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LAB # 01: TCP/IP UTILITIES

1. Tracert

Tracert is a utility that can be used to determine the route and hop count to a destination. Example of tracert is shown below:



```

C:\Documents and Settings\Farhan>cd..
C:\Documents and Settings>cd..
C:\>tracert www.yahoo.com

Tracing route to www.yahoo.com [87.248.112.181]
over a maximum of 30 hops:

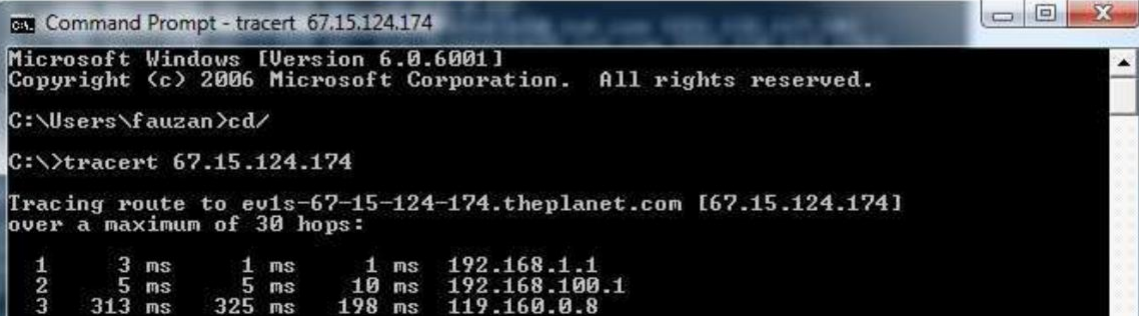
  0  1 ms    1 ms    1 ms    mywimax [192.168.15.1]
  1  *        *        *        Request timed out.
  2  77 ms   84 ms   135 ms   10.159.0.3
  3  54 ms   49 ms   95 ms   58-27-175-148.wateen.net [58.27.175.148]
  4  67 ms   364 ms  75 ms   58-27-175-148.wateen.net [58.27.175.148]
  5  221 ms  54 ms   103 ms  58-27-175-130.wateen.net [58.27.175.130]
  6  93 ms   88 ms   94 ms   58-27-209-54.wateen.net [58.27.209.54]
  7  84 ms   88 ms   90 ms   58-27-183-230.wateen.net [58.27.183.230]
  8  87 ms   84 ms   94 ms   tw31-static109.tw1.com [117.20.31.109]
  9  76 ms   89 ms   90 ms   tw128-static41.tw1.com [119.63.128.41]
 10 319 ms  169 ms  184 ms   pos10-0.palermo9.pal.seabone.net [195.22.197.12]
 11 394 ms  306 ms  306 ms   xe-11-0-0.franco31.fra.seabone.net [195.22.211.1]
 12 210 ms  234 ms  210 ms   ge-1-3-0.pat1.dee.yahoo.com [80.81.192.115]
 13 220 ms  218 ms  *        so-2-0-0.pat1.ams.yahoo.com [66.196.65.144]
 14 242 ms  255 ms  307 ms   UNKNOWN-66-196-65-8.yahoo.com [66.196.65.81]
 15 242 ms  239 ms  271 ms   ae-1.msrl.ird.yahoo.com [66.196.67.231]
 16 397 ms  307 ms  307 ms   te-7-4.bas-b1.ird.yahoo.com [87.248.101.103]
 17 214 ms  258 ms  307 ms   www.yahoo.com [87.248.112.181]

Trace complete.
C:\>_

```

Figure 1. Tracert

You can use IP Address instead of Domain Name



```

Microsoft Windows [Version 6.0.6001]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.

C:\Users\fauzan>cd/
C:\>tracert 67.15.124.174

Tracing route to evls-67-15-124-174.theplanet.com [67.15.124.174]
over a maximum of 30 hops:

  0  3 ms    1 ms    1 ms    192.168.1.1
  1  5 ms    5 ms    10 ms   192.168.100.1
  2 313 ms  325 ms  198 ms   119.160.0.8

```

Figure 2. Tracert with Domain Name

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2. PING

PING stands for “Packet Internet Groper” and it is a diagnostic tool that is used to check whether a host is reachable or not. Target can be either a name or IP address.

Syntax:

Ping *www.uit.edu*

Ping *ip address (you can mention ip address instead of domain name)*

Ping *ip address or Domain name -n number of packets you want to sent*

Ping -a *ip address.(will first resolve ip to its domain name)*

```
C:\>ping www.yahoo.com

Pinging www.yahoo-hk3.akadns.net [87.248.113.14] with 32 bytes of data:
Reply from 87.248.113.14: bytes=32 time=300ms TTL=48
Reply from 87.248.113.14: bytes=32 time=342ms TTL=48
Reply from 87.248.113.14: bytes=32 time=394ms TTL=48
Reply from 87.248.113.14: bytes=32 time=319ms TTL=48

Ping statistics for 87.248.113.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 300ms, Maximum = 394ms, Average = 338ms
```

Figure 3. Ping with Domain Name

```
C:\>ping 67.15.124.174

Pinging 67.15.124.174 with 32 bytes of data:
Reply from 67.15.124.174: bytes=32 time=424ms TTL=113
Reply from 67.15.124.174: bytes=32 time=1194ms TTL=113
Reply from 67.15.124.174: bytes=32 time=526ms TTL=113
Reply from 67.15.124.174: bytes=32 time=425ms TTL=113

Ping statistics for 67.15.124.174:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 424ms, Maximum = 1194ms, Average = 642ms
```

Figure 4. Ping with IP

```
C:\>ping 67.15.124.174 -n 3

Pinging 67.15.124.174 with 32 bytes of data:
Reply from 67.15.124.174: bytes=32 time=1016ms TTL=113
Reply from 67.15.124.174: bytes=32 time=407ms TTL=113
Reply from 67.15.124.174: bytes=32 time=1042ms TTL=113

Ping statistics for 67.15.124.174:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 407ms, Maximum = 1042ms, Average = 821ms
```

Figure 5. Ping -n

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```
C:\>ping -a 87.248.113.14

Pinging f1.us.www.vip.ird.yahoo.com [87.248.113.14] with 32 bytes of data:
Reply from 87.248.113.14: bytes=32 time=368ms TTL=48
Reply from 87.248.113.14: bytes=32 time=274ms TTL=48
Reply from 87.248.113.14: bytes=32 time=267ms TTL=48
Reply from 87.248.113.14: bytes=32 time=314ms TTL=48
```

Figure 6. Ping -a

3. ARP

ARP is “Address Resolution Protocol”. It is used to resolve IP address to MAC address.

arp -a (will show a list of relevant IP addresses and their corresponding MAC addresses)

```
C:\>arp -a

Interface: 192.168.1.35 --- 0xb
Internet Address      Physical Address      Type
192.168.1.1           00-19-cb-75-85-b0     dynamic
192.168.1.255         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
```

Figure 7. Arp

We can also set a MAC address against an IP address through the following command

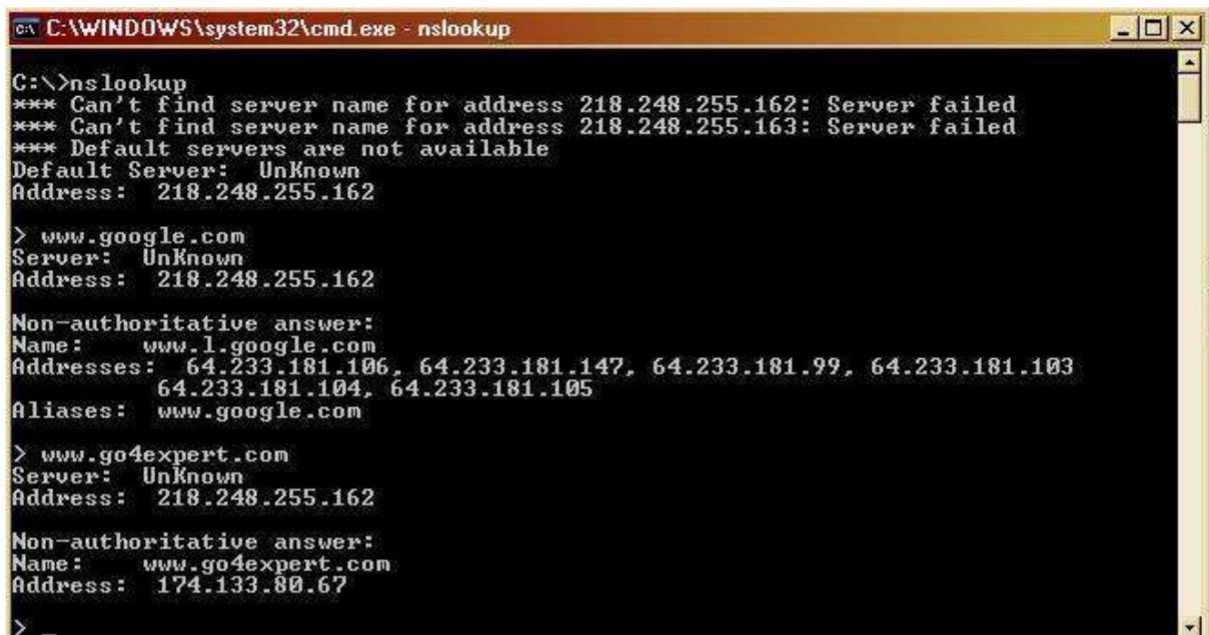
arp -s *ip address* *MAC address*

4. Nslookup

Nslookup utility is used to test and troubleshoot domain name servers. Nslookup has two modes. Interactive mode enables you to query name servers for information about hosts and domains, or to print a list of hosts in a domain. Non-interactive mode prints only the name and requested details for one host or domain. Non-interactive mode is useful for a single query.

To enter the interactive mode of Nslookup, type nslookup without any arguments at a command prompt, or use only a hyphen as the first argument and specify a domain name server in the second. The default DNS name server will be used if you don't enter anything for the second argument.

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```
C:\WINDOWS\system32\cmd.exe - nslookup

C:\>nslookup
*** Can't find server name for address 218.248.255.162: Server failed
*** Can't find server name for address 218.248.255.163: Server failed
*** Default servers are not available
Default Server: UnKnown
Address: 218.248.255.162

> www.google.com
Server: UnKnown
Address: 218.248.255.162

Non-authoritative answer:
Name: www.l.google.com
Addresses: 64.233.181.106, 64.233.181.147, 64.233.181.99, 64.233.181.103
          64.233.181.104, 64.233.181.105
Aliases: www.google.com

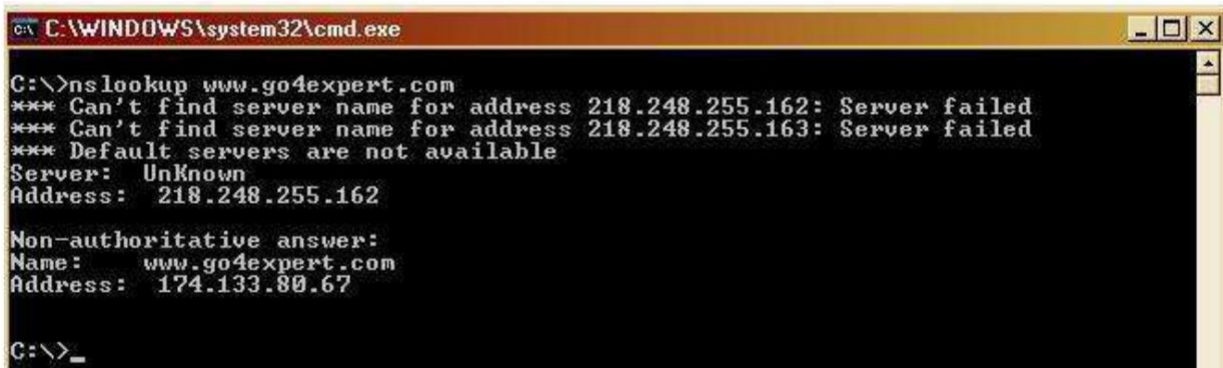
> www.go4expert.com
Server: UnKnown
Address: 218.248.255.162

Non-authoritative answer:
Name: www.go4expert.com
Address: 174.133.80.67

>
```

Figure 11. Nslookup

To use non-interactive mode, in the first argument, enter the name or IP address of the computer you want to look up. In the second argument, enter the name or IP address of a domain name server. The default DNS name server will be used if you don't enter anything for the second argument.



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

C:\>nslookup www.go4expert.com
*** Can't find server name for address 218.248.255.162: Server failed
*** Can't find server name for address 218.248.255.163: Server failed
*** Default servers are not available
Server: UnKnown
Address: 218.248.255.162

Non-authoritative answer:
Name: www.go4expert.com
Address: 174.133.80.67

C:\>_
```

Figure 12. Nslookup with Domain Name

(note:- nslookup works equally well in unix.)

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5. Ftp

Transfers files to and from a computer running a File Transfer Protocol (FTP) server service such as Internet Information Services. **Ftp** can be used interactively or in batch mode by processing ASCII text files. **Syntax**

ftp [-v] [-d] [-i] [-n] [-g] [-s:*FileName*] [-a] [-w:*WindowSize*] [-A] [*Host*]

Parameters

-v : Suppresses the display of FTP server responses.

-d : Enables debugging, displaying all commands passed between the FTP client and FTP server.

-i : Disables interactive prompting during multiple file transfers.

-n : Suppresses the ability to log on automatically when the initial connection is made.

-g : Disables file name globbing. **Glob** permits the use of the asterisk (*) and question mark (?) as wildcard characters in local file and path names.

-s: *FileName* : Specifies a text file that contains **ftp** commands. These commands run automatically after **ftp** starts. This parameter allows no spaces. Use this parameter instead of redirection (<).

-a : Specifies that any local interface can be used when binding the FTP data connection.

-w: *WindowSize* : Specifies the size of the transfer buffer. The default window size is 4096 bytes.

-A : Logs onto the FTP server as anonymous.

Host : Specifies the computer name, IP address, or IPv6 address of the FTP server to which to connect. The host name or address, if specified, must be the last parameter on the line.

/? : Displays help at the command prompt.

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Do it Yourself

Task 01: Explore the syntax “**ipconfig**” and “**winipcfg**”. Note down your observations?

Ans:

Ipconfig: assigned IP, subnet mask and default gateway addresses were displayed.

Winipcfg: IP and DNS addresses were displayed.

Task 02: Answer following questions

- 1) State the size of MAC address both in Bytes and Bits

Ans: 6 Bytes and 48 bits

- 2) Differentiate between IP and MAC address

Ans:

IP Address: IP stands for Internet Protocol. It is the logical address of a device. The size of an IP address is 32 bits.

MAC Address: MAC stands for Media Access Control. It is the physical address of a device. The size of a MAC address is 48 bits.

- 3) What is a gateway

Ans: Gateway is a device used to connect two different networks.

- 4) What is the purpose of loop-back address?

Ans: The loop-back address allows the testing of an ethernet card without a physical network.

- 5) PING stands for _____ Packet Internet Groper _____

- 6) What is the difference between ipconfig and ipconfig/all commands?

Ans:

ipconfig: This command displays all the current TCP/IP network information of the device and refreshes DHCP and DNS settings.

ipconfig /all: This command retrieves all the detailed and thorough TCP/IP network information.

- 7) What is Nslookup stands for? What is the significance of this utility?

What is Non-authoritative answer?

Ans:

NSLOOKUP stands for “from name server lookup”. It is used to test domain name servers.

Non-authoritative answer is the answer received from DNS server for the queried domain name for which the DNS server does not have the original zone files.

- 8) Write a command to transfer “abc.txt” file from PC having IP address 192.168.2.21 to PC having IP address 192.168.100.1. Also write a command to get the same file from the PC having IP address 192.168.100.1.

Ans: We use the following command to transfer file:

Ftp> put abc.txt

We use the following command to get the file:

Ftp> get abc.txt