

University Institute of Engineering

Department of Electronics & Communication Engineering

Experiment No. 7

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Semester: 6th
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1.Aim of the practical: To troubleshoot Network using PING, TRACERT, IPCONFIG, NSLOOKUP commands.

2. Tool Used:

Command Prompt on PC & Laptop

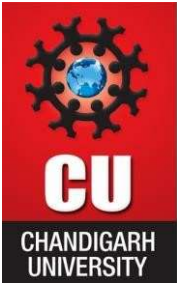
3. Theory:

To diagnose network issues, there are several commands that are commonly used. Here are some of the most commonly used commands and instructions on how to use them:

PING: This command is used to check connectivity between two devices. The command sends packets to the destination and waits for a response. If the destination is reachable, it will respond with a series of packets and their response times.

IPCONFIG: Ipconfig is a command-line tool used to display the present configuration settings of a device's network adapters. To utilize ipconfig, one can open a command prompt and type "ipconfig", which will reveal information such as the device's IP address, subnet mask, default gateway, and any DNS servers being utilized.

NSLOOKUP: It is a tool that is used via command-line to gather information about a domain name or an IP address from DNS servers. To utilize nslookup, one can open a command prompt and type "nslookup" followed by the domain name or IP address, for instance, "nslookup google.com" or "nslookup 8.8.8.8". This command will display essential network information, such as the IP address associated with the domain name or the domain name linked to the IP address.



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TRACERT: Tracert, also known as traceroute, is a command-line tool used for tracking the path taken by a data packet as it moves from one device to another on a network. To use tracert, one can open a command prompt and enter "tracert" followed by the destination IP address or domain name, such as "tracert google.com" or "tracert 192.168.1.1". This tool provides information on the path taken by the packet and identifies the locations where it experiences delays or disruptions. This helps in troubleshooting connectivity problems.

4. Steps for experiment:

PING:

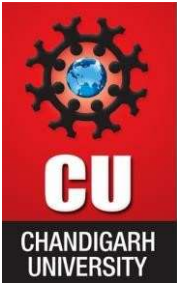
- a. Press Windows Key + R to open the Run dialog box.
- b. Type "cmd" and press Enter to open the Command Prompt.
- c. In the Command Prompt window, type "ping [IP address or domain name]" and press Enter.
- d. Wait for the ping command to complete. It will show a series of responses indicating the time it takes for each packet to travel between the two devices.
- e. If the ping command returns responses indicating that packets were lost, it could be an indication of network connectivity issues.
- f. If the ping command returns responses indicating that the connection is successful, it could be an indication of a different issue.

TRACERT:

- a. Press Windows Key + R to open the Run dialog box.
- b. Type "cmd" and press Enter to open the Command Prompt.
- c. In the Command Prompt window, type "tracert [IP address or domain name]" and press Enter.
- d. Wait for the tracert command to complete. It will show the route the packet takes and where it stops along the way.
- e. If the tracert command shows that the packet is not reaching the destination, it could be an indication of network connectivity issues.
- f. If the tracert command shows that the packet is reaching the destination but not returning to the source, it could be an indication of firewall issues.

IPCONFIG:

1. Press the Windows key + R to open the Run dialog box.
2. Type "cmd" and press Enter to open the command prompt.
3. Type "ipconfig" in the command prompt window and press Enter.
4. The output will display your device's IP address, subnet mask, default gateway, and DNS server IP addresses.
5. If the IP address begins with "169.254," this indicates that the device was unable to obtain an IP address from the DHCP server.



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6. Connectivity issues may occur if the IP address is incorrect or the subnet mask is not configured correctly.

NSLOOKUP:

1. Press the Windows key + R to open the Run dialog box.
2. Type "cmd" and press Enter to open the command prompt.
3. Type "nslookup [domain name or IP address]" in the command prompt window and press Enter.
4. The output will display the IP address associated with the domain name or the domain name associated with the IP address.
5. If the nslookup command returns an error, this could indicate DNS issues.
6. If the nslookup command returns a different IP address than expected, this could indicate DNS hijacking or spoofing.

4. Observations, Simulation/Output Screen Shots:

```
C:\Users\Owner>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter Ethernet 3:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::f0a5:2e60:3972:75e8%23
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 3:

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

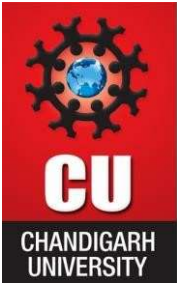
Wireless LAN adapter Local Area Connection* 4:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2405:201:5c0c:b0ec:f919:b16f:78ad:1125
    Temporary IPv6 Address. . . . . : 2405:201:5c0c:b0ec:552b:8fe7:f10a:ad10
    Link-local IPv6 Address . . . . . : fe80::1abd:b9c7:4a8b:b028%15
    IPv4 Address. . . . . : 192.168.29.221
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::3249:50ff:fe27:c9ba%15
                                192.168.29.1
```

Figure 7.1: IP CONFIG command



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```
Windows IP Configuration

Host Name . . . . . : Priyanshu
Primary Dns Suffix . . . . . :
Node Type . . . . . : Mixed
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Realtek PCIe GbE Family Controller
Physical Address. . . . . : E4-A8-DF-C6-8E-DD
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet 3:

Connection-specific DNS Suffix . :
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-17
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::f0a5:2e60:3972:75e8%23(Preferred)
IPv4 Address. . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 856293415
DHCPv6 Client DUID. . . . . : 00-01-00-01-2A-1C-38-03-E4-A8-DF-C6-8E-DD
NetBIOS over Tcpip. . . . . : Enabled
```

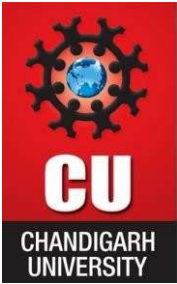
Figure 7.2: IPCONFIG/ALL command

```
C:\Users\Owner>ping 192.168.29.214

Pinging 192.168.29.214 with 32 bytes of data:
Reply from 192.168.29.214: bytes=32 time=239ms TTL=64
Reply from 192.168.29.214: bytes=32 time=2144ms TTL=64
Reply from 192.168.29.214: bytes=32 time=2ms TTL=64
Reply from 192.168.29.214: bytes=32 time=1277ms TTL=64

Ping statistics for 192.168.29.214:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2144ms, Average = 915ms
```

Figure 7.3: PING [IP add.] command



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```
C:\Users\Owner>ping mail.google.com

Pinging mail.google.com [2404:6800:4002:81d::2005] with 32 bytes of data:
Reply from 2404:6800:4002:81d::2005: time=17ms
Reply from 2404:6800:4002:81d::2005: time=17ms
Reply from 2404:6800:4002:81d::2005: time=17ms
Reply from 2404:6800:4002:81d::2005: time=22ms

Ping statistics for 2404:6800:4002:81d::2005:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 17ms, Maximum = 22ms, Average = 18ms
```

Figure 7.4: PING [www web site] command

```
C:\Users\Owner>tracert mail.google.com

Tracing route to mail.google.com [2404:6800:4002:81d::2005]
over a maximum of 30 hops:

  1    1 ms    1 ms    1 ms  2405:201:5c0c:b0ec:3249:50ff:fe27:c9ba
  2    *        *        *    Request timed out.
  3   13 ms   12 ms   11 ms  2405:200:801:1600::5
  4    *        *        *    Request timed out.
  5   21 ms   22 ms   70 ms  2001:4860:1:1::1a34
  6   22 ms   19 ms   18 ms  2404:6800:8126::1
  7   15 ms   15 ms   16 ms  2001:4860:0:1::54fe
  8   52 ms   46 ms   37 ms  2001:4860:0:1::5503
  9   66 ms   47 ms   39 ms  del11s18-in-x05.1e100.net [2404:6800:4002:81d::2005]

Trace complete.
```

Figure 7.5: TRACERT [web site] command

```
C:\Users\Owner>nslookup
Default Server:  reliance.reliance
Address:  2405:201:5c0c:b0ec::c0a8:1d01

>
>
> nslookup mail.google.com
Server:  mail.google.com
Addresses:  2404:6800:4002:81d::2005
            142.250.193.229

DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
*** Request to mail.google.com timed-out
```

Figure 7.6: NSLOOKUP [web site] command



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5. Additional Creative Inputs (If Any): Na Learning

outcomes (What I have learnt):

- Learnt basic network communication: PING, TRACERT, IPCONFIG, and NSLOOKUP commands that are essential tools in diagnosing network communication issues.
- PING is used to test network connectivity between two devices.
- TRACERT helps identify network latency issues by showing the path a packet takes from the source device to the destination device.
- IPCONFIG displays the configuration of the network interfaces on a device, including IP address, subnet mask, and default gateway.
- Learnt to implement commands in command prompt.

Evaluation Grid (To be filled by Faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day)		
2.	Viva Result		
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		
	Signature of Faculty (with Date):	Total Marks Obtained:	