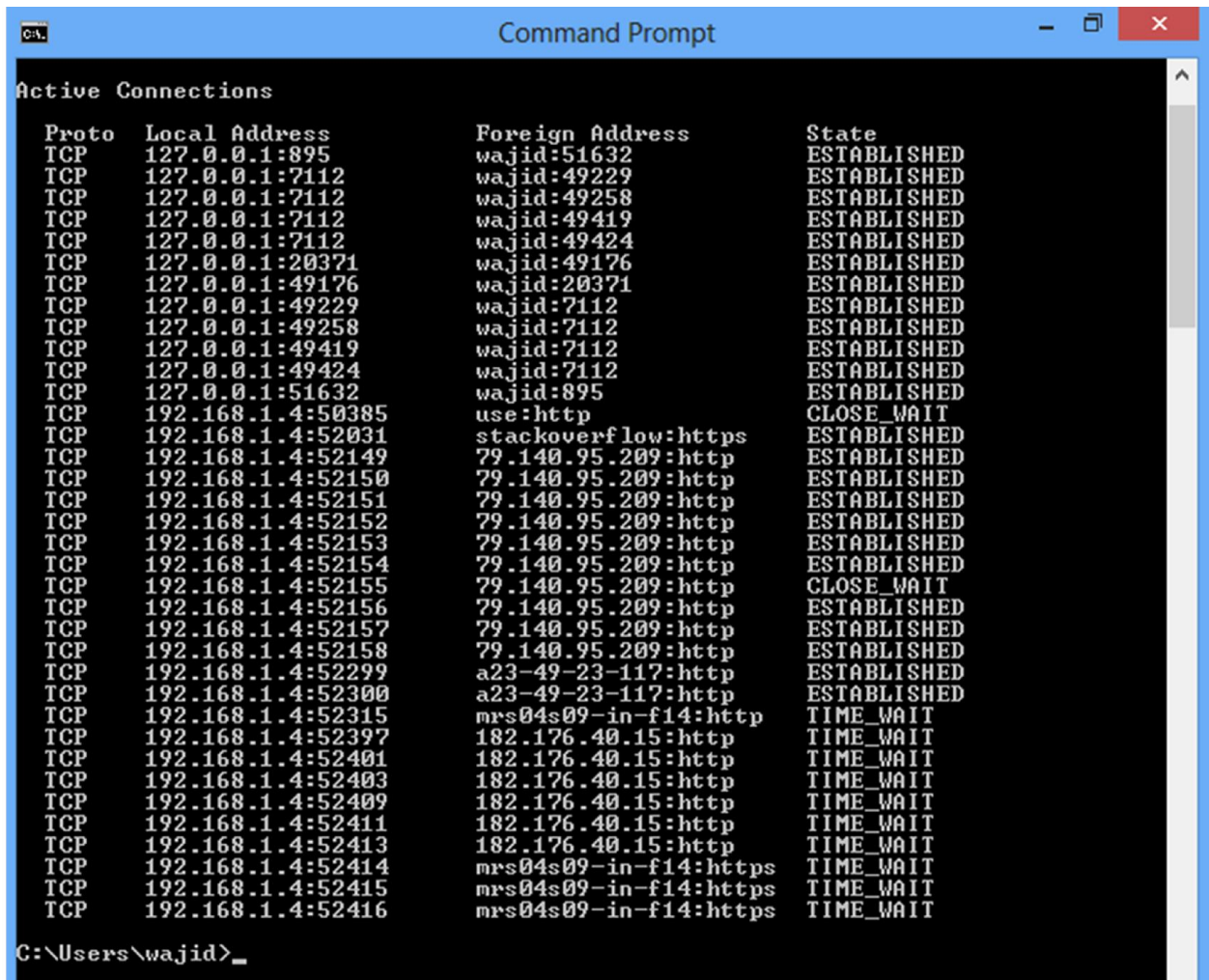


# TCP connection

## To See Active Network Connections (Windows)

**netstat:** shows a list of your current TCP connections and ports, with the physical computer name listed for local addresses and the host name listed for remote addresses. It will also tell you the state of the port (waiting, established, etc...)



```
Command Prompt

Active Connections

Proto Local Address Foreign Address State
TCP 127.0.0.1:895 wajid:51632 ESTABLISHED
TCP 127.0.0.1:7112 wajid:49229 ESTABLISHED
TCP 127.0.0.1:7112 wajid:49258 ESTABLISHED
TCP 127.0.0.1:7112 wajid:49419 ESTABLISHED
TCP 127.0.0.1:7112 wajid:49424 ESTABLISHED
TCP 127.0.0.1:20371 wajid:49176 ESTABLISHED
TCP 127.0.0.1:49176 wajid:20371 ESTABLISHED
TCP 127.0.0.1:49229 wajid:7112 ESTABLISHED
TCP 127.0.0.1:49258 wajid:7112 ESTABLISHED
TCP 127.0.0.1:49419 wajid:7112 ESTABLISHED
TCP 127.0.0.1:49424 wajid:7112 ESTABLISHED
TCP 127.0.0.1:51632 wajid:895 ESTABLISHED
TCP 192.168.1.4:50385 use:http CLOSE_WAIT
TCP 192.168.1.4:52031 stackoverflow:https ESTABLISHED
TCP 192.168.1.4:52149 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52150 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52151 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52152 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52153 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52154 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52155 79.140.95.209:https CLOSE_WAIT
TCP 192.168.1.4:52156 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52157 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52158 79.140.95.209:https ESTABLISHED
TCP 192.168.1.4:52299 a23-49-23-117:https ESTABLISHED
TCP 192.168.1.4:52300 a23-49-23-117:https ESTABLISHED
TCP 192.168.1.4:52315 mrs04s09-in-f14:https TIME_WAIT
TCP 192.168.1.4:52397 182.176.40.15:https TIME_WAIT
TCP 192.168.1.4:52401 182.176.40.15:https TIME_WAIT
TCP 192.168.1.4:52403 182.176.40.15:https TIME_WAIT
TCP 192.168.1.4:52409 182.176.40.15:https TIME_WAIT
TCP 192.168.1.4:52411 182.176.40.15:https TIME_WAIT
TCP 192.168.1.4:52413 182.176.40.15:https TIME_WAIT
TCP 192.168.1.4:52414 mrs04s09-in-f14:https TIME_WAIT
TCP 192.168.1.4:52415 mrs04s09-in-f14:https TIME_WAIT
TCP 192.168.1.4:52416 mrs04s09-in-f14:https TIME_WAIT

C:\Users\wajid>
```

**Netstat -s:** Displays statistics by protocol. By default, statistics are shown for the TCP, UDP, ICMP, and IP protocols. If the IPv6 protocol for Windows XP is installed, statistics are shown for the TCP over IPv6, UDP over IPv6, ICMPv6, and IPv6 protocols. The **-p** parameter can be used to specify a set of protocols

```
Command Prompt

C:\Users\wajid>netstat -s

IPv4 Statistics

Packets Received                = 11278
Received Header Errors          = 8
Received Address Errors         = 0
Datagrams Forwarded             = 0
Unknown Protocols Received      = 0
Received Packets Discarded      = 94
Received Packets Delivered      = 12095
Output Requests                 = 18233
Routing Discards                = 0
Discarded Output Packets        = 44
Output Packet No Route          = 35
Reassembly Required             = 0
Reassembly Successful           = 0
Reassembly Failures             = 0
Datagrams Successfully Fragmented = 0
Datagrams Failing Fragmentation = 0
Fragments Created               = 0

IPv6 Statistics

Packets Received                = 89
Received Header Errors          = 0
Received Address Errors         = 0
Datagrams Forwarded             = 0
Unknown Protocols Received      = 0
Received Packets Discarded      = 32
Received Packets Delivered      = 112
Output Requests                 = 349
Routing Discards                = 0
Discarded Output Packets        = 0
Output Packet No Route          = 18
Reassembly Required             = 0
Reassembly Successful           = 0
Reassembly Failures             = 0
Datagrams Successfully Fragmented = 0
Datagrams Failing Fragmentation = 0
Fragments Created               = 0

ICMPv4 Statistics

Messages      Received      Sent
Errors        0             0
Destination Unreachable 10             57
Time Exceeded 0             0
Parameter Problems  0             0
Source Quenches 0             0
Redirects       0             0
Echo Replies    0             0
Echos          0             0
Timestamps      0             0
Timestamp Replies 0             0
```

C:\

## Command Prompt

Timestamp Replies	0	0
Address Masks	0	0
Address Mask Replies	0	0
Router Solicitations	0	0
Router Advertisements	0	0

## ICMPv6 Statistics

	Received	Sent
Messages	68	36
Errors	0	0
Destination Unreachable	0	0
Packet Too Big	0	0
Time Exceeded	0	0
Parameter Problems	0	0
Echos	0	0
Echo Replies	0	0
MLD Queries	4	0
MLD Reports	0	0
MLD Dones	0	0
Router Solicitations	0	18
Router Advertisements	58	0
Neighbor Solicitations	3	9
Neighbor Advertisements	3	9
Redirects	0	0
Router Renumberings	0	0

## TCP Statistics for IPv4

Active Opens	= 1310
Passive Opens	= 913
Failed Connection Attempts	= 10
Reset Connections	= 724
Current Connections	= 110
Segments Received	= 116466
Segments Sent	= 115195
Segments Retransmitted	= 599

## TCP Statistics for IPv6

Active Opens	= 2
Passive Opens	= 0
Failed Connection Attempts	= 2
Reset Connections	= 0
Current Connections	= 0
Segments Received	= 12
Segments Sent	= 8
Segments Retransmitted	= 4

## UDP Statistics for IPv4

Datagrams Received	= 916
No Ports	= 112
Receive Errors	= 0
Datagrams Sent	= 1926

## UDP Statistics for IPv6

```
Command Prompt

UDP Statistics for IPv6
Datagrams Received    = 38
No Ports              = 32
Receive Errors        = 0
Datagrams Sent        = 469

C:\Users\wajid>_
```

**NETSTAT -b :** Displays the executable involved in creating each connection or listening port. In some cases well-known executable host multiple independent components, and in these cases the sequence of components involved in creating the connection or listening port is displayed. In this case the executable name is in [] at the bottom, on top is the component it called, and so forth until TCP/IP was reached. Note that this option can be time-consuming and will fail unless you have sufficient permissions.

```
Command Prompt

C:\Users\wajid>netstat -b
The requested operation requires elevation.

C:\Users\wajid>_
```

**netstat -n:** shows you the same list of TCP connections and ports, but with numerical, or ip addresses instead of the actual names of the computers or services.

```
Command Prompt

C:\Users\wajid>netstat -n

Active Connections

    Proto Local Address          Foreign Address         State
    TCP    127.0.0.1:895           127.0.0.1:51632         ESTABLISHED
    TCP    127.0.0.1:7112         127.0.0.1:49229         ESTABLISHED
    TCP    127.0.0.1:7112         127.0.0.1:49258         ESTABLISHED
    TCP    127.0.0.1:7112         127.0.0.1:49419         ESTABLISHED
    TCP    127.0.0.1:7112         127.0.0.1:49424         ESTABLISHED
    TCP    127.0.0.1:20371        127.0.0.1:49176         ESTABLISHED
    TCP    127.0.0.1:49176        127.0.0.1:20371         ESTABLISHED
    TCP    127.0.0.1:49229        127.0.0.1:7112         ESTABLISHED
    TCP    127.0.0.1:49258        127.0.0.1:7112         ESTABLISHED
    TCP    127.0.0.1:49419        127.0.0.1:7112         ESTABLISHED
    TCP    127.0.0.1:49424        127.0.0.1:7112         ESTABLISHED
    TCP    127.0.0.1:51632        127.0.0.1:895           ESTABLISHED
    TCP    192.168.1.4:50385      192.229.233.37:80        CLOSE_WAIT
    TCP    192.168.1.4:52031      198.252.206.25:443       ESTABLISHED
    TCP    192.168.1.4:52149      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52150      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52151      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52152      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52153      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52154      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52155      79.140.95.209:80         CLOSE_WAIT
    TCP    192.168.1.4:52156      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52157      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52158      79.140.95.209:80         ESTABLISHED
    TCP    192.168.1.4:52299      23.49.23.117:80          ESTABLISHED
    TCP    192.168.1.4:52300      23.49.23.117:80          ESTABLISHED
    TCP    192.168.1.4:52315      216.58.210.206:80        TIME_WAIT

C:\Users\wajid>
```



**netstat -a** : shows you a complete list of all connections on all protocols which are currently active on your machine. This list is not exhaustive, as it only shows the protocols that windows determine are relevant (typically TCP and UDP - ICMP and the like are not shown).

```
C:\Users\wajid>netstat -a

Active Connections

Proto Local Address           Foreign Address         State
TCP   0.0.0.0:135              wajid:0                 LISTENING
TCP   0.0.0.0:445              wajid:0                 LISTENING
TCP   0.0.0.0:895              wajid:0                 LISTENING
TCP   0.0.0.0:7112             wajid:0                 LISTENING
TCP   0.0.0.0:49152            wajid:0                 LISTENING
TCP   0.0.0.0:49153            wajid:0                 LISTENING
TCP   0.0.0.0:49154            wajid:0                 LISTENING
TCP   0.0.0.0:49155            wajid:0                 LISTENING
TCP   0.0.0.0:49158            wajid:0                 LISTENING
TCP   127.0.0.1:895            wajid:51632             ESTABLISHED
TCP   127.0.0.1:896            wajid:0                 LISTENING
TCP   127.0.0.1:1001           wajid:0                 LISTENING
TCP   127.0.0.1:7112           wajid:49229             ESTABLISHED
TCP   127.0.0.1:7112           wajid:49258             ESTABLISHED
TCP   127.0.0.1:7112           wajid:49419             ESTABLISHED
TCP   127.0.0.1:7112           wajid:49424             ESTABLISHED
TCP   127.0.0.1:20371          wajid:0                 LISTENING
TCP   127.0.0.1:20371          wajid:49176             ESTABLISHED
TCP   127.0.0.1:49176          wajid:20371             ESTABLISHED
TCP   127.0.0.1:49229          wajid:7112              ESTABLISHED
TCP   127.0.0.1:49258          wajid:7112              ESTABLISHED
TCP   127.0.0.1:49414          wajid:0                 LISTENING
TCP   127.0.0.1:49419          wajid:7112              ESTABLISHED
TCP   127.0.0.1:49424          wajid:7112              ESTABLISHED
TCP   127.0.0.1:49535          wajid:0                 LISTENING
TCP   127.0.0.1:50287          wajid:0                 LISTENING
TCP   127.0.0.1:50395          wajid:0                 LISTENING
TCP   127.0.0.1:51628          wajid:0                 LISTENING
TCP   127.0.0.1:51632          wajid:895               ESTABLISHED
TCP   192.168.1.4:139          wajid:0                 LISTENING
TCP   192.168.1.4:50385        use:http                 CLOSE_WAIT
TCP   192.168.1.4:52031        stackoverflow:https      ESTABLISHED
TCP   192.168.1.4:52149        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52150        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52151        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52152        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52153        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52154        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52155        79.140.95.209:http      CLOSE_WAIT
TCP   192.168.1.4:52156        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52157        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52158        79.140.95.209:http      ESTABLISHED
TCP   192.168.1.4:52299        a23-49-23-117:http      ESTABLISHED
TCP   192.168.1.4:52300        a23-49-23-117:http      ESTABLISHED
TCP   192.168.56.1:139        wajid:0                 LISTENING
TCP   [::]:135                 wajid:0                 LISTENING
TCP   [::]:445                 wajid:0                 LISTENING
TCP   [::]:49152               wajid:0                 LISTENING
TCP   [::]:49153               wajid:0                 LISTENING
TCP   [::]:49154               wajid:0                 LISTENING
TCP   [::]:49155               wajid:0                 LISTENING
```

## netstat -a

```
Command Prompt

TCP        [::]:49155          wajid:0          LISTENING
TCP        [::]:49158          wajid:0          LISTENING
TCP        [::]:49156          wajid:0          LISTENING
UDP        0.0.0.0:68         *:              *:
UDP        0.0.0.0:68         *:              *:
UDP        0.0.0.0:123        *:              *:
UDP        0.0.0.0:500        *:              *:
UDP        0.0.0.0:1900       *:              *:
UDP        0.0.0.0:4500        *:              *:
UDP        0.0.0.0:5355        *:              *:
UDP        127.0.0.1:1900       *:              *:
UDP        127.0.0.1:53082      *:              *:
UDP        127.0.0.1:56071      *:              *:
UDP        127.0.0.1:58078      *:              *:
UDP        192.168.1.4:137      *:              *:
UDP        192.168.1.4:138      *:              *:
UDP        192.168.1.4:1900     *:              *:
UDP        192.168.1.4:58076    *:              *:
UDP        192.168.56.1:137     *:              *:
UDP        192.168.56.1:138     *:              *:
UDP        192.168.56.1:1900     *:              *:
UDP        192.168.56.1:58077   *:              *:
UDP        [::]:123           *:              *:
UDP        [::]:500           *:              *:
UDP        [::]:4500           *:              *:
UDP        [::]:5355           *:              *:
UDP        [::]:1900           *:              *:
UDP        [::]:58075          *:              *:
UDP        [fe80::515c:87b7:5e6d:6f9a%20]:546 *:
UDP        [fe80::515c:87b7:5e6d:6f9a%20]:546 *:
UDP        [fe80::515c:87b7:5e6d:6f9a%20]:1900 *:
UDP        [fe80::515c:87b7:5e6d:6f9a%20]:58074 *:
UDP        [fe80::91d6:71d5:a851:3a80%13]:546 *:
UDP        [fe80::91d6:71d5:a851:3a80%13]:546 *:
UDP        [fe80::91d6:71d5:a851:3a80%13]:1900 *:
UDP        [fe80::91d6:71d5:a851:3a80%13]:58073 *:

C:\Users\wajid>
```

**netstat /?** : If you would like to see them all, type netstat /? for a complete listing and partial description (provided you have the background knowledge on what they imply).

```
Command Prompt

C:\Users\wajid>netstat -b
The requested operation requires elevation.

C:\Users\wajid>netstat/?

Displays protocol statistics and current TCP/IP network connections.

NETSTAT [-a] [-b] [-e] [-f] [-n] [-o] [-p proto] [-r] [-s] [-x] [-t] [interval]

-a          Displays all connections and listening ports.
-b          Displays the executable involved in creating each connection or
           listening port. In some cases well-known executables host
           multiple independent components, and in these cases the
           sequence of components involved in creating the connection
           or listening port is displayed. In this case the executable
           name is in [] at the bottom, on top is the component it called,
           and so forth until TCP/IP was reached. Note that this option
           can be time-consuming and will fail unless you have sufficient
           permissions.
-e          Displays Ethernet statistics. This may be combined with the -s
           option.
-f          Displays Fully Qualified Domain Names (FQDN) for foreign
           addresses.
-n          Displays addresses and port numbers in numerical form.
-o          Displays the owning process ID associated with each connection.
-p proto    Shows connections for the protocol specified by proto; proto
           may be any of: TCP, UDP, TCPv6, or UDPv6. If used with the -s
           option to display per-protocol statistics, proto may be any of:
           IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
-r          Displays the routing table.
-s          Displays per-protocol statistics. By default, statistics are
           shown for IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, and UDPv6;
           the -p option may be used to specify a subset of the default.
-t          Displays the current connection offload state.
-x          Displays NetworkDirect connections, listeners, and shared
           endpoints.
-y          Displays the TCP connection template for all connections.
           Cannot be combined with the other options.
interval    Redisplays selected statistics, pausing interval seconds
           between each display. Press CTRL+C to stop redisplaying
           statistics. If omitted, netstat will print the current
           configuration information once.

C:\Users\wajid>_
```



## Tracert: trace a path

```
Command Prompt

C:\Users\wajid>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
              [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d          Do not resolve addresses to hostnames.
    -h maximum_hops  Maximum number of hops to search for target.
    -j host-list  Loose source route along host-list (IPv4-only).
    -w timeout    Wait timeout milliseconds for each reply.
    -R          Trace round-trip path (IPv6-only).
    -S srcaddr    Source address to use (IPv6-only).
    -4          Force using IPv4.
    -6          Force using IPv6.

C:\Users\wajid>tracert www.google.com

Tracing route to www.google.com [216.58.209.164]
over a maximum of 30 hops:

  1      2 ms      2 ms      6 ms  Broadcom.Home [192.168.1.1]
  2     26 ms     35 ms     80 ms  182.176.0.53
  3    256 ms    172 ms    331 ms  10.0.1.2
  4    256 ms    209 ms    227 ms  203.99.170.250
  5     80 ms     65 ms     82 ms  rwp44.pie.net.pk [221.120.253.221]
  6    123 ms     74 ms     60 ms  static-khi275-P02-pie.net.pk [221.120.254.6]
  7    405 ms    338 ms    353 ms  static.khi77.pie.net.pk [202.125.128.171]
  8    540 ms    521 ms    553 ms  72.14.242.234
  9    670 ms    561 ms    371 ms  209.85.252.36
 10    617 ms    723 ms    766 ms  209.85.253.8
 11    459 ms      *      366 ms  72.14.232.78
 12    495 ms    466 ms    543 ms  209.85.241.213
 13    535 ms    400 ms    431 ms  66.249.95.61
 14    518 ms    510 ms    470 ms  bud02s21-in-f4.1e100.net [216.58.209.164]

Trace complete.

C:\Users\wajid>_
```

**Pathping:** for detail about packet forwarding and packet loss and each router and link in the path using pathping command.

```

C:\Users\wajid>pathping -n google.com

Tracing route to google.com [216.58.210.206]
over a maximum of 30 hops:
 0  192.168.1.4
 1  192.168.1.1
 2  182.176.0.53
 3  10.0.1.2
 4  203.99.170.250
 5  221.120.253.25
 6  221.120.254.6
 7  202.125.128.151
 8  72.14.242.234
 9  209.85.252.36
10  64.233.174.55
11  216.58.210.206

Computing statistics for 275 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
     RTT      Lost/Sent = Pct  Lost/Sent = Pct  Lost/Sent = Pct
 0    0ms      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      192.168.1.4
 1    2ms      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      192.168.1.1
 2   150ms     1/ 100 = 1%      1/ 100 = 1%      0/ 100 = 0%      182.176.0.53
 3    ---     100/ 100 =100%   100/ 100 =100%   0/ 100 = 0%      10.0.1.2
 4   153ms     2/ 100 = 2%      2/ 100 = 2%      0/ 100 = 0%      203.99.170.250
 5   202ms     2/ 100 = 2%      2/ 100 = 2%      0/ 100 = 0%      221.120.253.25
 6   187ms     2/ 100 = 2%      2/ 100 = 2%      0/ 100 = 0%      221.120.254.6
 7   179ms     4/ 100 = 4%      4/ 100 = 4%      0/ 100 = 0%      202.125.128.151
 8   415ms     0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      72.14.242.234
 9    ---     100/ 100 =100%   100/ 100 =100%   0/ 100 = 0%      209.85.252.36
10    ---     100/ 100 =100%   100/ 100 =100%   0/ 100 = 0%      64.233.174.55
11   388ms     0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      216.58.210.206

Trace complete.
C:\Users\wajid>_

```

**Ping:** verifies and tests connectivity

```

C:\
Command Prompt
Microsoft Windows [Version 6.2.9200]
(c) 2012 Microsoft Corporation. All rights reserved.

C:\Users\wajid>ping -t google.com

Pinging google.com [216.58.210.206] with 32 bytes of data:
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=276ms TTL=250
Reply from 216.58.210.206: bytes=32 time=274ms TTL=250
Reply from 216.58.210.206: bytes=32 time=275ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=274ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=285ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=271ms TTL=250
Reply from 216.58.210.206: bytes=32 time=279ms TTL=250
Reply from 216.58.210.206: bytes=32 time=274ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=275ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250
Reply from 216.58.210.206: bytes=32 time=272ms TTL=250
Reply from 216.58.210.206: bytes=32 time=273ms TTL=250

Ping statistics for 216.58.210.206:
    Packets: Sent = 36, Received = 36, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 271ms, Maximum = 285ms, Average = 273ms
Control-C
^C
C:\Users\wajid>
```

## Ipconfig: Display the current tcp/ip configuration

```

C:\Users\wajid>ipconfig

Windows IP Configuration

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 11:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : Home
    Link-local IPv6 Address . . . . . : fe80::91d6:71d5:a851:3a80%13
    IPv4 Address. . . . . : 192.168.1.4
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::515c:87b7:5e6d:6f9a%20
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Tunnel adapter isatap.Home:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : Home

Tunnel adapter Teredo Tunneling Pseudo-Interface:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Tunnel adapter isatap.{B5B43E83-D84F-4796-B31E-85FB80A664C0}:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

C:\Users\wajid>
```

## Route: Display or Modifies the local routing table

```
Command Prompt

C:\Users\wajid>route

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
      [MASK netmask] [gateway] [METRIC metric] [IF interface]

-f          Clears the routing tables of all gateway entries.  If this is
            used in conjunction with one of the commands, the tables are
            cleared prior to running the command.

-p          When used with the ADD command, makes a route persistent across
            boots of the system.  By default, routes are not preserved
            when the system is restarted.  Ignored for all other commands,
            which always affect the appropriate persistent routes.

-4          Force using IPv4.

-6          Force using IPv6.

command     One of these:
            PRINT      Prints a route
            ADD        Adds a route
            DELETE     Deletes a route
            CHANGE     Modifies an existing route

destination Specifies the host.
MASK          Specifies that the next parameter is the 'netmask' value.
netmask       Specifies a subnet mask value for this route entry.
            If not specified, it defaults to 255.255.255.255.
gateway       Specifies gateway.
interface     the interface number for the specified route.
METRIC        specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database
file NETWORKS.  The symbolic names for gateway are looked up in the host name
database file HOSTS.

If the command is PRINT or DELETE.  Destination or gateway can be a wildcard,
(wildcard is specified as a star '*'), or the gateway argument may be omitted.

If Dest contains a * or ?, it is treated as a shell pattern, and only
matching destination routes are printed.  The '*' matches any string,
and '?' matches any one char.  Examples: 157.*.1, 157.*, 127.*, *224*.

Pattern match is only allowed in PRINT command.

Diagnostic Notes:
  Invalid MASK generates an error, that is when <DEST & MASK> != DEST.
  Example> route ADD 157.0.0.0 MASK 155.0.0.0 157.55.80.1 IF 1
           The route addition failed: The specified mask parameter is invalid.
  <Destination & Mask> != Destination.

Examples:
  > route PRINT
  > route PRINT -4
  > route PRINT -6
  > route PRINT 157*          .... Only prints those matching 157*
```





## Command Prompt

C:\Users\wajid&gt;route PRINT

## Interface List

```
15...08 ed b9 87 0c 46 .....Bluetooth Device (Personal Area Network)
14...0a ed b9 87 0c 45 .....Microsoft Wi-Fi Direct Virtual Adapter
13...08 ed b9 87 0c 45 .....Dell Wireless 1704 802.11b/g/n (2.4GHz)
12...e0 db 55 96 13 60 .....Realtek PCIe FE Family Controller
20...08 00 27 00 3c 10 .....VirtualBox Host-Only Ethernet Adapter
1 .....Software Loopback Interface 1
17...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
18...00 00 00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
19...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #2
```

## IPv4 Route Table

## Active Routes:

Network	Destination	Netmask	Gateway	Interface	Metric
	0.0.0.0	0.0.0.0	192.168.1.1	192.168.1.4	25
	127.0.0.0	255.0.0.0	On-link	127.0.0.1	306
	127.0.0.1	255.255.255.255	On-link	127.0.0.1	306
127.255.255.255	255.255.255.255	255.255.255.255	On-link	127.0.0.1	306
192.168.1.0	255.255.255.0	On-link	192.168.1.4	281	
192.168.1.4	255.255.255.255	On-link	192.168.1.4	281	
192.168.1.255	255.255.255.255	On-link	192.168.1.4	281	
192.168.56.0	255.255.255.0	On-link	192.168.56.1	276	
192.168.56.1	255.255.255.255	On-link	192.168.56.1	276	
192.168.56.255	255.255.255.255	On-link	192.168.56.1	276	
224.0.0.0	240.0.0.0	On-link	127.0.0.1	306	
224.0.0.0	240.0.0.0	On-link	192.168.56.1	276	
224.0.0.0	240.0.0.0	On-link	192.168.1.4	281	
255.255.255.255	255.255.255.255	On-link	127.0.0.1	306	
255.255.255.255	255.255.255.255	On-link	192.168.56.1	276	
255.255.255.255	255.255.255.255	On-link	192.168.1.4	281	

## Persistent Routes:

None

## IPv6 Route Table

## Active Routes:

If	Metric	Network	Destination	Gateway
1	306	:::1/128		On-link
20	276	fe80::/64		On-link
13	281	fe80::/64		On-link
20	276	fe80::515c:87b7:5e6d:6f9a/128		On-link
13	281	fe80::91d6:71d5:a851:3a80/128		On-link
1	306	ff00::/8		On-link
20	276	ff00::/8		On-link
13	281	ff00::/8		On-link

## Persistent Routes:

None

C:\Users\wajid&gt;

## Route -4 : only show the ipv4 table

```
C:\Users\wajid>route PRINT -4
=====
Interface List
15...08 ed b9 87 0c 46 .....Bluetooth Device (Personal Area Network)
14...0a ed b9 87 0c 45 .....Microsoft Wi-Fi Direct Virtual Adapter
13...08 ed b9 87 0c 45 .....Dell Wireless 1704 802.11b/g/n (2.4GHz)
12...e0 db 55 96 13 60 .....Realtek PCIe FE Family Controller
20...08 00 27 00 3c 10 .....VirtualBox Host-Only Ethernet Adapter
1 .....Software Loopback Interface 1
17...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
18...00 00 00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
19...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #2
=====

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.1.1      192.168.1.4      306
127.0.0.0                  255.0.0.0        On-link          127.0.0.1        306
127.0.0.1                  255.255.255.255  On-link          127.0.0.1        306
127.255.255.255            255.255.255.255  On-link          127.0.0.1        306
192.168.1.0                255.255.255.0    On-link          192.168.1.4      286
192.168.1.4                255.255.255.255  On-link          192.168.1.4      286
192.168.1.255              255.255.255.255  On-link          192.168.1.4      286
192.168.56.0               255.255.255.0    On-link          192.168.56.1     276
192.168.56.1               255.255.255.255  On-link          192.168.56.1     276
192.168.56.255             255.255.255.255  On-link          192.168.56.1     276
224.0.0.0                  240.0.0.0        On-link          127.0.0.1        306
224.0.0.0                  240.0.0.0        On-link          192.168.56.1     276
224.0.0.0                  240.0.0.0        On-link          192.168.1.4      286
255.255.255.255            255.255.255.255  On-link          127.0.0.1        306
255.255.255.255            255.255.255.255  On-link          192.168.56.1     276
255.255.255.255            255.255.255.255  On-link          192.168.1.4      286
=====
Persistent Routes:
None
C:\Users\wajid>
```

**Route -6** : only show the ipv6 routing table

```
Command Prompt

C:\Users\wajid>route PRINT -6
=====
Interface List
15...08 ed b9 87 0c 46 .....Bluetooth Device (Personal Area Network)
14...0a ed b9 87 0c 45 .....Microsoft Wi-Fi Direct Virtual Adapter
13...08 ed b9 87 0c 45 .....Dell Wireless 1704 802.11b/g/n (2.4GHz)
12...e0 db 55 96 13 60 .....Realtek PCIe FE Family Controller
20...08 00 27 00 3c 10 .....VirtualBox Host-Only Ethernet Adapter
1.....Software Loopback Interface 1
17...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
18...00 00 00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
19...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #2
=====

IPv6 Route Table
=====
Active Routes:
  If Metric Network Destination      Gateway
  1       306 ::1/128                  On-link
  20      276 fe80::/64                On-link
  13      286 fe80::/64                On-link
  20      276 fe80::515c:87b7:5e6d:6f9a/128
                                On-link
  13      286 fe80::91d6:71d5:a851:3a80/128
                                On-link
  1       306 ff00::/8                    On-link
  20      276 ff00::/8                    On-link
  13      286 ff00::/8                    On-link
=====
Persistent Routes:
None
C:\Users\wajid>_
```

## Arp: Display the cache of locally IP address

```
Command Prompt

C:\Users\wajid>arp

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

-a          Displays current ARP entries by interrogating the current
            protocol data. If inet_addr is specified, the IP and Physical
            addresses for only the specified computer are displayed. If
            more than one network interface uses ARP, entries for each ARP
            table are displayed.
-g          Same as -a.
-v          Displays current ARP entries in verbose mode. All invalid
            entries and entries on the loop-back interface will be shown.
inet_addr  Specifies an internet address.
-N if_addr Displays the ARP entries for the network interface specified
            by if_addr.
-d          Deletes the host specified by inet_addr. inet_addr may be
            wildcarded with * to delete all hosts.
-s          Adds the host and associates the Internet address inet_addr
            with the Physical address eth_addr. The Physical address is
            given as 6 hexadecimal bytes separated by hyphens. The entry
            is permanent.
eth_addr   Specifies a physical address.
if_addr    If present, this specifies the Internet address of the
            interface whose address translation table should be modified.
            If not present, the first applicable interface will be used.

Example:
> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
> arp -a              .... Displays the arp table.

C:\Users\wajid>arp -a

Interface: 192.168.1.4 --- 0xd
Internet Address  Physical Address  Type
192.168.1.1       34-bf-90-4e-5c-16 dynamic
224.0.0.22        01-00-5e-00-00-16 static
224.0.0.252       01-00-5e-00-00-fc static
255.255.255.255   ff-ff-ff-ff-ff-ff static

Interface: 192.168.56.1 --- 0x14
Internet Address  Physical Address  Type
224.0.0.22        01-00-5e-00-00-16 static

C:\Users\wajid>
```