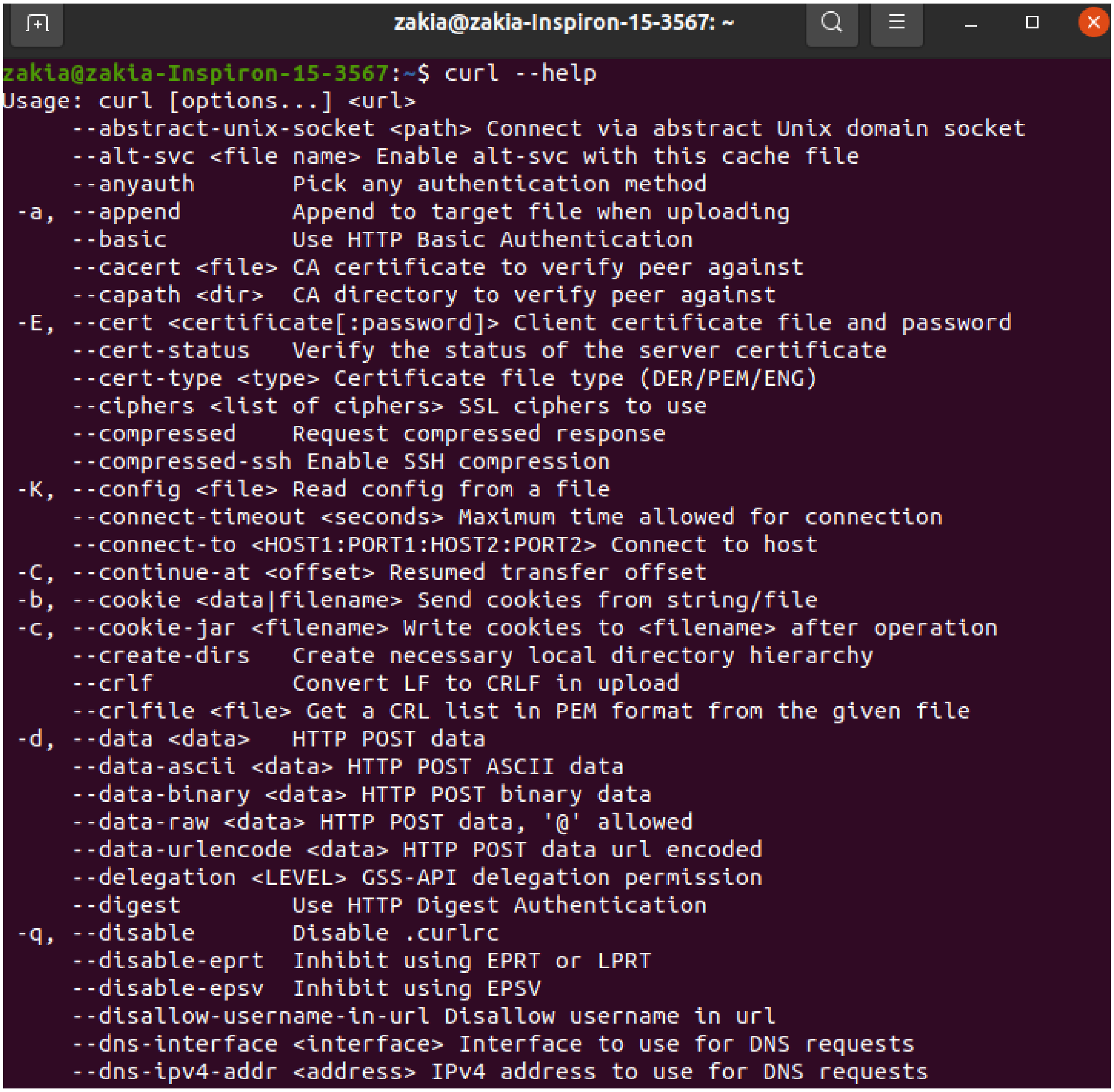
**Ping:** The ping command is one of the most used tools for troubleshooting, testing, and diagnosing network connectivity issues. Ping works by sending one or more ICMP (Internet Control Message Protocol) Echo Request packages to a specified destination IP on the network and waits for a reply.



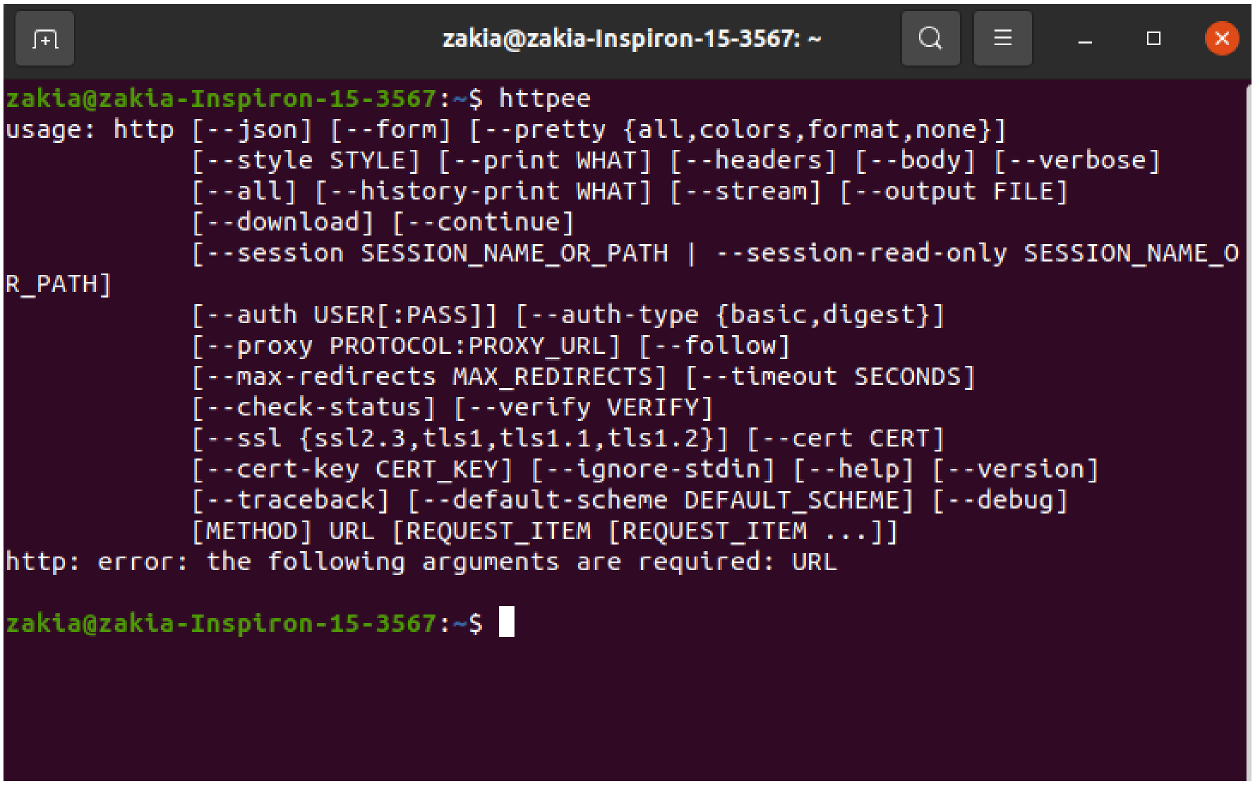
```
zakia@zakia-Inspiron-15-3567:~$ ping 192.168.42.136
PING 192.168.42.136 (192.168.42.136) 56(84) bytes of data.
64 bytes from 192.168.42.136: icmp_seq=1 ttl=64 time=0.042 ms
64 bytes from 192.168.42.136: icmp_seq=2 ttl=64 time=0.084 ms
64 bytes from 192.168.42.136: icmp_seq=3 ttl=64 time=0.083 ms
64 bytes from 192.168.42.136: icmp_seq=4 ttl=64 time=0.089 ms
64 bytes from 192.168.42.136: icmp_seq=5 ttl=64 time=0.086 ms
64 bytes from 192.168.42.136: icmp_seq=6 ttl=64 time=0.084 ms
64 bytes from 192.168.42.136: icmp_seq=7 ttl=64 time=0.082 ms
64 bytes from 192.168.42.136: icmp_seq=8 ttl=64 time=0.082 ms
64 bytes from 192.168.42.136: icmp_seq=9 ttl=64 time=0.084 ms
64 bytes from 192.168.42.136: icmp_seq=10 ttl=64 time=0.083 ms
64 bytes from 192.168.42.136: icmp_seq=11 ttl=64 time=0.078 ms
64 bytes from 192.168.42.136: icmp_seq=12 ttl=64 time=0.057 ms
64 bytes from 192.168.42.136: icmp_seq=13 ttl=64 time=0.083 ms
64 bytes from 192.168.42.136: icmp_seq=14 ttl=64 time=0.071 ms
64 bytes from 192.168.42.136: icmp_seq=15 ttl=64 time=0.085 ms
64 bytes from 192.168.42.136: icmp_seq=16 ttl=64 time=0.084 ms
64 bytes from 192.168.42.136: icmp_seq=17 ttl=64 time=0.089 ms
64 bytes from 192.168.42.136: icmp_seq=18 ttl=64 time=0.071 ms
64 bytes from 192.168.42.136: icmp_seq=19 ttl=64 time=0.084 ms
64 bytes from 192.168.42.136: icmp_seq=20 ttl=64 time=0.084 ms
64 bytes from 192.168.42.136: icmp_seq=21 ttl=64 time=0.049 ms
64 bytes from 192.168.42.136: icmp_seq=22 ttl=64 time=0.089 ms
```

**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, SMTP, TFTP, TELNET, LDAP or FILE) . curl is powered by Libcurl. This tool is preferred for automation, since it is designed to work without user interaction.



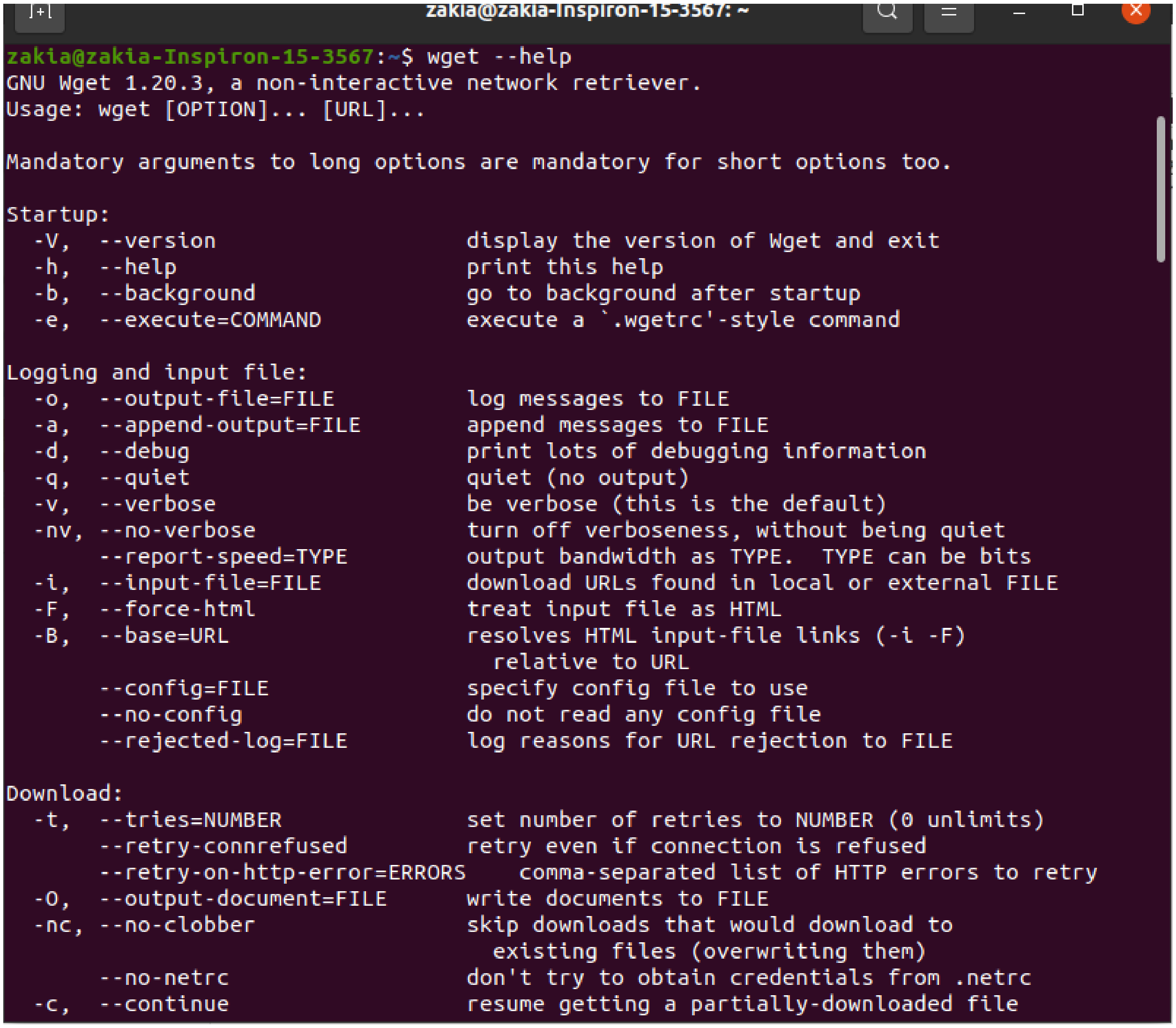
```
zakia@zakia-Inspiron-15-3567:~$ curl --help
Usage: curl [options...] <url>
     --abstract-unix-socket <path> Connect via abstract Unix domain socket
     --alt-svc <file name> Enable alt-svc with this cache file
     --anyauth       Pick any authentication method
 -a, --append        Append to target file when uploading
     --basic         Use HTTP Basic Authentication
     --cacert <file> CA certificate to verify peer against
     --capath <dir>  CA directory to verify peer against
 -E, --cert <certificate[:password]> Client certificate file and password
     --cert-status   Verify the status of the server certificate
     --cert-type <type> Certificate file type (DER/PEM/ENG)
     --ciphers <list of ciphers> SSL ciphers to use
     --compressed    Request compressed response
     --compressed-ssh Enable SSH compression
 -K, --config <file> Read config from a file
     --connect-timeout <seconds> Maximum time allowed for connection
     --connect-to <HOST1:PORT1:HOST2:PORT2> Connect to host
 -C, --continue-at <offset> Resumed transfer offset
 -b, --cookie <data|filename> Send cookies from string/file
 -c, --cookie-jar <filename> Write cookies to <filename> after operation
     --create-dirs   Create necessary local directory hierarchy
     --crlf          Convert LF to CRLF in upload
     --crlfile <file> Get a CRL list in PEM format from the given file
 -d, --data <data>   HTTP POST data
     --data-ascii <data> HTTP POST ASCII data
     --data-binary <data> HTTP POST binary data
     --data-raw <data> HTTP POST data, '@' allowed
     --data-urlencode <data> HTTP POST data url encoded
     --delegation <LEVEL> GSS-API delegation permission
     --digest        Use HTTP Digest Authentication
 -q, --disable       Disable .curlrc
     --disable-eprt  Inhibit using EPRT or LPRT
     --disable-epsv  Inhibit using EPSV
     --disallow-username-in-url Disallow username in url
     --dns-interface <interface> Interface to use for DNS requests
     --dns-ipv4-addr <address> IPv4 address to use for DNS requests
```

**HTTPEE:** HTTPEE– A Modern HTTP Client Similar to Curl and Wget commands. HTTPie (pronounced aitch-tee-tee-pie) is a cURL-like, modern, user-friendly, and cross-platform command line HTTP client written in Python. It is designed to make CLI interaction with web services easy and as user- friendly as possible.



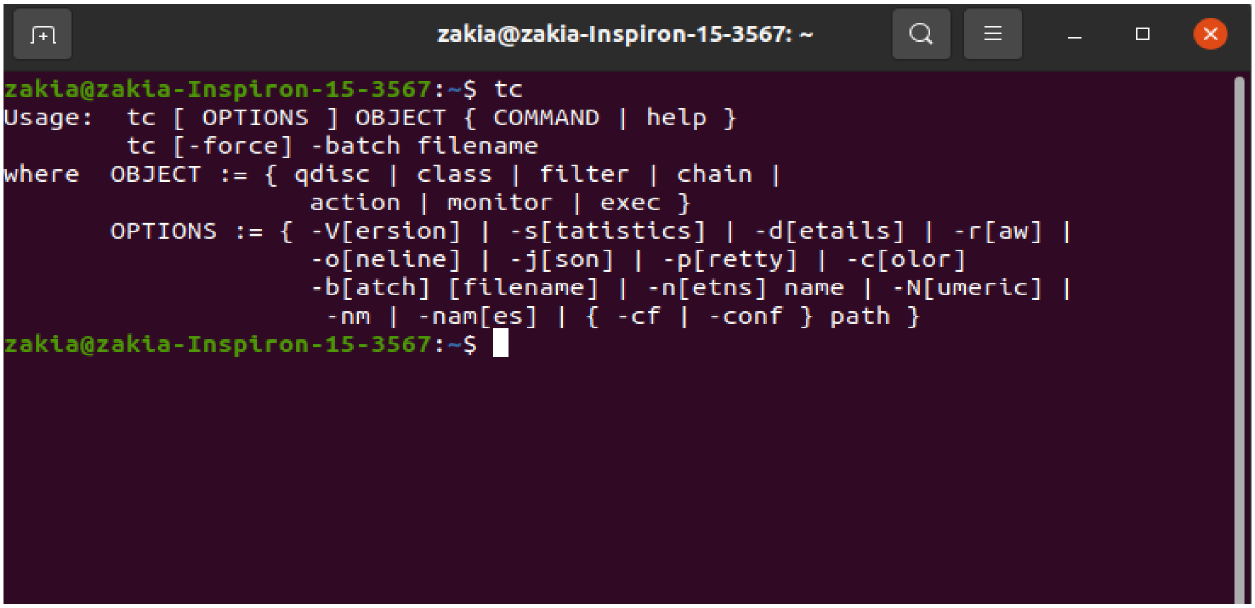
```
zakia@zakia-Inspiron-15-3567:~$ httpee
usage: http [--json] [--form] [--pretty {all,colors,format,none}]
            [--style STYLE] [--print WHAT] [--headers] [--body] [--verbose]
            [--all] [--history-print WHAT] [--stream] [--output FILE]
            [--download] [--continue]
            [--session SESSION_NAME_OR_PATH | --session-read-only SESSION_NAME_O
R_PATH]
            [--auth USER[:PASS]] [--auth-type {basic,digest}]
            [--proxy PROTOCOL:PROXY_URL] [--follow]
            [--max-redirects MAX_REDIRECTS] [--timeout SECONDS]
            [--check-status] [--verify VERIFY]
            [--ssl {ssl2.3,tls1,tls1.1,tls1.2}] [--cert CERT]
            [--cert-key CERT_KEY] [--ignore-stdin] [--help] [--version]
            [--traceback] [--default-scheme DEFAULT_SCHEME] [--debug]
            [METHOD] URL [REQUEST_ITEM [REQUEST_ITEM ...]]
http: error: the following arguments are required: URL

zakia@zakia-Inspiron-15-3567:~$ 
```

**WGET:** wget is a free utility for non-interactive download of files from the web.It supports HTTP,HTTPS, and FTP protocols.



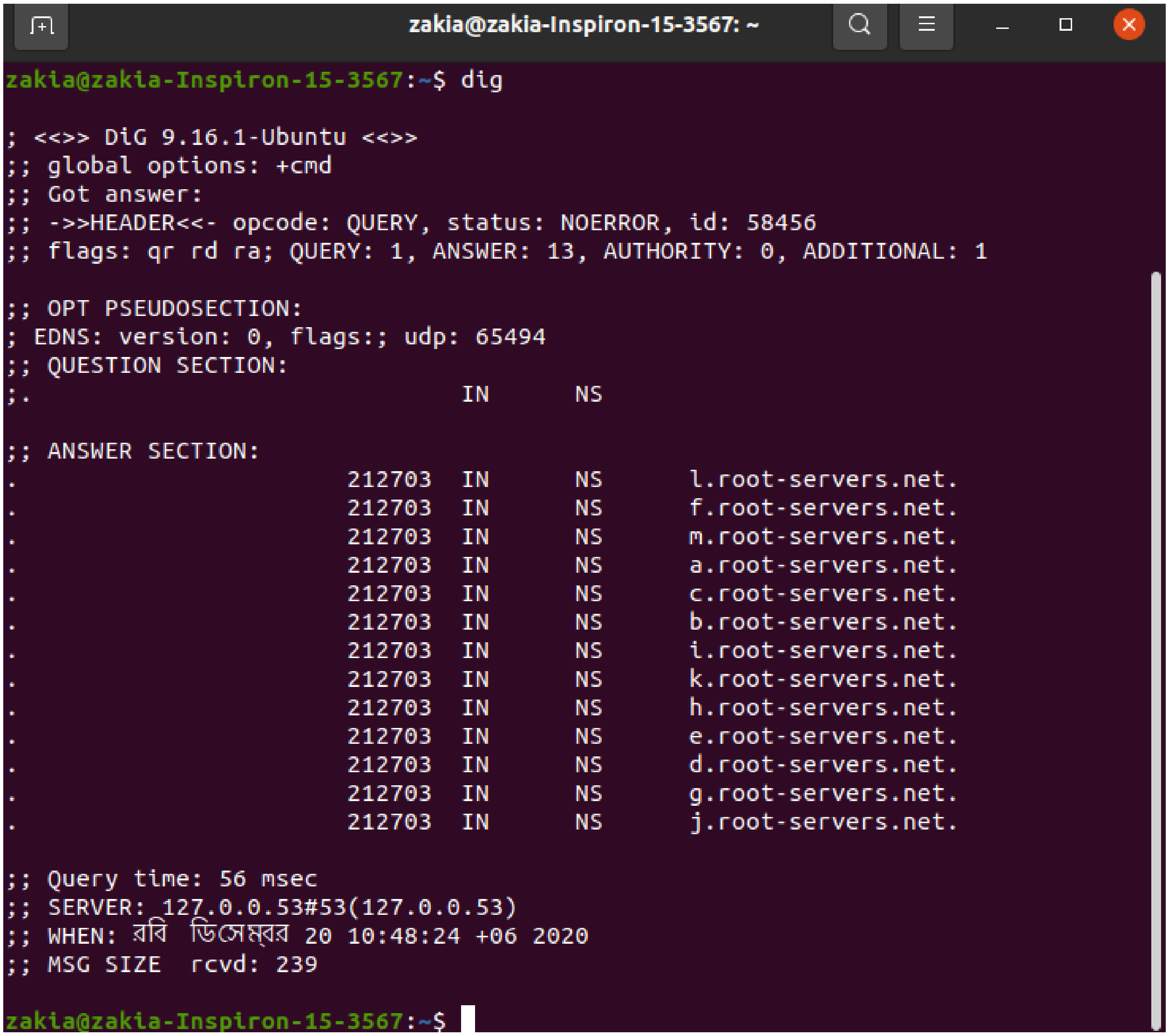
```
zakia@zakia-Inspiron-15-3567:~$ wget --help
GNU Wget 1.20.3, a non-interactive network retriever.
Usage: wget [OPTION]... [URL]...

Mandatory arguments to long options are mandatory for short options too.

Startup:
  -V,  --version                   display the version of Wget and exit
  -h,  --help                      print this help
  -b,  --background                go to background after startup
  -e,  --execute=COMMAND           execute a `.wgetrc'-style command

Logging and input file:
  -o,  --output-file=FILE          log messages to FILE
  -a,  --append-output=FILE        append messages to FILE
  -d,  --debug                     print lots of debugging information
  -q,  --quiet                     quiet (no output)
  -v,  --verbose                   be verbose (this is the default)
  -nv, --no-verbose                turn off verboseness, without being quiet
       --report-speed=TYPE         output bandwidth as TYPE.  TYPE can be bits
  -i,  --input-file=FILE           download URLs found in local or external FILE
  -F,  --force-html                treat input file as HTML
  -B,  --base=URL                  resolves HTML input-file links (-i -F)
                                     relative to URL
       --config=FILE               specify config file to use
       --no-config                 do not read any config file
       --rejected-log=FILE         log reasons for URL rejection to FILE

Download:
  -t,  --tries=NUMBER              set number of retries to NUMBER (0 unlimits)
       --retry-connrefused         retry even if connection is refused
       --retry-on-http-error=ERRORS    comma-separated list of HTTP errors to retry
  -O,  --output-document=FILE      write documents to FILE
  -nc, --no-clobber                skip downloads that would download to
                                     existing files (overwriting them)
       --no-netrc                  don't try to obtain credentials from .netrc
  -c,  --continue                  resume getting a partially-downloaded file
```

**TC:** Tc is used to configure Traffic Control in the Linux kernel. Traffic Control consists of the following: SHAPING When traffic is shaped, its rate of transmission is under control. Shaping may be more than lowering the available bandwidth - it is also used to smooth out bursts in traffic for better network behaviour.



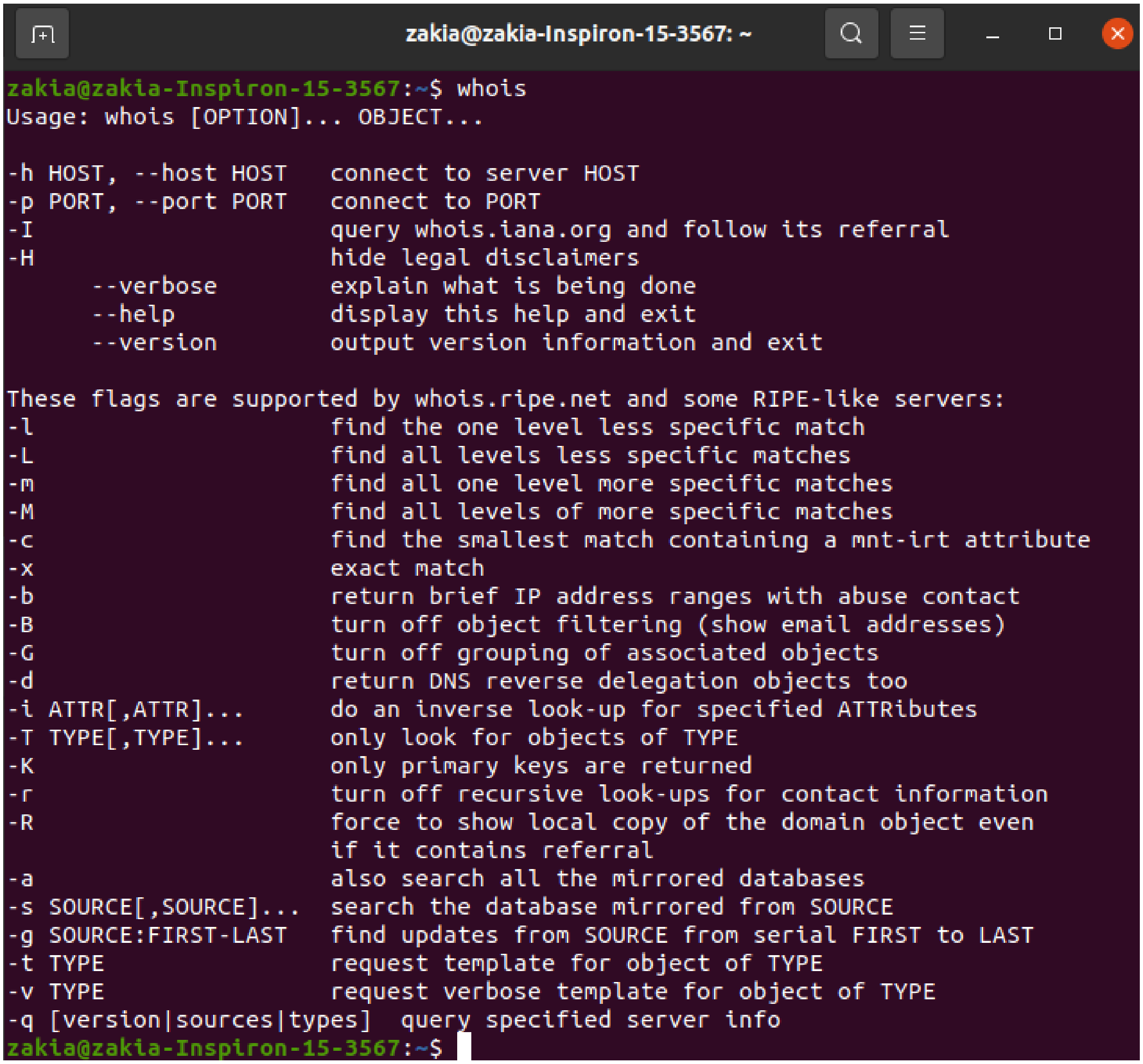
```
zakia@zakia-Inspiron-15-3567:~$ tc
Usage:  tc [ OPTIONS ] OBJECT { COMMAND | help }
        tc [-force] -batch filename
where  OBJECT := { qdisc | class | filter | chain |
                    action | monitor | exec }
       OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[aw] |
                    -o[neline] | -j[son] | -p[retty] | -c[olor]
                    -b[atch] [filename] | -n[etns] name | -N[umeric] |
                     -nm | -nam[es] | { -cf | -conf } path }
zakia@zakia-Inspiron-15-3567:~$
```

**DIG/NSLOOKUP:** Dig (Domain Information Groper) is a command line utility that performs DNS lookup by querying name servers and displaying the result to you. In this tutorial, you'll find all the basic uses of the command you should know in the Linux operating system.



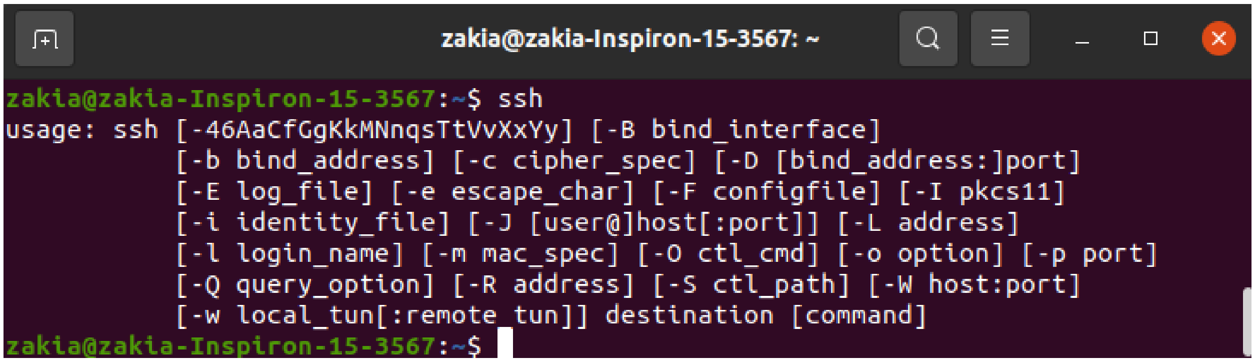
```
zakia@zakia-Inspiron-15-3567:~$ dig

; <<>> DiG 9.16.1-Ubuntu <<>>
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 58456
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;.                              IN      NS

;; ANSWER SECTION:
.                       212703  IN      NS      l.root-servers.net.
.                       212703  IN      NS      f.root-servers.net.
.                       212703  IN      NS      m.root-servers.net.
.                       212703  IN      NS      a.root-servers.net.
.                       212703  IN      NS      c.root-servers.net.
.                       212703  IN      NS      b.root-servers.net.
.                       212703  IN      NS      i.root-servers.net.
.                       212703  IN      NS      k.root-servers.net.
.                       212703  IN      NS      h.root-servers.net.
.                       212703  IN      NS      e.root-servers.net.
.                       212703  IN      NS      d.root-servers.net.
.                       212703  IN      NS      g.root-servers.net.
.                       212703  IN      NS      j.root-servers.net.

;; Query time: 56 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: রবি  ডিসেম্বর 20 10:48:24 +06 2020
;; MSG SIZE  rcvd: 239

zakia@zakia-Inspiron-15-3567:~$
```

**WHOIS:** In Linux, the whois command line utility is a WHOIS client for communicating with the WHOIS server (or database host) which listen to requests on the well-known port number 43, which stores and delivers database content in a humanreadable format.



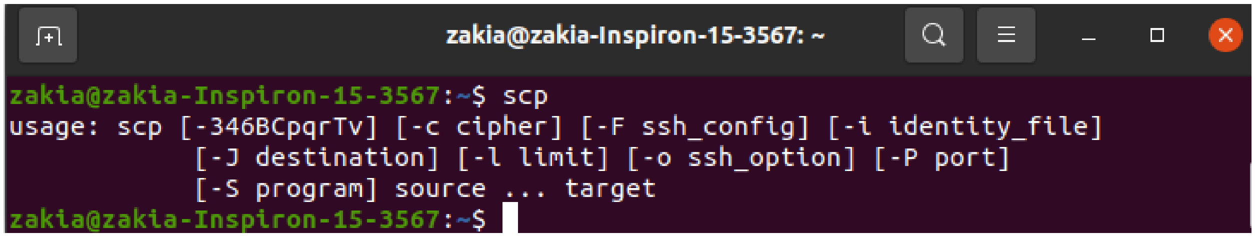
```
zakia@zakia-Inspiron-15-3567:~$ whois
Usage: whois [OPTION]... OBJECT...

-h HOST, --host HOST   connect to server HOST
-p PORT, --port PORT   connect to PORT
-I                     query whois.iana.org and follow its referral
-H                     hide legal disclaimers
      --verbose        explain what is being done
      --help           display this help and exit
      --version        output version information and exit

These flags are supported by whois.ripe.net and some RIPE-like servers:
-l                     find the one level less specific match
-L                     find all levels less specific matches
-m                     find all one level more specific matches
-M                     find all levels of more specific matches
-c                     find the smallest match containing a mnt-irt attribute
-x                     exact match
-b                     return brief IP address ranges with abuse contact
-B                     turn off object filtering (show email addresses)
-G                     turn off grouping of associated objects
-d                     return DNS reverse delegation objects too
-i ATTR[,ATTR]...      do an inverse look-up for specified ATTRibutes
-T TYPE[,TYPE]...      only look for objects of TYPE
-K                     only primary keys are returned
-r                     turn off recursive look-ups for contact information
-R                     force to show local copy of the domain object even
                       if it contains referral
-a                     also search all the mirrored databases
-s SOURCE[,SOURCE]...  search the database mirrored from SOURCE
-g SOURCE:FIRST-LAST   find updates from SOURCE from serial FIRST to LAST
-t TYPE                request template for object of TYPE
-v TYPE                request verbose template for object of TYPE
-q [version|sources|types]  query specified server info
zakia@zakia-Inspiron-15-3567:~$ 
```

**SSH:** ssh command provides a secure encrypted connection between two hosts over an insecure network. This connection can also be used for terminal access, file transfers, and for tunneling other applications. Graphical X11 applications can also be run securely over SSH from a remote location.



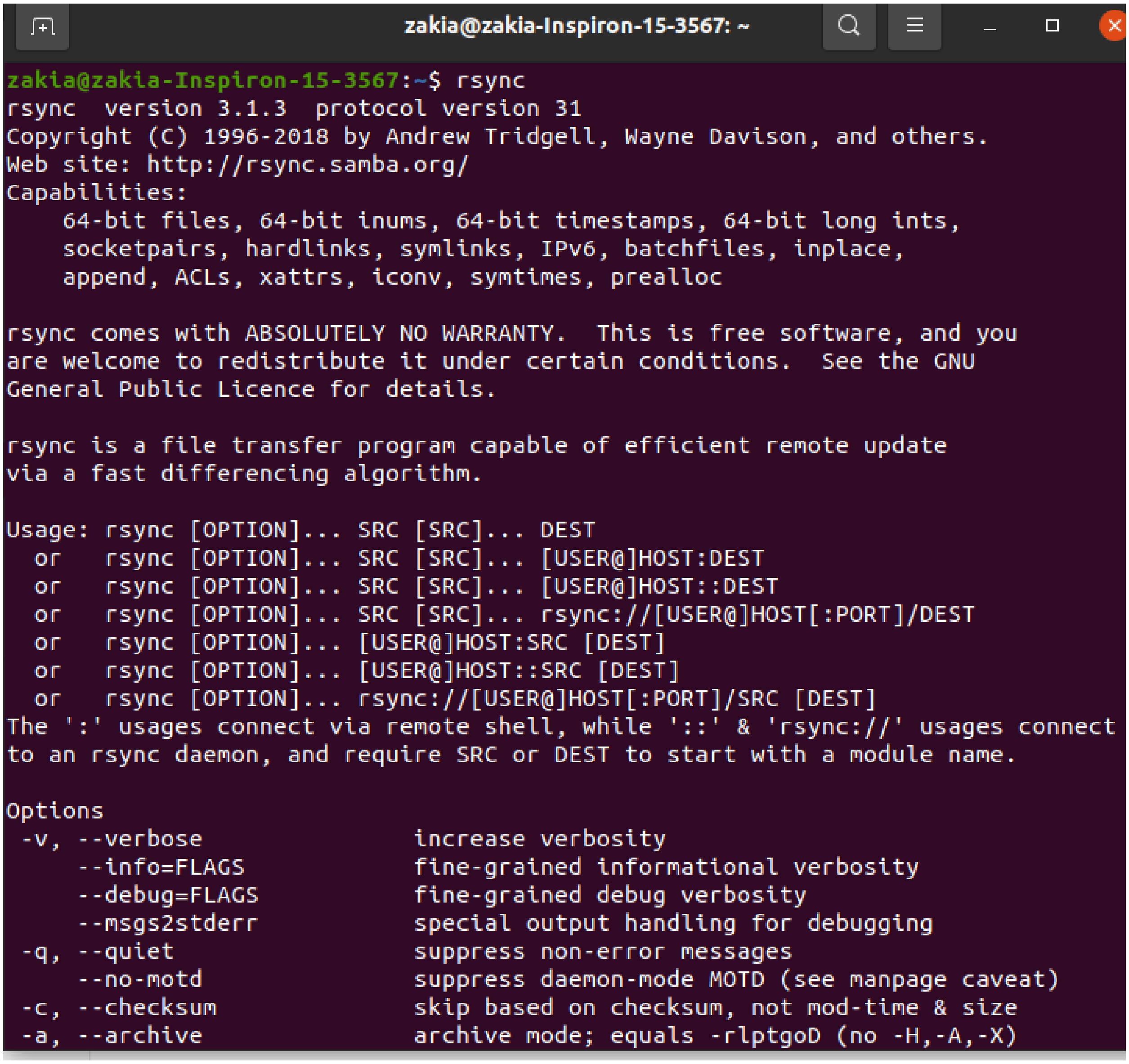
```
zakia@zakia-Inspiron-15-3567:~$ ssh
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-i identity_file] [-J [user@]host[:port]] [-L address]
           [-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]] destination [command]
zakia@zakia-Inspiron-15-3567:~$ 
```

**SCP: scp (secure copy)** command in Linux system is used to copy file(s) between servers in a secure way. The SCP command or secure copy allows secure transferring of files in between the local host and the remote host or between two remote hosts.



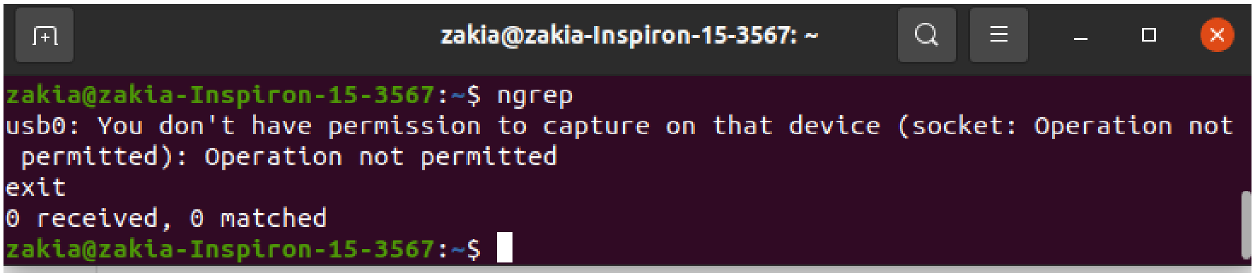
```
zakia@zakia-Inspiron-15-3567:~$ scp
usage: scp [-346BCpqrTv] [-c cipher] [-F ssh_config] [-i identity_file]
            [-J destination] [-l limit] [-o ssh_option] [-P port]
            [-S program] source ... target
zakia@zakia-Inspiron-15-3567:~$ 
```

**RSYNC:** rsync is a fast and versatile command-line utility for synchronizing files and directories between two locations over a remote shell, or from/to a remote Rsync daemon. It provides fast incremental file transfer by transferring only the differences between the source and the destination.



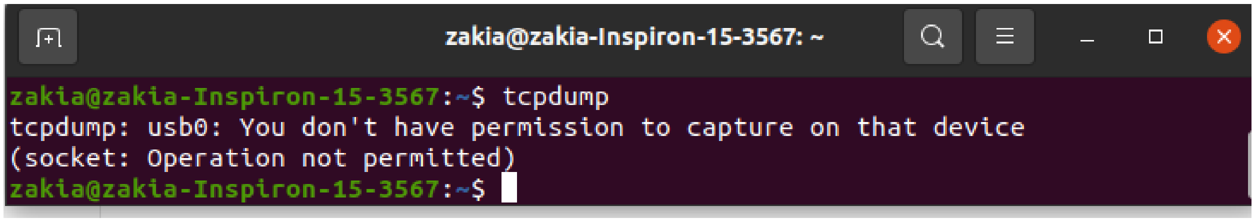
```
zakia@zakia-Inspiron-15-3567:~$ rsync
rsync  version 3.1.3  protocol version 31
Copyright (C) 1996-2018 by Andrew Tridgell, Wayne Davison, and others.
Web site: http://rsync.samba.org/
Capabilities:
    64-bit files, 64-bit inums, 64-bit timestamps, 64-bit long ints,
    socketpairs, hardlinks, symlinks, 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)
```

**NGREP:** ngrep (network grep) is a network packet analyzer written by Jordan Ritter. It has a command-line interface, and relies upon the pcap library and the ... it works in many UNIX-like operating systems: Linux, Solaris, illumos, BSD, AIX.



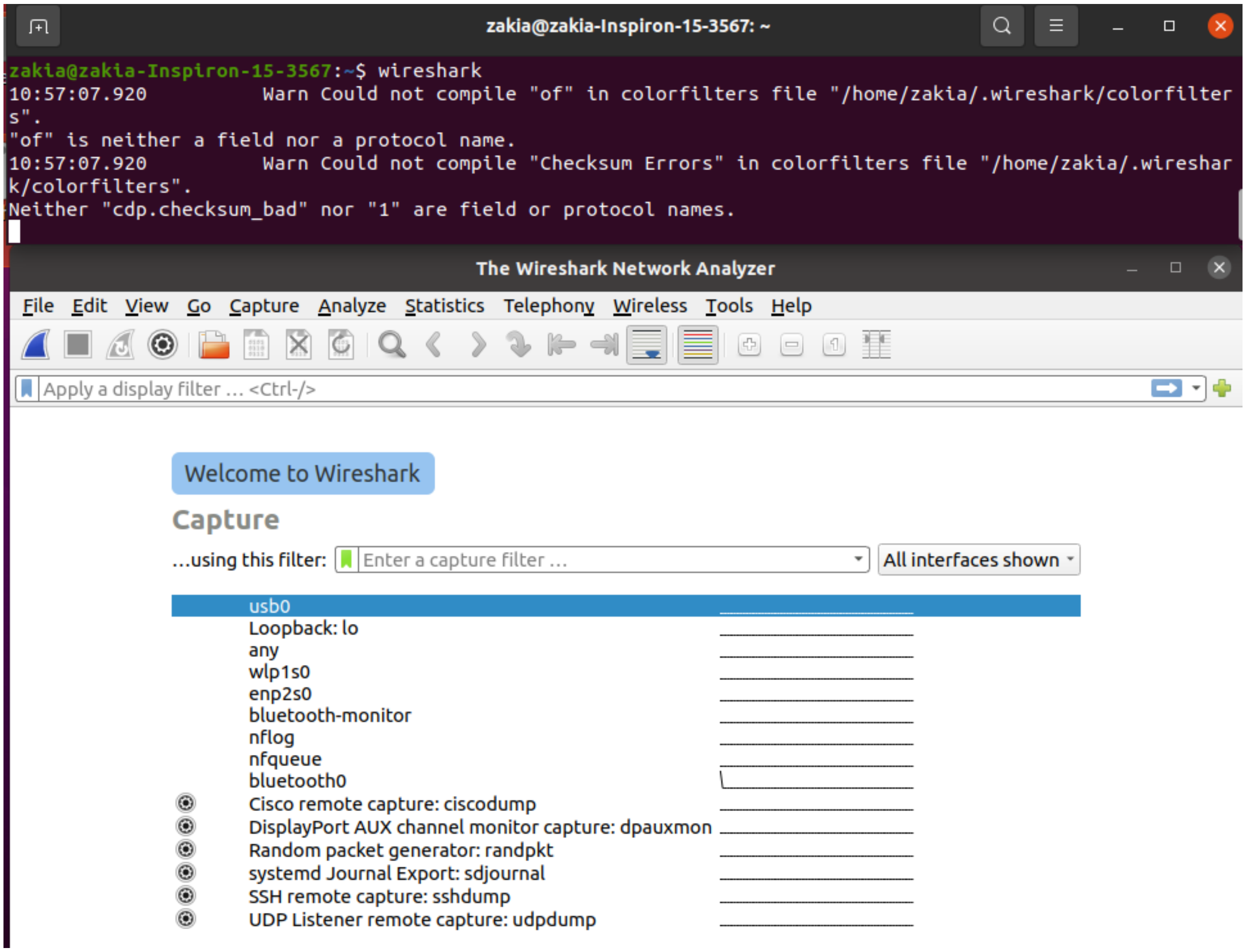
```
zakia@zakia-Inspiron-15-3567:~$ ngrep
usb0: You don't have permission to capture on that device (socket: Operation not
 permitted): Operation not permitted
exit
0 received, 0 matched
zakia@zakia-Inspiron-15-3567:~$
```

**TCPDUMP:** tcpdump is a most powerful and widely used 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. It is available under most of the Linux/Unix based operating systems.



```
zakia@zakia-Inspiron-15-3567:~$ tcpdump
tcpdump: usb0: You don't have permission to capture on that device
(socket: Operation not permitted)
zakia@zakia-Inspiron-15-3567:~$
```

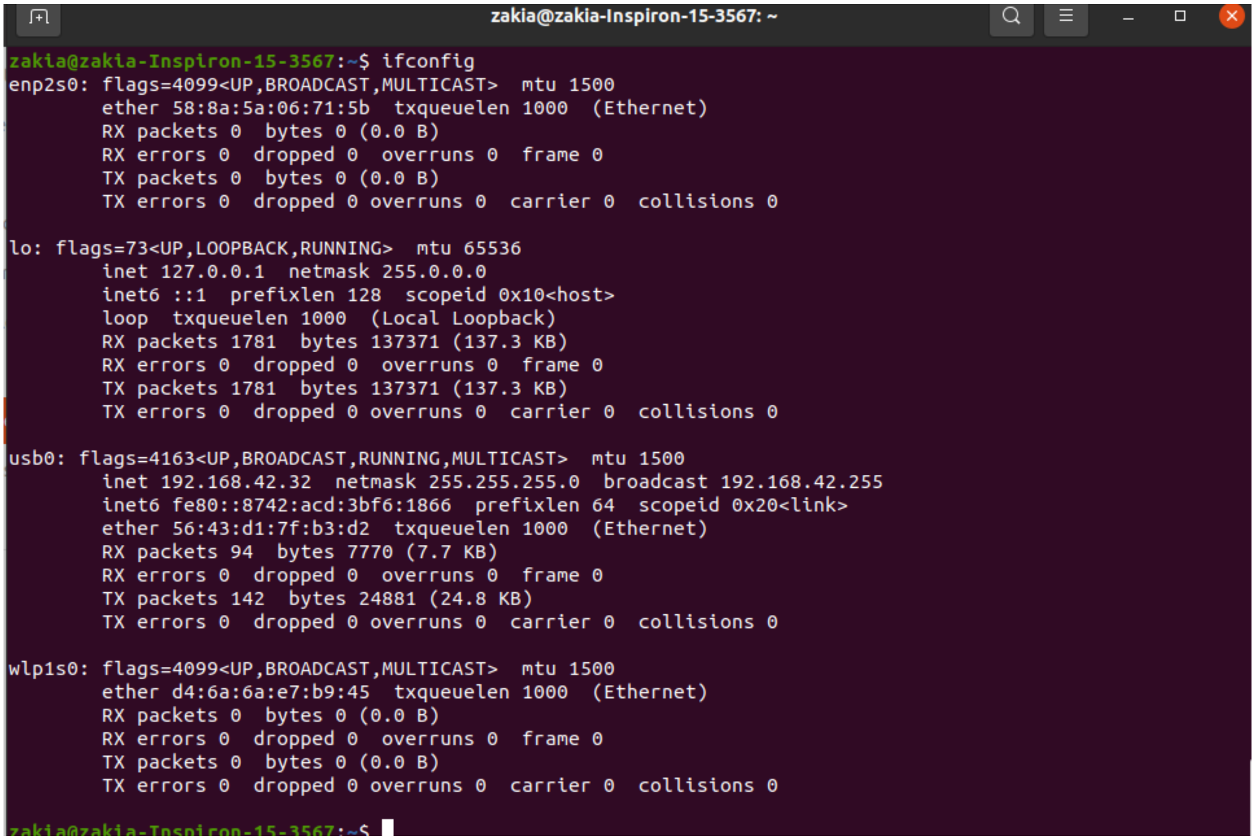
## WIRESHARK:


zakia@zakia-Inspiron-15-3567: ~
The Wireshark Network Analyzer
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter … <Ctrl-/>
Welcome to Wireshark
Capture
…using this filter:
Enter a capture filter …
All interfaces shown

```
zakia@zakia-Inspiron-15-3567:~$ wireshark
10:57:07.920          Warn Could not compile "of" in colorfilters file "/home/zakia/.wireshark/colorfilter
s".
"of" is neither a field nor a protocol name.
10:57:07.920          Warn Could not compile "Checksum Errors" in colorfilters file "/home/zakia/.wireshar
k/colorfilters".
Neither "cdp.checksum_bad" nor "1" are field or protocol names.
```

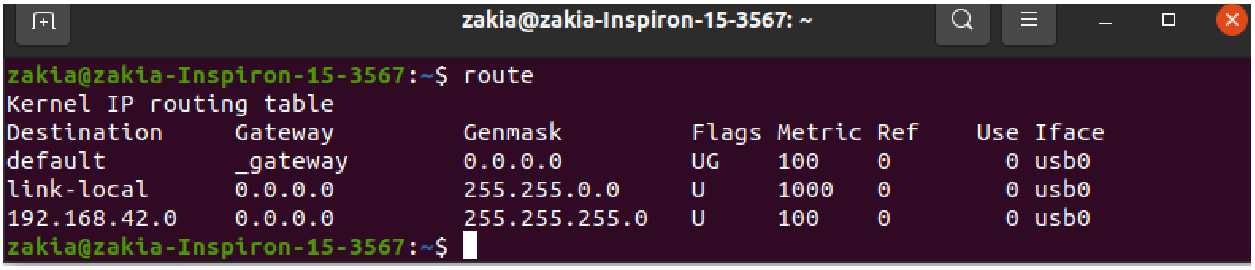
```
usb0
Loopback: lo
any
wlp1s0
enp2s0
bluetooth-monitor
nflog
nfqueue
bluetooth0
Cisco remote capture: ciscodump
DisplayPort AUX channel monitor capture: dpauxmon
Random packet generator: randpkt
systemd Journal Export: sdjournal
SSH remote capture: sshdump
UDP Listener remote capture: udpdump
```

**IFCONFIG:** stands for "interface configuration." It is used to view and change the configuration of the network interfaces on your system.



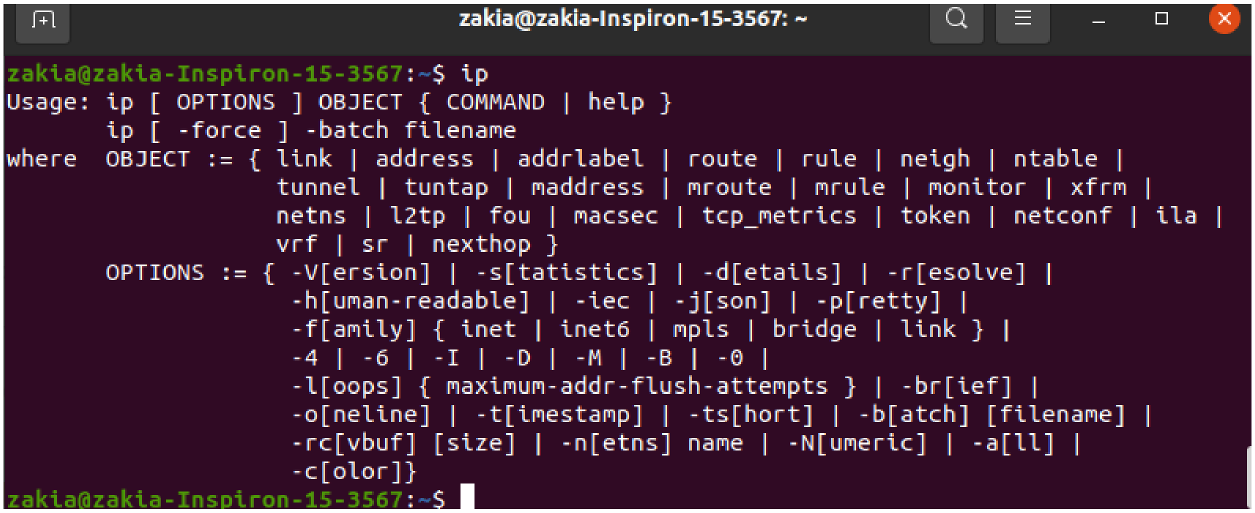
```
zakia@zakia-Inspiron-15-3567:~$ ifconfig
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 58:8a:5a:06:71:5b  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 1781  bytes 137371 (137.3 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1781  bytes 137371 (137.3 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

usb0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.42.32  netmask 255.255.255.0  broadcast 192.168.42.255
        inet6 fe80::8742:acd:3bf6:1866  prefixlen 64  scopeid 0x20<link>
        ether 56:43:d1:7f:b3:d2  txqueuelen 1000  (Ethernet)
        RX packets 94  bytes 7770 (7.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 142  bytes 24881 (24.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp1s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether d4:6a:6a:e7:b9:45  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

zakia@zakia-Inspiron-15-3567:~$
```

**ROUTE:** route command in Linux is used when you want to work with the IP/kernel routing table. It is mainly used to set up static routes to specific hosts or networks via an interface. It is used for showing or update the IP/kernel routing table.



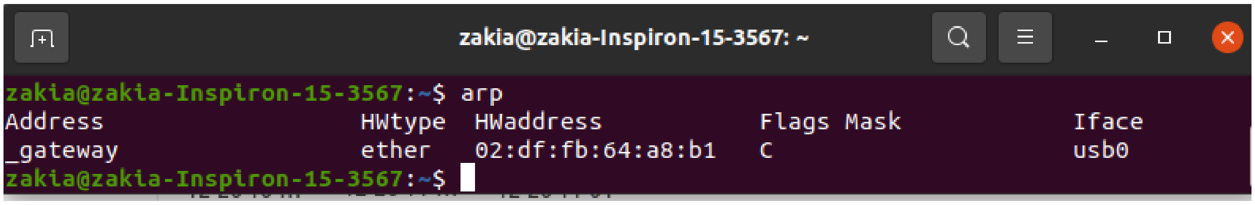
```
zakia@zakia-Inspiron-15-3567:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 usb0
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 usb0
192.168.42.0    0.0.0.0         255.255.255.0   U     100    0        0 usb0
zakia@zakia-Inspiron-15-3567:~$
```

**IP:** The ip command is a Linux net-tool for system and network administrators. IP stands for Internet Protocol and as the name suggests, the tool is used for configuring network interfaces. Older Linux distributions used the ifconfig command, which operates similarly.



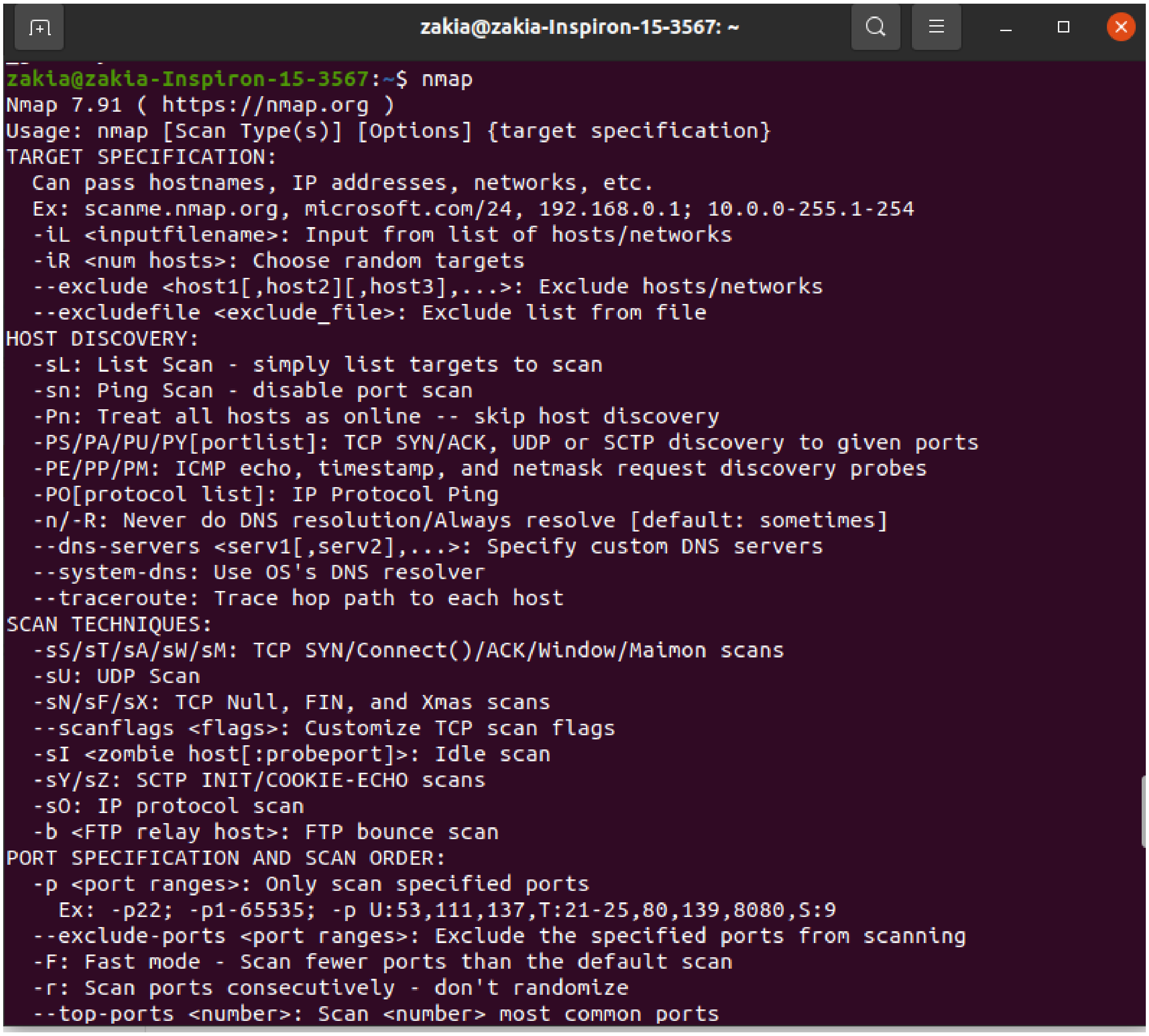
```
zakia@zakia-Inspiron-15-3567:~$ ip
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
       ip [ -force ] -batch filename
where  OBJECT := { link | address | addrlabel | route | rule | neigh | ntable |
                   tunnel | tuntap | maddress | mroute | mrule | monitor | xfrm |
                   netns | l2tp | fou | macsec | tcp_metrics | token | netconf | ila |
                   vrf | sr | nexthop }
       OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
                    -h[uman-readable] | -iec | -j[son] | -p[retty] |
                    -f[amily] { inet | inet6 | mpls | bridge | link } |
                    -4 | -6 | -I | -D | -M | -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 | -N[umeric] | -a[ll] |
                    -c[olor]}
zakia@zakia-Inspiron-15-3567:~$ 
```

**ARP:** arp command manipulates the System's ARP cache. It also allows a complete dump of the ARP cache. ARP stands for Address Resolution Protocol. The primary function of this protocol is to resolve the IP address of a system to its mac address, and hence it works between level 2(Data link layer) and level 3(Network layer).



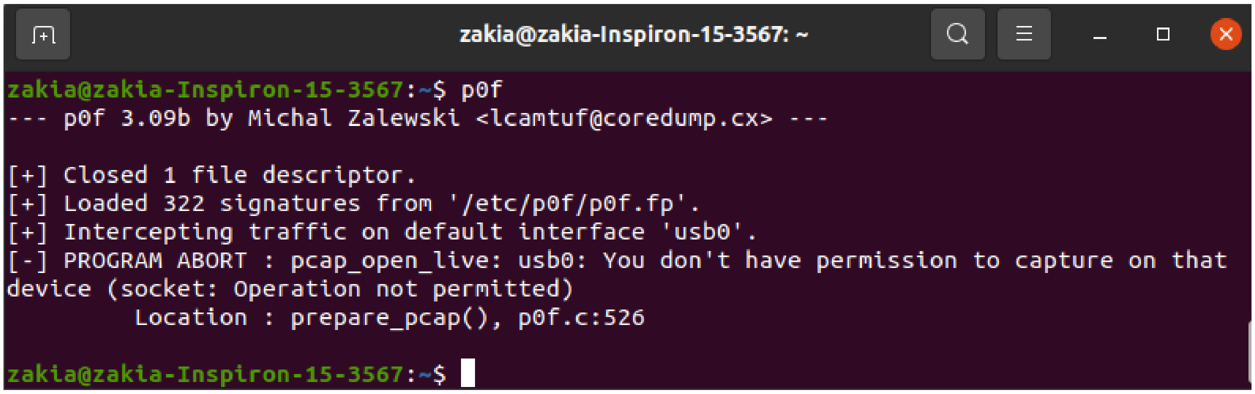
```
zakia@zakia-Inspiron-15-3567:~$ arp
Address                  HWtype  HWaddress           Flags Mask            Iface
_gateway                 ether   02:df:fb:64:a8:b1   C                     usb0
zakia@zakia-Inspiron-15-3567:~$ 
```

**NMAP:** Nmap is Linux command-line tool for network exploration and security auditing. This tool is generally used by hackers and cybersecurity enthusiasts and even by network and system administrators.



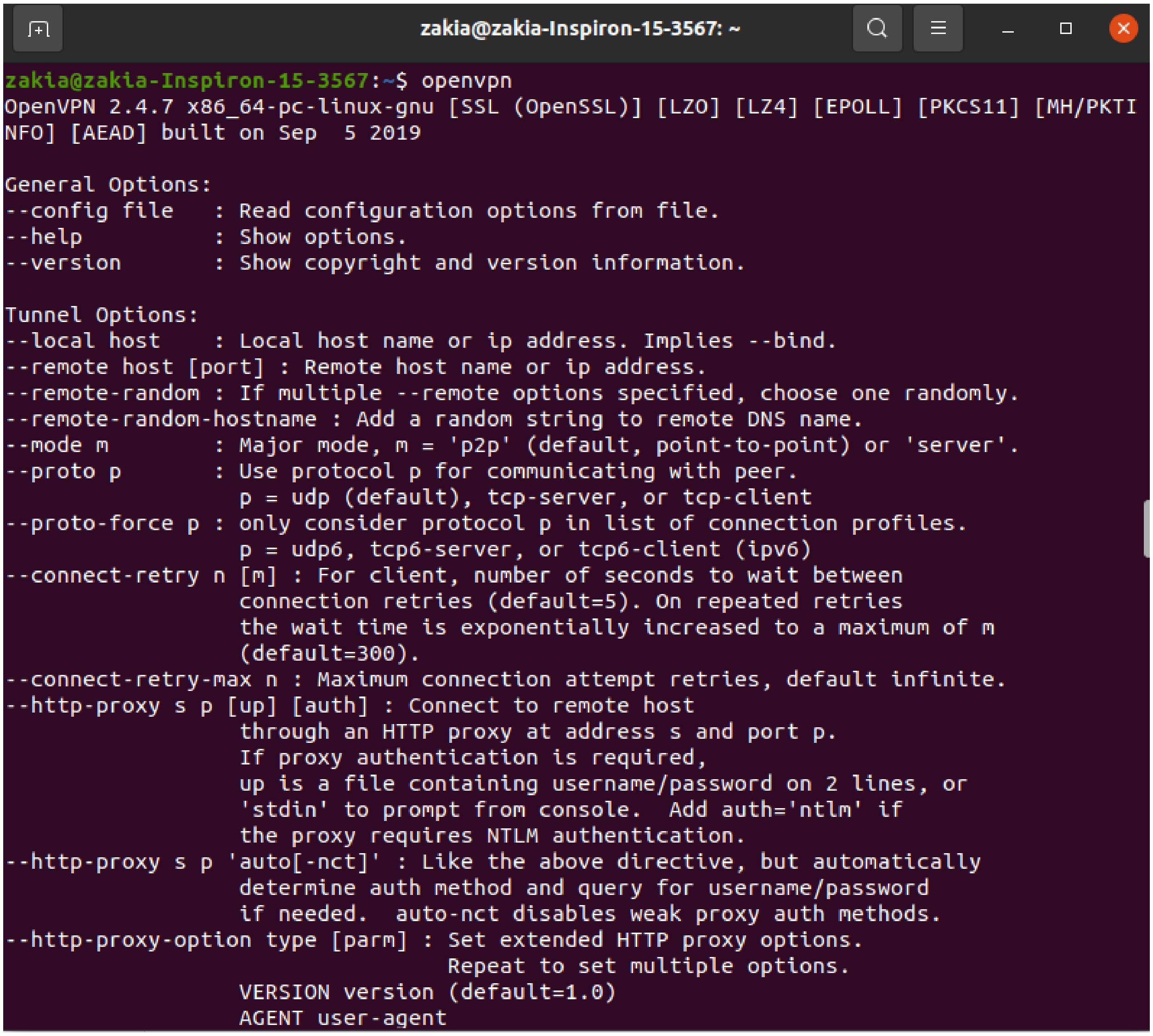
```
zakia@zakia-Inspiron-15-3567:~$ nmap
Nmap 7.91 ( https://nmap.org )
Usage: nmap [Scan Type(s)] [Options] {target specification}
TARGET SPECIFICATION:
  Can pass hostnames, IP addresses, networks, etc.
  Ex: scanme.nmap.org, microsoft.com/24, 192.168.0.1; 10.0.0-255.1-254
  -iL <inputfilename>: Input 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 ports
  -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
  -sY/sZ: SCTP INIT/COOKIE-ECHO scans
  -sO: IP protocol scan
  -b <FTP relay host>: FTP bounce scan
PORT SPECIFICATION AND SCAN ORDER:
  -p <port ranges>: Only scan specified ports
    Ex: -p22; -p1-65535; -p U:53,111,137,T:21-25,80,139,8080,S:9
  --exclude-ports <port ranges>: Exclude the specified ports from scanning
  -F: Fast mode - Scan fewer ports than the default scan
  -r: Scan ports consecutively - don't randomize
  --top-ports <number>: Scan <number> most common ports
```

**POF:** p0f is a passive TCP/IP stack fingerprinting tool. p0f can attempt to identify the system running on machines that send network traffic to the box it is running on, or to a machine that shares a medium with the machine it is running on. p0f can also assist in analysing other aspects of the remote system.



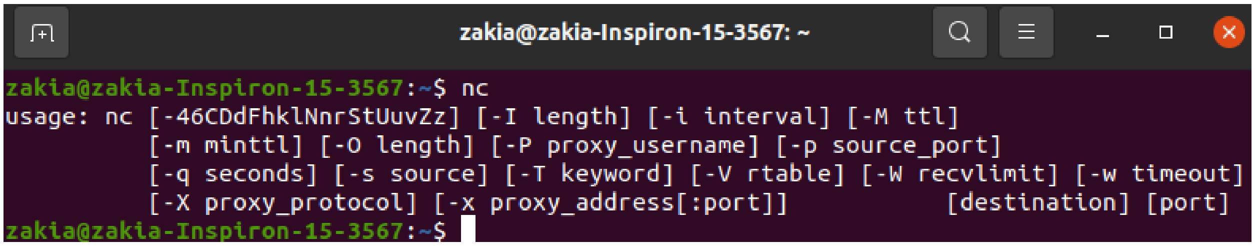
```
zakia@zakia-Inspiron-15-3567:~$ p0f
--- p0f 3.09b by Michal Zalewski <lcamtuf@coredump.cx> ---

[+] Closed 1 file descriptor.
[+] Loaded 322 signatures from '/etc/p0f/p0f.fp'.
[+] Intercepting traffic on default interface 'usb0'.
[-] PROGRAM ABORT : pcap_open_live: usb0: You don't have permission to capture on that
device (socket: Operation not permitted)
         Location : prepare_pcap(), p0f.c:526

zakia@zakia-Inspiron-15-3567:~$
```

## OPENVPN:



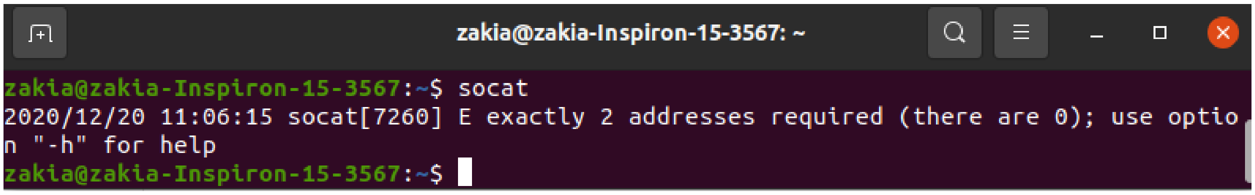
```
zakia@zakia-Inspiron-15-3567:~$ openvpn
OpenVPN 2.4.7 x86_64-pc-linux-gnu [SSL (OpenSSL)] [LZO] [LZ4] [EPOLL] [PKCS11] [MH/PKTI
NFO] [AEAD] built on Sep  5 2019

General Options:
--config file   : Read configuration options from file.
--help          : Show options.
--version       : Show copyright and version information.

Tunnel Options:
--local host    : Local host name or ip address. Implies --bind.
--remote host [port] : Remote host name or ip address.
--remote-random : If multiple --remote options specified, choose one randomly.
--remote-random-hostname : Add a random string to remote DNS name.
--mode m        : Major mode, m = 'p2p' (default, point-to-point) or 'server'.
--proto p       : Use protocol p for communicating with peer.
                  p = udp (default), tcp-server, or tcp-client
--proto-force p : only consider protocol p in list of connection profiles.
                  p = udp6, tcp6-server, or tcp6-client (ipv6)
--connect-retry n [m] : For client, number of seconds to wait between
                  connection retries (default=5). On repeated retries
                  the wait time is exponentially increased to a maximum of m
                  (default=300).
--connect-retry-max n : Maximum connection attempt retries, default infinite.
--http-proxy s p [up] [auth] : Connect to remote host
                  through an HTTP proxy at address s and port p.
                  If proxy authentication is required,
                  up is a file containing username/password on 2 lines, or
                  'stdin' to prompt from console.  Add auth='ntlm' if
                  the proxy requires NTLM authentication.
--http-proxy s p 'auto[-nct]' : Like the above directive, but automatically
                  determine auth method and query for username/password
                  if needed.  auto-nct disables weak proxy auth methods.
--http-proxy-option type [parm] : Set extended HTTP proxy options.
                                  Repeat to set multiple options.
                  VERSION version (default=1.0)
                  AGENT user-agent
```

**NC:** ncat or nc is networking utility with functionality similar to cat command but for network. It is a general purpose CLI tool for reading, writing, redirecting data across a network. It is designed to be a reliable back-end tool that can be used with scripts or other programs.



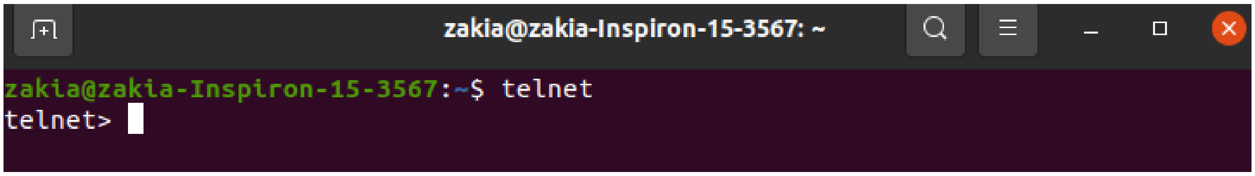
```
zakia@zakia-Inspiron-15-3567:~$ nc
usage: nc [-46CDdFhklNnrStUuvZz] [-I length] [-i interval] [-M ttl]
          [-m minttl] [-O length] [-P proxy_username] [-p source_port]
          [-q seconds] [-s source] [-T keyword] [-V rtable] [-W recvlimit] [-w timeout]
          [-X proxy_protocol] [-x proxy_address[:port]]           [destination] [port]
zakia@zakia-Inspiron-15-3567:~$ 
```

**SOCAT:** Socat is a command line based utility that establishes two bidirectional byte streams and transfers data between them.



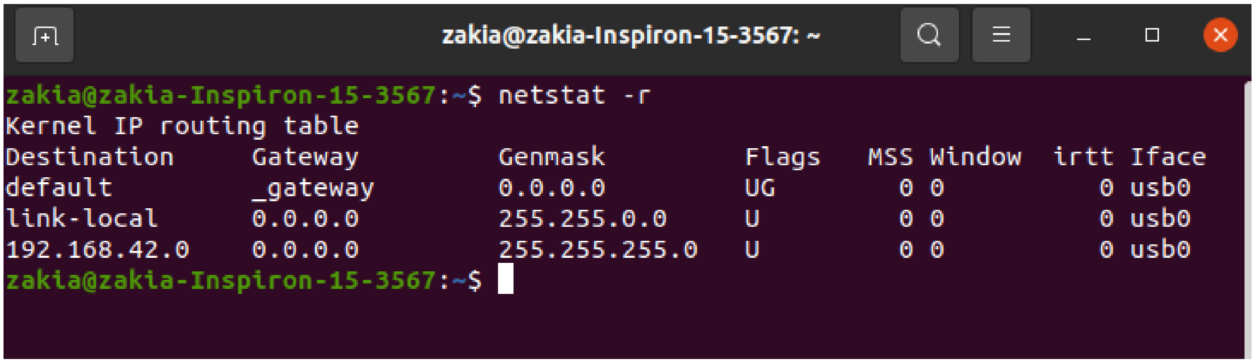
```
zakia@zakia-Inspiron-15-3567:~$ socat
2020/12/20 11:06:15 socat[7260] E exactly 2 addresses required (there are 0); use optio
n "-h" for help
zakia@zakia-Inspiron-15-3567:~$ 
```

**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. It uses a TELNET protocol. FTP/SFTP: FTP (File Transfer Protocol) is a standard network protocol used to transfer files to and from a remote network. ... However, the ftp command is useful when you work on a server without GUI and you want to transfer files over FTP to or from a remote server.



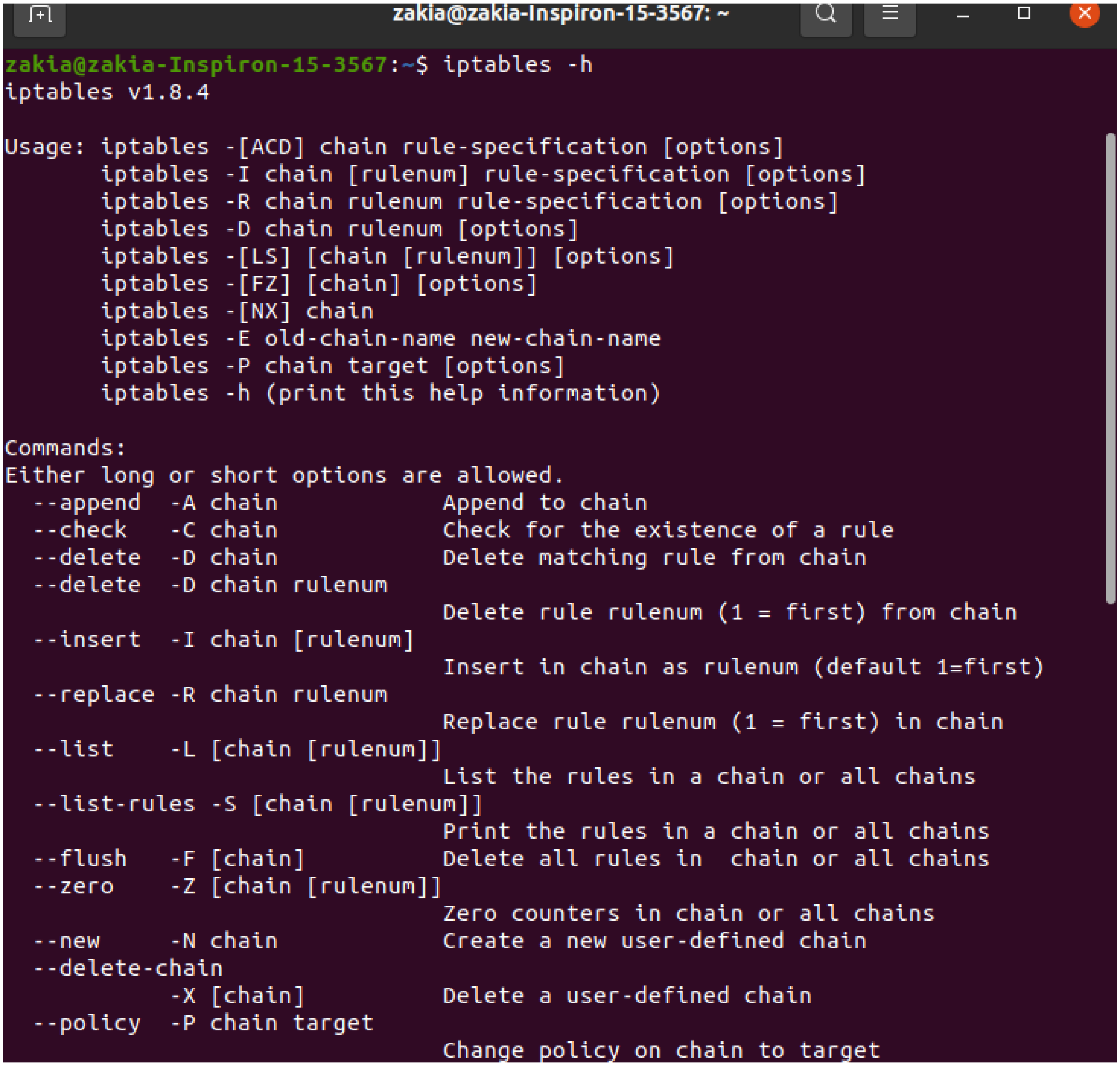
```
zakia@zakia-Inspiron-15-3567:~$ telnet
telnet> 
```

**NETSTAT/SS/LSOF/FUSER:** The netstat command generates displays that show network status and protocol statistics. You can display the status of TCP and UDP endpoints in table format, routing table information, and interface information. The most frequently used options for determining network status are: s , r , and i .



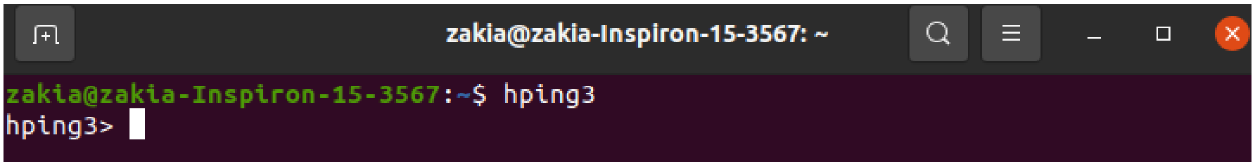
```
zakia@zakia-Inspiron-15-3567:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
default         _gateway        0.0.0.0         UG        0 0          0 usb0
link-local      0.0.0.0         255.255.0.0     U         0 0          0 usb0
192.168.42.0    0.0.0.0         255.255.255.0   U         0 0          0 usb0
zakia@zakia-Inspiron-15-3567:~$ 
```

**IPTABLES**: iptables is a command line interface used to set up and maintain tables for the Netfilter firewall for IPv4, included in the Linux kernel. The firewall matches packets with rules defined in these tables and then takes the specified action on a possible match. Tables is the name for a set of chains.



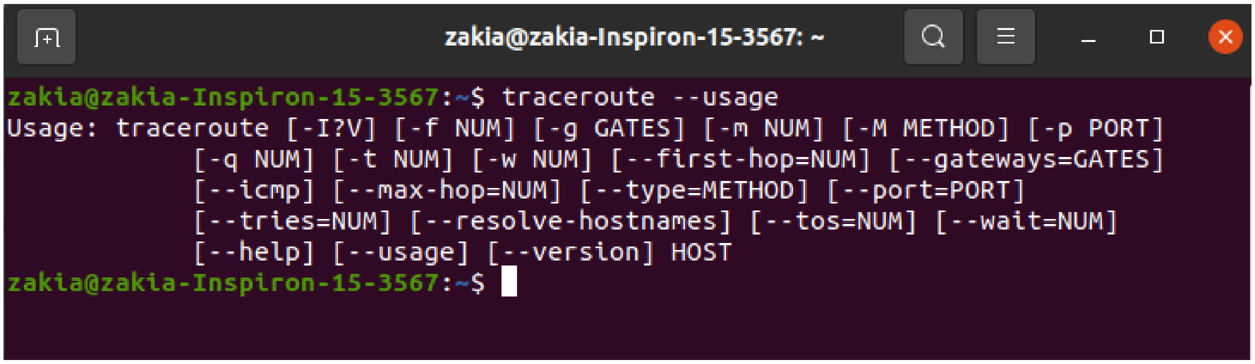
```
zakia@zakia-Inspiron-15-3567:~$ iptables -h
iptables v1.8.4

Usage: iptables -[ACD] chain rule-specification [options]
       iptables -I chain [rulenum] rule-specification [options]
       iptables -R chain rulenum rule-specification [options]
       iptables -D chain rulenum [options]
       iptables -[LS] [chain [rulenum]] [options]
       iptables -[FZ] [chain] [options]
       iptables -[NX] chain
       iptables -E old-chain-name new-chain-name
       iptables -P chain target [options]
       iptables -h (print this help information)

Commands:
Either long or short options are allowed.
  --append  -A chain            Append to chain
  --check   -C chain            Check for the existence of a rule
  --delete  -D chain            Delete matching rule from chain
  --delete  -D chain rulenum
                                Delete rule rulenum (1 = first) from chain
  --insert  -I chain [rulenum]
                                Insert in chain as rulenum (default 1=first)
  --replace -R chain rulenum
                                Replace rule rulenum (1 = first) in chain
  --list    -L [chain [rulenum]]
                                List the rules in a chain or all chains
  --list-rules -S [chain [rulenum]]
                                Print the rules in a chain or all chains
  --flush   -F [chain]          Delete all rules in  chain or all chains
  --zero    -Z [chain [rulenum]]
                                Zero counters in chain or all chains
  --new     -N chain            Create a new user-defined chain
  --delete-chain
            -X [chain]          Delete a user-defined chain
  --policy  -P chain target
                                Change policy on chain to target
```

**HPING3:** hping is a command-line oriented TCP/IP packet assembler/analyzer. The interface is inspired to the ping(8) unix command, but hping isn't only able to send ICMP echo requests. It supports TCP, UDP, ICMP and RAW-IP protocols, has a traceroute mode, the ability to send files between a covered channel, and many other features.



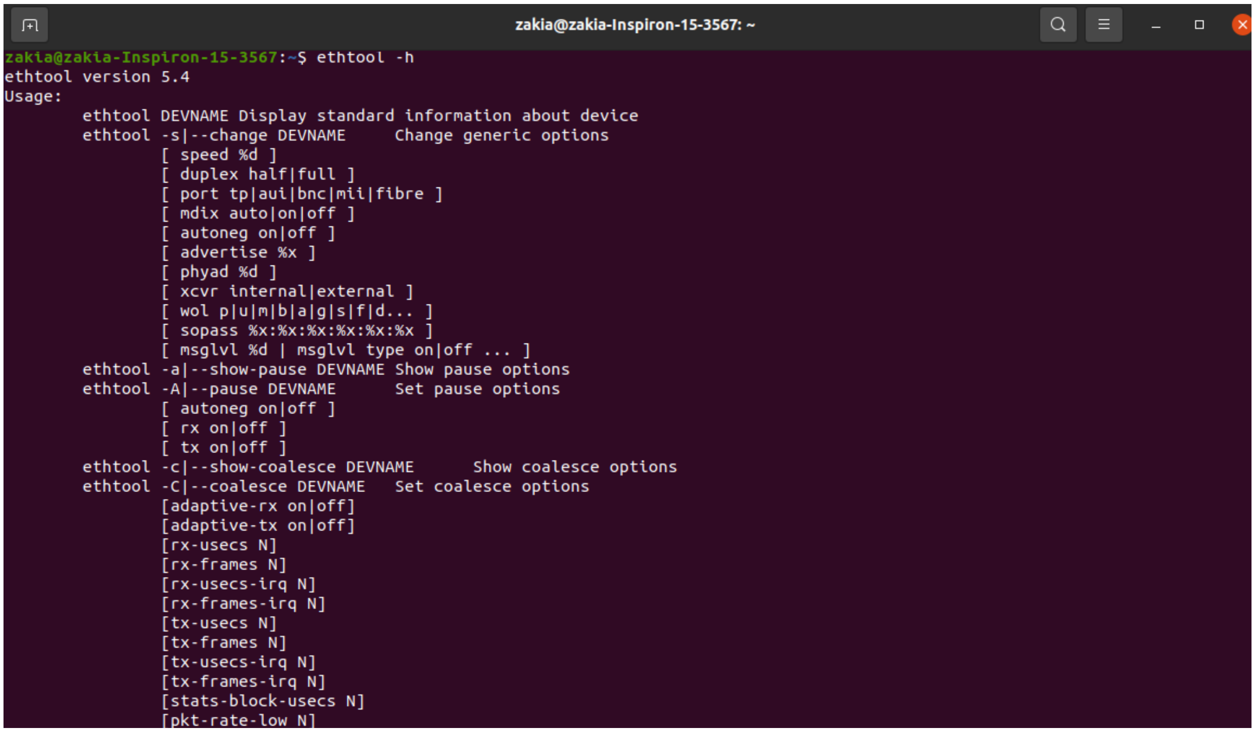
```
zakia@zakia-Inspiron-15-3567:~$ hping3
hping3> 
```

**TRACEROUTE/MTR:** traceroute command in Linux prints the route that a packet takes to reach the host. This command is useful when you want to know about the route and about all the hops that a packet takes.



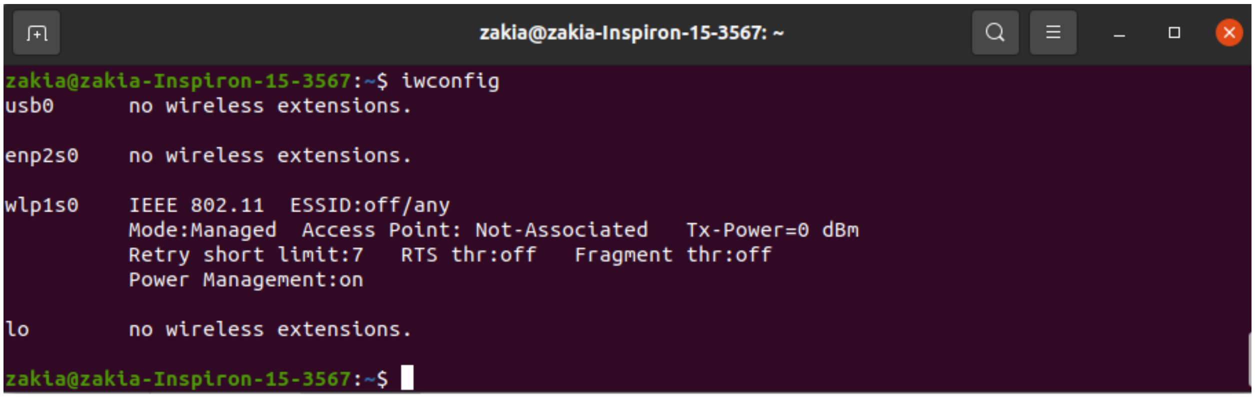
```
zakia@zakia-Inspiron-15-3567:~$ traceroute --usage
Usage: traceroute [-I?V] [-f NUM] [-g GATES] [-m NUM] [-M METHOD] [-p PORT]
            [-q NUM] [-t NUM] [-w NUM] [--first-hop=NUM] [--gateways=GATES]
            [--icmp] [--max-hop=NUM] [--type=METHOD] [--port=PORT]
            [--tries=NUM] [--resolve-hostnames] [--tos=NUM] [--wait=NUM]
            [--help] [--usage] [--version] HOST
zakia@zakia-Inspiron-15-3567:~$ 
```

**ETHTOOL:** The ethtool command is used to display/change Ethernet adapter settings. You can change network card speed, auto-negotiation, wake on LAN setting, duplex mode using this tool in Linux.



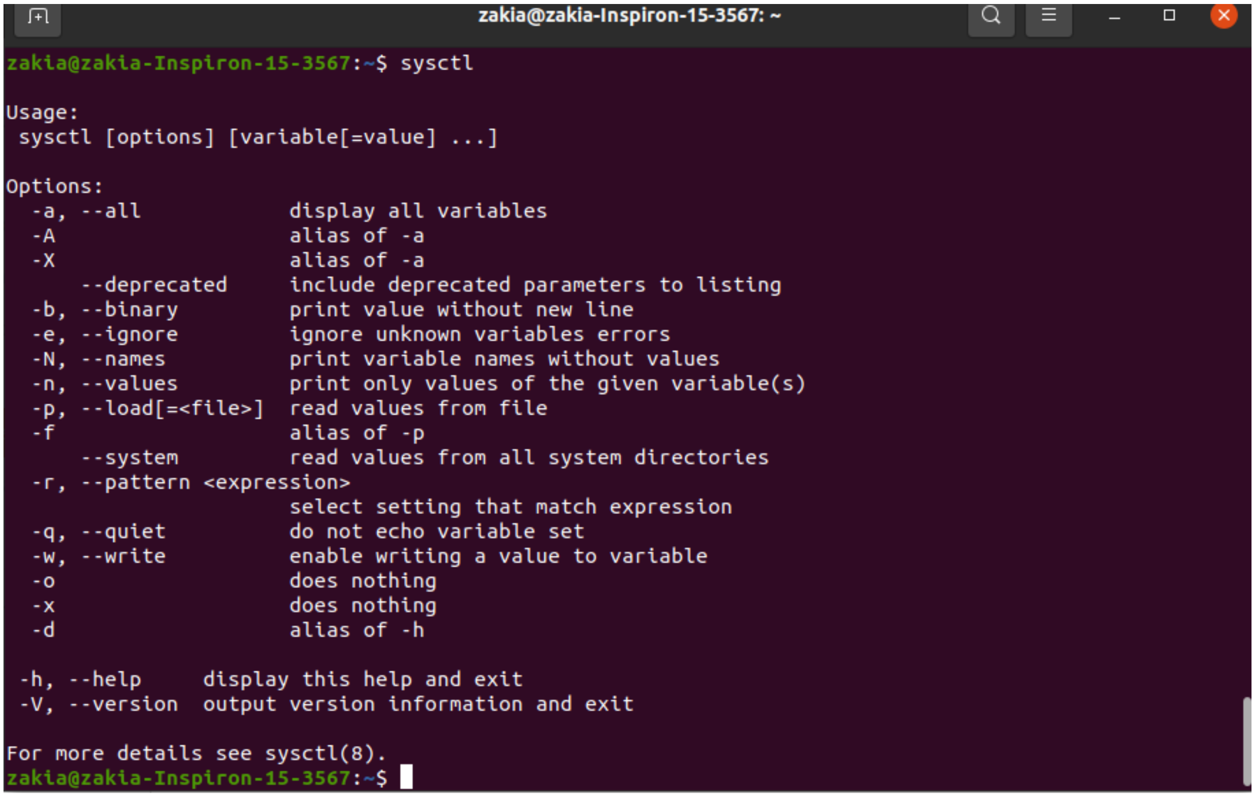
```
zakia@zakia-Inspiron-15-3567:~$ ethtool -h
ethtool version 5.4
Usage:
        ethtool DEVNAME Display standard information about device
        ethtool -s|--change DEVNAME     Change generic options
                [ speed %d ]
                [ duplex half|full ]
                [ port tp|aui|bnc|mii|fibre ]
                [ mdix auto|on|off ]
                [ autoneg on|off ]
                [ advertise %x ]
                [ phyad %d ]
                [ xcvr internal|external ]
                [ wol p|u|m|b|a|g|s|f|d... ]
                [ sopass %x:%x:%x:%x:%x:%x ]
                [ msglvl %d | msglvl type on|off ... ]
        ethtool -a|--show-pause DEVNAME Show pause options
        ethtool -A|--pause DEVNAME      Set pause options
                [ autoneg on|off ]
                [ rx on|off ]
                [ tx on|off ]
        ethtool -c|--show-coalesce DEVNAME      Show coalesce options
        ethtool -C|--coalesce DEVNAME   Set coalesce options
                [adaptive-rx on|off]
                [adaptive-tx on|off]
                [rx-usecs N]
                [rx-frames N]
                [rx-usecs-irq N]
                [rx-frames-irq N]
                [tx-usecs N]
                [tx-frames N]
                [tx-usecs-irq N]
                [tx-frames-irq N]
                [stats-block-usecs N]
                [pkt-rate-low N]
```

**IW/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.



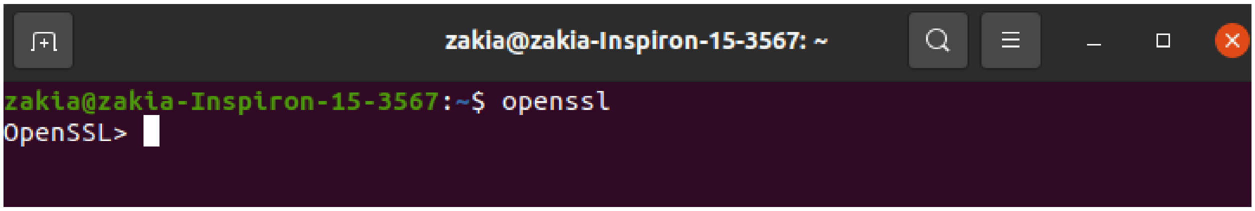
```
zakia@zakia-Inspiron-15-3567:~$ iwconfig
usb0      no wireless extensions.

enp2s0    no wireless extensions.

wlp1s0    IEEE 802.11  ESSID:off/any
          Mode:Managed  Access Point: Not-Associated   Tx-Power=0 dBm
          Retry short limit:7   RTS thr:off   Fragment thr:off
          Power Management:on

lo        no wireless extensions.

zakia@zakia-Inspiron-15-3567:~$
```

**SYSCTL:** The sysctl command reads the information from the /proc/sys directory. /proc/sys is a virtual directory that contains file objects that can be used to view and set the current kernel parameters. You can also view a parameter value by displaying the content of the appropriate file.



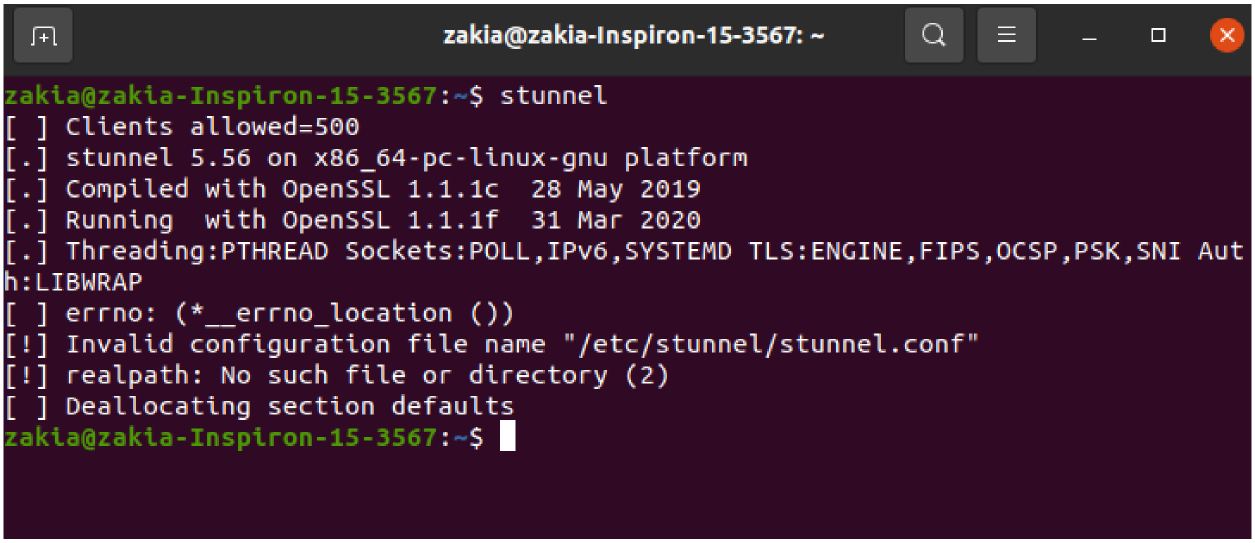
```
zakia@zakia-Inspiron-15-3567:~$ sysctl

Usage:
 sysctl [options] [variable[=value] ...]

Options:
  -a, --all            display all variables
  -A                   alias of -a
  -X                   alias of -a
      --deprecated     include deprecated parameters to listing
  -b, --binary         print value without new line
  -e, --ignore         ignore unknown variables errors
  -N, --names          print variable names without values
  -n, --values         print only values of the given variable(s)
  -p, --load[=<file>]  read values from file
  -f                   alias of -p
      --system         read values from all system directories
  -r, --pattern <expression>
                       select setting that match expression
  -q, --quiet          do not echo variable set
  -w, --write          enable writing a value to variable
  -o                   does nothing
  -x                   does nothing
  -d                   alias of -h

 -h, --help     display this help and exit
 -V, --version  output version information and exit

For more details see sysctl(8).
zakia@zakia-Inspiron-15-3567:~$
```

**OPENSSL:** OpenSSL is a versatile command line tool that can be used for a large variety of tasks ... This includes OpenSSL examples of generating private keys, certificate signing requests, and certificate format conversion.



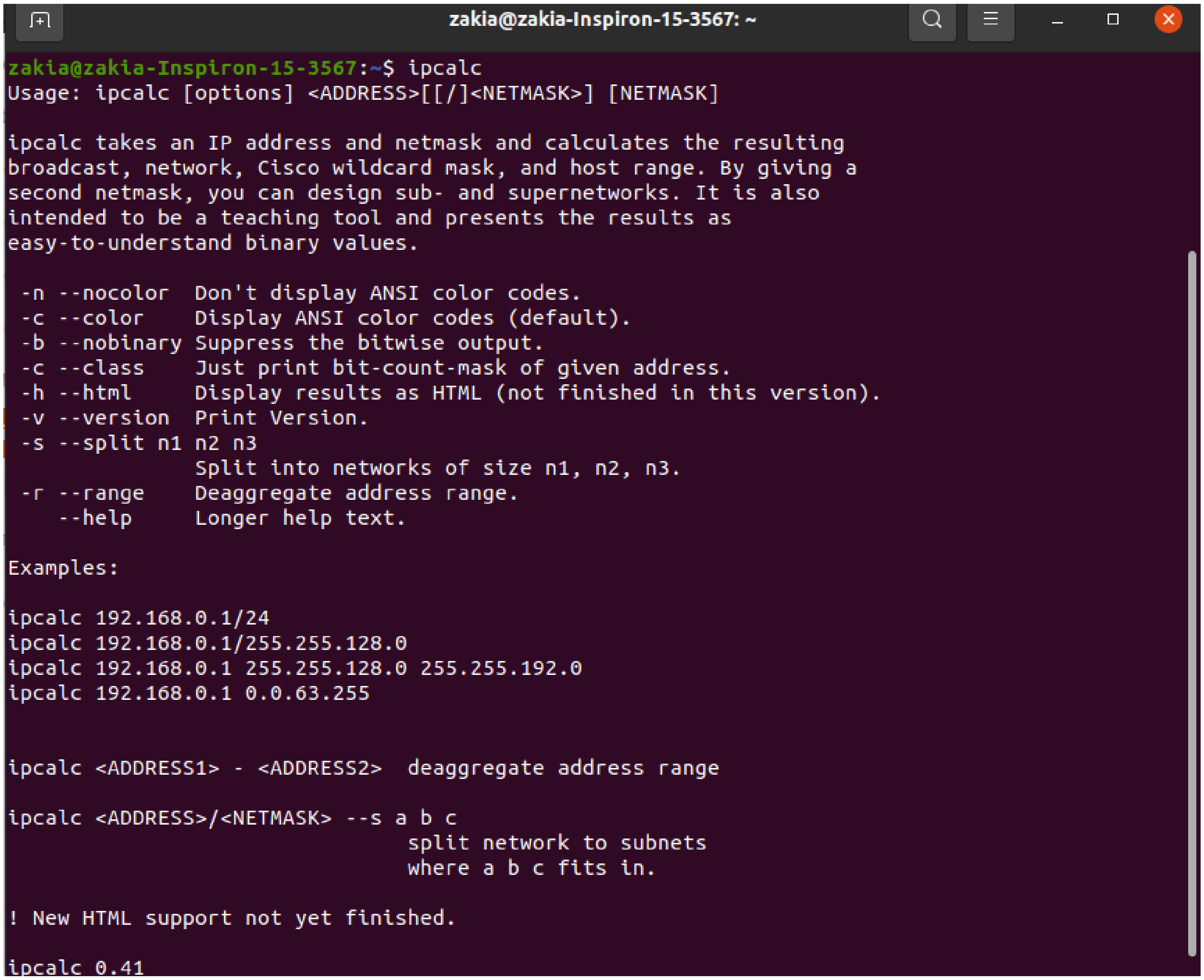
```
zakia@zakia-Inspiron-15-3567:~$ openssl
OpenSSL>
```

**STUNNEL:** Stunnel is an open-source multi-platform application used to provide a universal TLS/SSL tunneling service. Stunnel can be used to provide secure encrypted connections for clients or servers that do not speak TLS or SSL natively.



```
zakia@zakia-Inspiron-15-3567:~$ stunnel
[ ] Clients allowed=500
[.] stunnel 5.56 on x86_64-pc-linux-gnu platform
[.] Compiled with OpenSSL 1.1.1c  28 May 2019
[.] Running  with OpenSSL 1.1.1f  31 Mar 2020
[.] Threading:PTHREAD Sockets:POLL,IPv6,SYSTEMD TLS:ENGINE,FIPS,OCSP,PSK,SNI Aut
h:LIBWRAP
[ ] errno: (*__errno_location ())
[!] Invalid configuration file name "/etc/stunnel/stunnel.conf"
[!] realpath: No such file or directory (2)
[ ] Deallocating section defaults
zakia@zakia-Inspiron-15-3567:~$
```

## IPCALC:



```
zakia@zakia-Inspiron-15-3567:~$ ipcalc
Usage: ipcalc [options] <ADDRESS>[[/]<NETMASK>] [NETMASK]

ipcalc takes an IP address and netmask and calculates the resulting
broadcast, network, Cisco wildcard mask, and host range. By giving a
second netmask, you can design sub- and supernetworks. It is also
intended to be a teaching tool and presents the results as
easy-to-understand binary values.

 -n --nocolor  Don't display ANSI color codes.
 -c --color    Display ANSI color codes (default).
 -b --nobinary Suppress the bitwise output.
 -c --class    Just print bit-count-mask of given address.
 -h --html     Display results as HTML (not finished in this version).
 -v --version  Print Version.
 -s --split n1 n2 n3
               Split into networks of size n1, n2, n3.
 -r --range    Deaggregate address range.
    --help     Longer help text.

Examples:

ipcalc 192.168.0.1/24
ipcalc 192.168.0.1/255.255.128.0
ipcalc 192.168.0.1 255.255.128.0 255.255.192.0
ipcalc 192.168.0.1 0.0.63.255


ipcalc <ADDRESS1> - <ADDRESS2>  deaggregate address range

ipcalc <ADDRESS>/<NETMASK> --s a b c
                                split network to subnets
                                where a b c fits in.

! New HTML support not yet finished.

ipcalc 0.41
```