

Lab 3 Network

Task1:

The ping command is a fundamental network utility used to test the reachability of a host on an Internet Protocol (IP) network and to measure the round-trip time for messages sent from the originating host to a destination computer.

The ping command sends Internet Control Message Protocol(ICMP) echo request packets to the target host and waits for an “echo response”.

It measures the time it takes for the packets to travel to the destination and back, providing information on the latency and packet loss.

Use of command

Ping <host name or IP address >

Example: ping google.com

Task 2:

```
PS C:\Users\hp> ping google.com

Pinging google.com [142.250.194.238] with 32 bytes of data:
Reply from 142.250.194.238: bytes=32 time=89ms TTL=56
Reply from 142.250.194.238: bytes=32 time=57ms TTL=52
Reply from 142.250.194.238: bytes=32 time=55ms TTL=52
Reply from 142.250.194.238: bytes=32 time=62ms TTL=52

Ping statistics for 142.250.194.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 55ms, Maximum = 89ms, Average = 65ms
```

Size of packet receive from 142.250.194.238 is 32 bytes

The TTL values indicate the number of hops the packets took to reach the destination. The variation in TTL values (56 and 52) might be due to different routes taken by the packets.

Now for Local host

For finding local host we can use ipconfig command and look for the IPv4 and we get local host address

My local host address is 10.15.7.125

```
PS C:\Users\hp> ping 10.15.7.125

Pinging 10.15.7.125 with 32 bytes of data:
Reply from 10.15.7.125: bytes=32 time<1ms TTL=128
Reply from 10.15.7.125: bytes=32 time<1ms TTL=128
Reply from 10.15.7.125: bytes=32 time<1ms TTL=128
Reply from 10.15.7.125: bytes=32 time<1ms TTL=128

Ping statistics for 10.15.7.125:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Task 3:

- -c <count>: Specifies the number of packets to send. For example, ping -c 5 google.com sends five packets.
- -t: Pings the specified host until stopped. This is the default behavior in Linux.
- -s: The -s option in the ping command is used to specify the size of the data packets sent to the target host. By default, the ping command sends packets of 56 bytes (84 bytes when including the ICMP header). You can use the -s option to change this size.
- The -W option in the ping command is used to specify a timeout value in milliseconds for each packet sent. This means it sets the maximum time the ping command will wait for a reply before considering the packet lost.

Examples:

use of -c: but in window -n

```
PS C:\Users\hp> ping -n 5 youtube.com

Pinging youtube.com [142.250.194.110] with 32 bytes of data:
Reply from 142.250.194.110: bytes=32 time=51ms TTL=111
Reply from 142.250.194.110: bytes=32 time=67ms TTL=114
Reply from 142.250.194.110: bytes=32 time=53ms TTL=111
Reply from 142.250.194.110: bytes=32 time=52ms TTL=111
Reply from 142.250.194.110: bytes=32 time=51ms TTL=111

Ping statistics for 142.250.194.110:
    Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 51ms, Maximum = 67ms, Average = 54ms
```

Use of -s: but in window -l

```
PS C:\Users\hp> ping -l 100 youtube.com

Pinging youtube.com [216.58.221.46] with 100 bytes of data:
Reply from 216.58.221.46: bytes=68 (sent 100) time=55ms TTL=110
Reply from 216.58.221.46: bytes=68 (sent 100) time=60ms TTL=110
Reply from 216.58.221.46: bytes=68 (sent 100) time=65ms TTL=110
Reply from 216.58.221.46: bytes=68 (sent 100) time=71ms TTL=56

Ping statistics for 216.58.221.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 55ms, Maximum = 71ms, Average = 62ms
```

Use of -t: but in window -i

```
PS C:\Users\hp> ping -i 164 youtube.com

Pinging youtube.com [216.58.221.46] with 32 bytes of data:
Reply from 216.58.221.46: bytes=32 time=65ms TTL=56
Reply from 216.58.221.46: bytes=32 time=55ms TTL=110
Reply from 216.58.221.46: bytes=32 time=64ms TTL=56
Reply from 216.58.221.46: bytes=32 time=62ms TTL=56

Ping statistics for 216.58.221.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 55ms, Maximum = 65ms, Average = 61ms
```

Use of -W : but in window -w

```
PS C:\Users\hp> ping -w 100 youtube.com

Pinging youtube.com [142.250.206.174] with 32 bytes of data:
Request timed out.
Reply from 142.250.206.174: bytes=32 time=48ms TTL=53
Reply from 142.250.206.174: bytes=32 time=91ms TTL=56
Reply from 142.250.206.174: bytes=32 time=193ms TTL=56

Ping statistics for 142.250.206.174:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 48ms, Maximum = 193ms, Average = 110ms
```

Task 4:

Scenario: Diagnosing Slow Network Speeds

Situation:

You notice that your internet connection is unusually slow. Websites are taking a long time to load, and online videos are buffering frequently. You want to determine if the issue is with your local network, your ISP, or a specific website.

Steps to Troubleshoot Using ping:

1. Ping Your Router:

- First, check the connection between your computer and your router.
- Open Command Prompt and type:
- ping <router ips>
- **Interpretation:** If the response times are low (e.g., < 10ms) and there is no packet loss, your local network is likely fine. High response times or packet loss indicate a problem with your local network.

2. Ping a Reliable External Server:

- Next, check the connection to a reliable external server, such as Google's DNS server.
- Type:
- ping 8.8.8.8
- **Interpretation:** Low response times (e.g., < 50ms) and no packet loss suggest that your connection to the internet is stable. High response times or packet loss indicate an issue with your ISP or the connection to the wider internet.

3. Ping a Specific Website:

- Finally, check the connection to the specific website you are having trouble with.
- Type:
- ping example.com
- Replace example.com with the website's domain.
- **Interpretation:** If the response times are high or there is packet loss, the issue might be with the website's server or its network. If the response times are normal, the problem might be elsewhere.

Conclusion:

By using the ping command, you can systematically check different parts of your network to identify where the issue might be. This helps in isolating the problem, whether it's within your local network, with your ISP, or with a specific website.

Would you like to explore more advanced network troubleshooting techniques or tools?

Task5:

Output-----

```
PS C:\Users\hp\OneDrive - Indian Institute of Technology Patna\Desktop\network code'> python task5.py
WARNING: Wireshark is installed, but cannot read manu!
Enter the destination IP: 8.8.8.8
Enter the number of pings: 1
Enter the TTL value: 40
Enter the packet size: 2
Enter the timeout value: 1
8.8.8.8 is alive, RTT: 234.44 ms

--- 8.8.8.8 ping statistics ---
1 packets transmitted, 1 received, 0.00% packet loss
rtt min/avg/max = 234.44/234.44/234.44 ms
```