

## Experiment -01

### BASIC NETWORKING COMMANDS

#### **AIM: - Study of various Network commands used in Linux and Windows**

**arp -a:** ARP is short form of address resolution protocol, It will show the IP address of your computer along with the IP address and MAC address of your router.

**hostname:** This is the simplest of all TCP/IP commands. It simply displays the name of your computer.

**ipconfig /all:** This command displays detailed configuration information about your TCP/IP connection including Router, Gateway, DNS, DHCP, and type of Ethernet adapter in your system

**nbtstat -a:** This command helps solve problems with NetBIOS name resolution. (Nbt stands for NetBIOS over TCP/IP)

**netstat:** (network statistics) netstat displays a variety of statistics about a computers active TCP/IP connections. It is a command line tool for monitoring network connections both incoming and outgoing as well as viewing routing tables, interface statistics etc.

e.g.:  
e.g.: netstat -r

**nslookup:** (name server lookup) is a tool used to perform DNS lookups in Linux. It is used to display DNS details, such as the IP address of a particular computer, the MX records for a domain or the NS servers of a domain. nslookup can operate in two modes: interactive and non-interactive.

e.g.: nslookup [www.google.com](http://www.google.com)

**pathping:** Pathping is unique to Window's, and is basically a combination of the Ping and Tracert commands. Pathping traces the route to the destination address then launches a 25 second test of each router along the way, gathering statistics on the rate of data loss along each hop.

**ping:** (Packet INternet Groper) command is the best way to test connectivity between two nodes. Ping use ICMP (Internet Control Message Protocol) to communicate to other devices.

1. #ping hostname( ping localhost)
2. #ping ip address (ping 4.2.2.2)
3. #ping fully qualified domain name(ping [www.facebook.com](http://www.facebook.com))

**Route:** route command is used to show/manipulate the IP routing table. It is primarily used to setup static routes to specific host or networks via an interface.

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Windows PowerShell
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PS C:\Users\Lenovo> 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-09-62-C6-09 .... Adds a static entry.
> arp -a                                     .... Displays the arp table.

PS C:\Users\Lenovo> hostname
DESKTOP-C01BH7D
PS C:\Users\Lenovo> ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::a098:b3f4:e84d:50c5%5
IPv4 Address . . . . . : 172.16.75.153
Subnet Mask . . . . . : 255.255.248.0
```

```
Default Gateway . . . . . : 172.16.72.1
PS C:\Users\Lenovo> 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, i.e. 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*  
  
> route ADD 157.0.0.0 MASK 255.0.0.0 157.55.80.1 METRIC 3 IF 2  
      destination*     *mask      *gateway      metric*    *  
                                         Interface*  
      If IF is not given, it tries to find the best interface for a given  
      gateway.  
> route ADD 3ffe::/32 3ffe::1  
  
> route CHANGE 157.0.0.0 MASK 255.0.0.0 157.55.80.5 METRIC 2 IF 2  
      CHANGE is used to modify gateway and/or metric only.  
  
> route DELETE 157.0.0.0  
> route DELETE 3ffe::/32  
PS C:\Users\Lenovo> ping
```

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]  
 [-r count] [-s count] [[-j host-list] | [-k host-list]]  
 [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]  
 [-4] [-6] target\_name

Options:

-t	Ping the specified host until stopped. To see statistics and continue - type Control-Break; To stop - type Control-C.
-a	Resolve addresses to hostnames.
-n count	Number of echo requests to send.
-l size	Send buffer size.
-f	Set Don't Fragment flag in packet (IPv4-only).
-i TTL	Time To Live.
-v TOS	Type Of Service (IPv4-only. This setting has been deprecated and has no effect on the type of service field in the IP Header).
-r count	Record route for count hops (IPv4-only).
-s count	Timestamp for count hops (IPv4-only).
-j host-list	Loose source route along host-list (IPv4-only).
-k host-list	Strict source route along host-list (IPv4-only).
-w timeout	Timeout in milliseconds to wait for each reply.
-R	Use routing header to test reverse route also (IPv6-only). Per RFC 5095 the use of this routing header has been deprecated. Some systems may drop echo requests if this header is used.
-S srcaddr	Source address to use.
-c compartment	Routing compartment identifier.
-p	Ping a Hyper-V Network Virtualization provider address.

```

        -4          Force using IPv4.
        -6          Force using IPv6.

PS C:\Users\Lenovo> 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.

PS C:\Users\Lenovo> pathping

Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]
                 [-p period] [-q num_queries] [-w timeout]
                 [-4] [-6] target_name

Options:
  -g host-list      Loose source route along host-list.
  -h maximum_hops  Maximum number of hops to search for target.
  -i address        Use the specified source address.
  -n               Do not resolve addresses to hostnames.
  -p period         Wait period milliseconds between pings.
  -q num_queries   Number of queries per hop.
  -w timeout        Wait timeout milliseconds for each reply.
  -4               Force using IPv4.
  -6               Force using IPv6.

```

### **RESULT:**

**the Study of various Network commands used in Linux and Windows has been studied successfully**