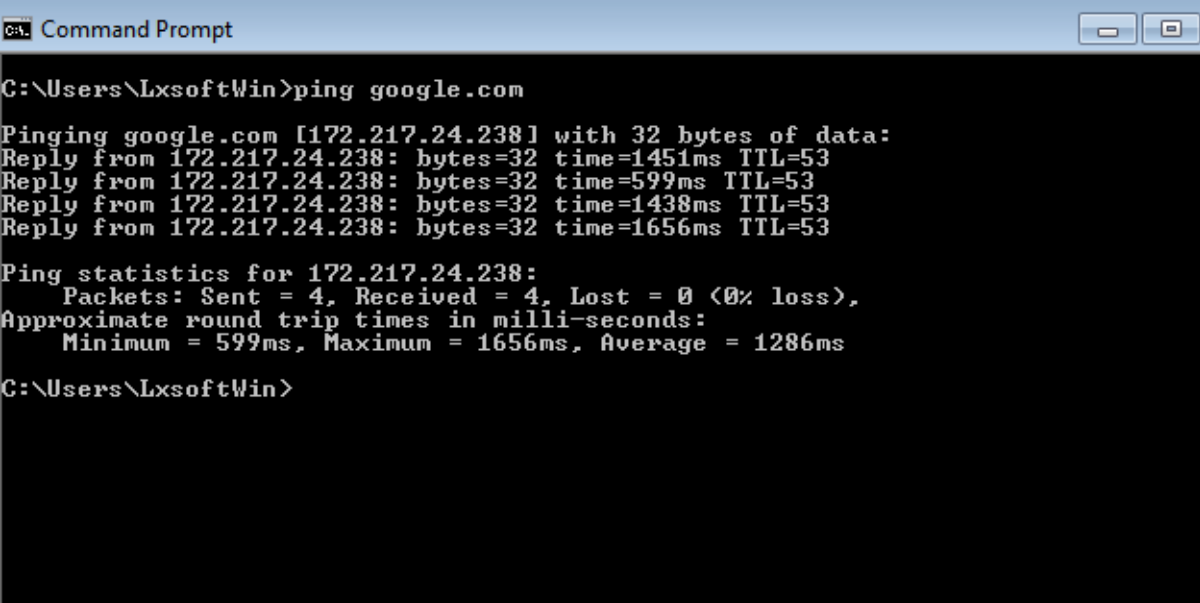


## Experiment 2 : Work with the commands Ping, Tracert, Ipconfig, pathping, telnet, ftp, getmac, ARP, Hostname, Nbtstat, netdiag, and Nslookup

### Ping Command :

Verifies IP-level connectivity to another TCP/IP computer by sending Internet Control Message Protocol (ICMP) Echo Request messages. The receipt of corresponding Echo Reply messages are displayed, along with round-trip times. Ping is the primary TCP/IP command used to troubleshoot connectivity, reachability, and name resolution.



```
C:\Users\LxsoftWin>ping google.com

Pinging google.com [172.217.24.238] with 32 bytes of data:
Reply from 172.217.24.238: bytes=32 time=1451ms TTL=53
Reply from 172.217.24.238: bytes=32 time=599ms TTL=53
Reply from 172.217.24.238: bytes=32 time=1438ms TTL=53
Reply from 172.217.24.238: bytes=32 time=1656ms TTL=53

Ping statistics for 172.217.24.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 599ms, Maximum = 1656ms, Average = 1286ms

C:\Users\LxsoftWin>
```

### Tracert Command :

Determines the path taken to a destination by sending Internet Control Message Protocol (ICMP) Echo Request messages to the destination with incrementally increasing Time to Live (TTL) field values. The path displayed is the list of near-side router interfaces of the routers in the path between a source host and a destination. The near-side interface is the interface of the router that is closest to the sending host in the path. Used without parameters, tracert displays help.

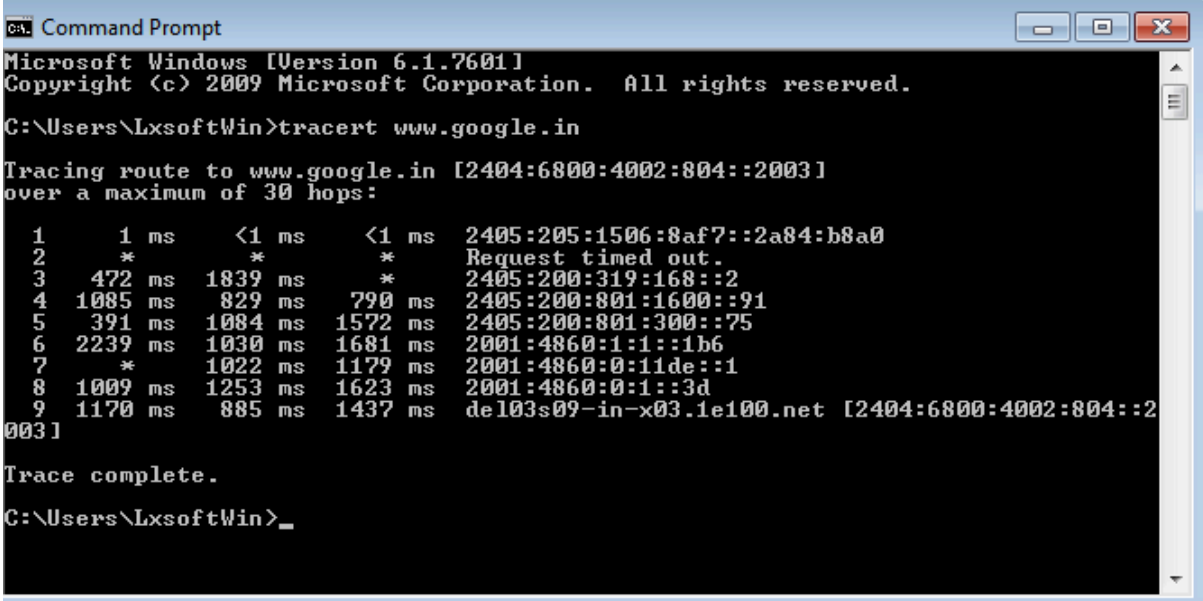
This diagnostic tool determines the path taken to a destination by sending ICMP Echo Request messages with varying Time to Live (TTL) values to the destination. Each router along the path is required to decrement the TTL in an IP packet by at least 1 before forwarding it.

Effectively, the TTL is a maximum link counter. When the TTL on a packet reaches 0, the router is expected to return an ICMP Time Exceeded message to the source computer. Tracert determines the path by sending the first Echo Request message with a TTL of 1 and incrementing the TTL by 1 on each subsequent transmission until the target responds or the maximum number of hops is reached. The maximum number of hops is 30 by default and can be specified using the -h parameter.

The path is determined by examining the ICMP Time Exceeded messages returned by intermediate routers and the Echo Reply message returned by the destination. However, some routers do not return Time Exceeded messages for packets with expired TTL values and are invisible to the tracert command. In this case, a row of asterisks (\*) is displayed for that hop.

### Examples:

To trace the path to the host named www.google.co.in use following command



```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\LxsoftWin>tracert www.google.in

Tracing route to www.google.in [2404:6800:4002:804::2003]
over a maximum of 30 hops:

  0  1 ms    <1 ms   <1 ms   2405:205:1506:8af7::2a84:b8a0
  1  *      *      *      Request timed out.
  2  472 ms  1839 ms *      2405:200:319:168::2
  3  1085 ms 829 ms  790 ms  2405:200:801:1600::91
  4  391 ms  1084 ms 1572 ms 2405:200:801:300::75
  5  2239 ms 1030 ms 1681 ms 2001:4860:1:1::1b6
  6  *      1022 ms 1179 ms 2001:4860:0:11de::1
  7  1009 ms 1253 ms 1623 ms 2001:4860:0:1::3d
  8  1170 ms 885 ms  1437 ms del03s09-in-x03.1e100.net [2404:6800:4002:804::2003]

Trace complete.

C:\Users\LxsoftWin>_
```

### Ipconfig Command :

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. This command is most useful on computers that are configured to obtain an IP address automatically. This enables users to determine which TCP/IP configuration values have been configured by DHCP, Automatic Private IP Addressing (APIPA), or an alternate configuration.

If the Adapter name contains any spaces, use quotation marks around the adapter name (that is, "Adapter Name").

For adapter names, ipconfig supports the use of the asterisk (\*) wildcard character to specify either adapters with names that begin with a specified string or adapters with names that contain a specified string.

### ARP Command :

Displays and modifies entries in the Address Resolution Protocol (ARP) cache, which contains one or more tables that are used to store IP addresses and their resolved Ethernet or Token Ring physical addresses. There is a separate table for each Ethernet or Token Ring network adapter installed on your computer.

### Examples:

To display the ARP cache tables for all interfaces use following command

```
C:\ Command Prompt
C:\Users\LxsoftWin>arp -a

Interface: 192.168.42.171 --- 0xd
  Internet Address      Physical Address      Type
  192.168.42.129        8e-df-54-4e-ac-fc    dynamic
  192.168.42.255        ff-ff-ff-ff-ff-ff    static
  224.0.0.22            01-00-5e-00-00-16    static
  224.0.0.252           01-00-5e-00-00-fc    static
  239.255.255.250       01-00-5e-7f-ff-fa    static
  255.255.255.255       ff-ff-ff-ff-ff-ff    static

Interface: 192.168.79.1 --- 0x14
  Internet Address      Physical Address      Type
  192.168.79.255        ff-ff-ff-ff-ff-ff    static
  224.0.0.22            01-00-5e-00-00-16    static
  224.0.0.252           01-00-5e-00-00-fc    static
  239.255.255.250       01-00-5e-7f-ff-fa    static

Interface: 192.168.23.1 --- 0x15
  Internet Address      Physical Address      Type
  192.168.23.255        ff-ff-ff-ff-ff-ff    static
  224.0.0.22            01-00-5e-00-00-16    static
  224.0.0.252           01-00-5e-00-00-fc    static
  239.255.255.250       01-00-5e-7f-ff-fa    static

C:\Users\LxsoftWin>_
```

### Netstat Command :

Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols).

```
CA Command Prompt - netstat
C:\Users\LxsoftWin>netstat
Active Connections

Proto Local Address Foreign Address State
TCP 127.0.0.1:49159 LxsoftWin-PC:56051 ESTABLISHED
TCP 127.0.0.1:49159 LxsoftWin-PC:56297 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:49259 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55384 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55392 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55394 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55395 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55401 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55406 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55407 ESTABLISHED
TCP 127.0.0.1:49160 LxsoftWin-PC:55408 ESTABLISHED
TCP 127.0.0.1:49163 LxsoftWin-PC:49164 ESTABLISHED
TCP 127.0.0.1:49164 LxsoftWin-PC:49163 ESTABLISHED
TCP 127.0.0.1:49165 LxsoftWin-PC:49166 ESTABLISHED
TCP 127.0.0.1:49166 LxsoftWin-PC:49165 ESTABLISHED
TCP 127.0.0.1:49167 LxsoftWin-PC:49168 ESTABLISHED
TCP 127.0.0.1:49168 LxsoftWin-PC:49167 ESTABLISHED
TCP 127.0.0.1:49259 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:51259 LxsoftWin-PC:51260 ESTABLISHED
TCP 127.0.0.1:51260 LxsoftWin-PC:51259 ESTABLISHED
TCP 127.0.0.1:55361 LxsoftWin-PC:55362 ESTABLISHED
TCP 127.0.0.1:55362 LxsoftWin-PC:55361 ESTABLISHED
TCP 127.0.0.1:55384 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55392 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55394 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55395 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55401 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55406 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55407 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:55408 LxsoftWin-PC:49160 ESTABLISHED
TCP 127.0.0.1:56051 LxsoftWin-PC:49159 ESTABLISHED
TCP 127.0.0.1:56297 LxsoftWin-PC:49159 ESTABLISHED
TCP 192.168.42.171:55097 server-52-222-136-39:https CLOSE_WAIT
```

**Nbtstat Command :**

Displays NetBIOS over TCP/IP (NetBT) protocol statistics

NetBIOS name tables for both the local computer and remote computers, and the NetBIOS name cache. Nbtstat allows a refresh of the NetBIOS name cache and the names registered with Windows Internet Name Service (WINS).

Nbtstat command-line parameters are case-sensitive.

```

C:\Users\LxsoftWin>nbtstat

Displays protocol statistics and current TCP/IP connections using NBT
(NetBIOS over TCP/IP).

NBTSTAT [ [-a RemoteName] [-A IP address] [-c] [-n]
          [-r] [-R] [-RR] [-s] [-S] [interval] ]

-a (adapter status) Lists the remote machine's name table given its name
-A (Adapter status) Lists the remote machine's name table given its
                    IP address.
-c (cache)          Lists NBT's cache of remote [machine] names and their IP
                    addresses
-n (names)          Lists local NetBIOS names.
-r (resolved)       Lists names resolved by broadcast and via WINS
-R (Reload)         Purges and reloads the remote cache name table
-S (Sessions)       Lists sessions table with the destination IP addresses
-s (sessions)       Lists sessions table converting destination IP
                    addresses to computer NETBIOS names.
-RR (ReleaseRefresh) Sends Name Release packets to WINS and then, starts Refresh

RemoteName Remote host machine name.
IP address  Dotted decimal representation of the IP address.
interval    Redisplays selected statistics, pausing interval seconds
            between each display. Press Ctrl+C to stop redisplaying
            statistics.

C:\Users\LxsoftWin>_

```

### Nslookup Command :

Nslookup (Name Server lookup) is a UNIX shell command to query Internet domain name servers

```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\TARUN HUMAR>nslookup
Default Server: triband-del-59.179.243.78.bol.net.in
Address: 59.179.243.78

> set type=mx
type=mx
> gmail.com
Server: triband-del-59.179.243.78.bol.net.in
Address: 59.179.243.78

Non-authoritative answer:
gmail.com MX preference = 10, mail exchanger = alt1.gmail-smtp-in.1.google.com
gmail.com MX preference = 10, mail exchanger = alt2.gmail-smtp-in.1.google.com
gmail.com MX preference = 50, mail exchanger = gsntp147.google.com
gmail.com MX preference = 50, mail exchanger = gsntp183.google.com
gmail.com MX preference = 5, mail exchanger = gmail-smtp-in.1.google.com
gmail.com nameserver = ns4.google.com
gmail.com nameserver = ns1.google.com
gmail.com nameserver = ns2.google.com
gmail.com nameserver = ns3.google.com
gmail-smtp-in.1.google.com internet address = 209.85.143.27
alt1.gmail-smtp-in.1.google.com internet address = 209.85.143.114
alt1.gmail-smtp-in.1.google.com internet address = 209.85.133.114
alt2.gmail-smtp-in.1.google.com internet address = 209.85.135.22
alt2.gmail-smtp-in.1.google.com internet address = 209.85.135.114
gsntp147.google.com internet address = 209.85.147.27
gsntp183.google.com internet address = 64.233.183.27
ns1.google.com internet address = 216.239.32.10
ns2.google.com internet address = 216.239.34.10
ns3.google.com internet address = 216.239.36.10
ns4.google.com internet address = 216.239.38.10
>

```

### Pathping Command :

The PathPing [command](#) is a [command-line network utility](#) supplied in [Windows 2000](#) and beyond that combines the functionality of [ping](#) with that of [tracert](#). It is used to locate spots that have [network latency](#) and network loss. The command provides details of the path between two [hosts](#) and ping-like statistics for each node in the path based on samples taken over a time period, depending on how many nodes are between the start and end host.

The advantages of PathPing over ping and traceroute are that each node is pinged as the result of a single command, and that the behavior of nodes is studied over an extended time period, rather than the default ping sample of four messages or default traceroute single route trace. The disadvantage is that it takes a total of 25 seconds per hop to show the ping statistics

```

C:\Windows\system32\cmd.exe
C:\Users\Rcew>
C:\Users\Rcew>pathping www.google.com

Tracing route to www.google.com [142.250.182.196]
over a maximum of 30 hops:
 0  Rcew-PC [172.16.21.32]
 1  172.16.16.1
 2  103.206.112.33
 3  45.127.59.1
 4  103.255.145.1
 5  static-202-65-133-42.pol.net.in [202.65.133.42]
 6  198.18.5.11
 7  72.14.197.154
 8  142.251.76.27
 9  142.250.214.101
10  bom07s28-in-f4.1e100.net [142.250.182.196]

Computing statistics for 250 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0           Lost/Sent = Pct  Lost/Sent = Pct  Rcew-PC [172.16.21.32]
 1    0ms      0/ 100 = 0%      0/ 100 = 0%      |
 2    0ms      0/ 100 = 0%      0/ 100 = 0%      |
 3    0ms      0/ 100 = 0%      0/ 100 = 0%      |
 4    7ms      51/ 100 = 51%    51/ 100 = 51%    |
 5    6ms      0/ 100 = 0%      0/ 100 = 0%      |
 6   22ms     0/ 100 = 0%      0/ 100 = 0%      |
 7   23ms     0/ 100 = 0%      0/ 100 = 0%      |
 8   25ms     1/ 100 = 1%      1/ 100 = 1%      |
 9   23ms     1/ 100 = 1%      1/ 100 = 1%      |
10   24ms     0/ 100 = 0%      0/ 100 = 0%      |
Address: 172.16.16.1
         103.206.112.33
         45.127.59.1
         103.255.145.1
         static-202-65-133-42.pol.net.in [202.65.133.42]
         198.18.5.11
         72.14.197.154
         142.251.76.27
         142.250.214.101
         bom07s28-in-f4.1e100.net [142.250.182.196]

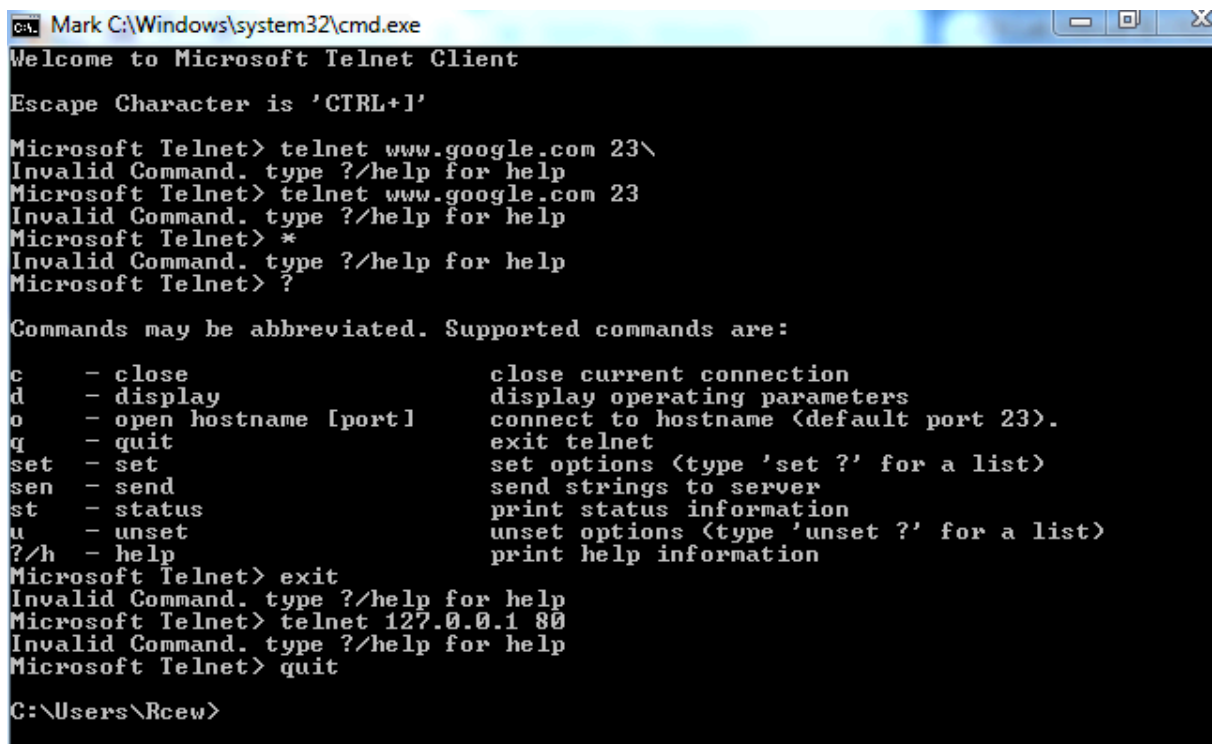
Trace complete.
C:\Users\Rcew>

```

### Telnet Command :

The Telnet protocol creates a communication path through a virtual terminal connection. The data distributes in-band with Telnet control information over the transmission control protocol (TCP). Unlike other TCP/IP protocols, Telnet provides a log-in screen and allows logging in as the remote device's actual user when establishing a connection on port 23. This type of access grants direct control with all the same privileges as the owner of the credentials. Telnet comes with a command

accessible from the command line in Windows. The `telnet` command also exists for macOS and Linux operating systems.



```
Mark C:\Windows\system32\cmd.exe
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+I'

Microsoft Telnet> telnet www.google.com 23\
Invalid Command. type ?/help for help
Microsoft Telnet> telnet www.google.com 23
Invalid Command. type ?/help for help
Microsoft Telnet> *
Invalid Command. type ?/help for help
Microsoft Telnet> ?

Commands may be abbreviated. Supported commands are:

c      - close                close current connection
d      - display              display operating parameters
o      - open hostname [port] connect to hostname (default port 23).
q      - quit                 exit telnet
set    - set                  set options (type 'set ?' for a list)
sen    - send                 send strings to server
st     - status               print status information
u      - unset                unset options (type 'unset ?' for a list)
?/h   - help                  print help information
Microsoft Telnet> exit
Invalid Command. type ?/help for help
Microsoft Telnet> telnet 127.0.0.1 80
Invalid Command. type ?/help for help
Microsoft Telnet> quit

C:\Users\Rcew>
```

### Ftp Command :

[FTP](#) is the simplest file transfer protocol to exchange files to and from a remote computer or network. Similar to Windows, Linux and UNIX operating systems also have built-in command-line prompts that can be used as FTP clients to make an FTP connection. Here's a list of commonly used [FTP Linux](#) and UNIX platforms commands.

```
Administrator: C:\Windows\system32\cmd.exe - ftp 192.168.227.128
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Mandar>ftp 192.168.227.128
Connected to 192.168.227.128.
220 Microsoft FTP Service
User (192.168.227.128:(none)): Administrator
331 Password required for Administrator.
Password:
230 User Administrator logged in.
ftp> dir
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
01-09-13 01:05PM          8 AUTOEXEC.BAT
01-09-13 01:05PM          8 CONFIG.SYS
01-09-13 01:27PM        <DIR>      Documents and Settings
01-11-13 02:28AM        <DIR>      Inetpub
01-14-13 02:21PM        <DIR>      New Folder
01-13-13 03:57PM        <DIR>      Office2007
01-14-13 12:29AM        <DIR>      Program Files
01-09-13 01:58PM        <DIR>      Teradata Setup
01-14-13 12:07AM        <DIR>      WINDOWS
226 Transfer complete.
ftp: 474 bytes received in 0.00Seconds 237.00Kbytes/sec.
ftp>
```

### Getmac Command :

Returns the media access control (MAC) address and list of network protocols associated with each address for all network cards in each computer, either locally or across a network. This command is particularly useful either when you want to enter the MAC address into a network analyzer, or when you need to know what protocols are currently in use on each network adapter on a computer.

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Student>getmac

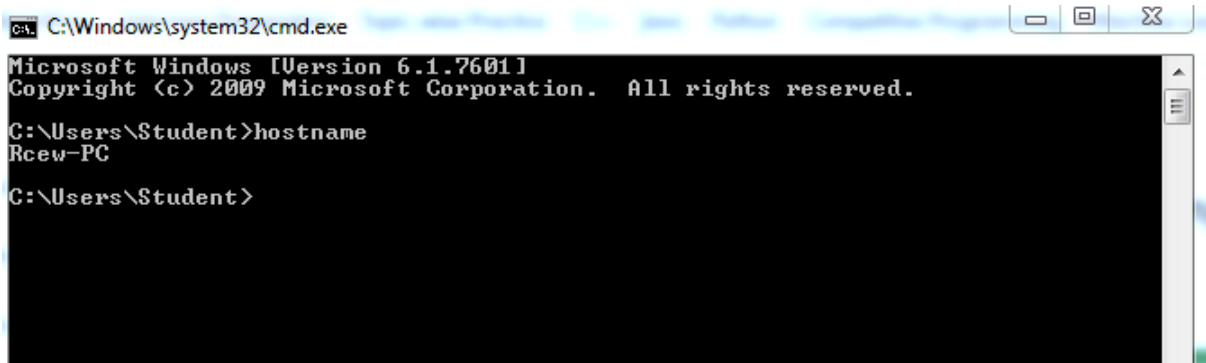
Physical Address      Transport Name
=====
EC-A8-6B-A2-1E-2E    \Device\NPF{8C22AC91-2EE7-44DB-A2C8-47EDA3DCC9E4}
0A-00-27-00-00-0E    \Device\NPF{4FB5807B-EB08-4CE3-AA75-99BCFBA5F799}

C:\Users\Student>
```

### Hostname Command :

*hostname* command in Linux is used to obtain the DNS(Domain Name System) name and set the system's hostname or NIS(Network Information System) domain name. A hostname is a name which

is given to a computer and it attached to the network. Its main purpose is to uniquely identify over a network.



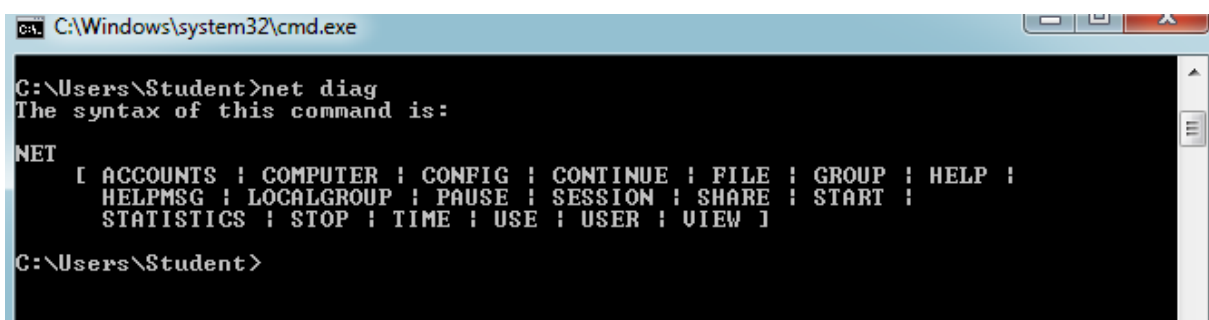
```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Student>hostname
Rcew-PC

C:\Users\Student>
```

### Netdiag Command:

The Netdiag command-line diagnostic tool helps to isolate networking and connectivity problems by performing a series of tests to determine the state of your network client. These tests and the key network status information that they expose give network administrators and support personnel a more direct means of identifying and isolating network problems.



```
C:\Windows\system32\cmd.exe

C:\Users\Student>net diag
The syntax of this command is:

NET
 [ ACCOUNTS | COMPUTER | CONFIG | CONTINUE | FILE | GROUP | HELP |
  HELPMMSG | LOCALGROUP | PAUSE | SESSION | SHARE | START |
  STATISTICS | STOP | TIME | USE | USER | VIEW ]

C:\Users\Student>
```