

Network LAB 1

Q1: explain how to get the private IP?

```
C:\Users\mass>Ipconfig

Windows IP Configuration

Unknown adapter Local Area Connection:

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

Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 10:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : home
    IPv6 Address. . . . . : fdb4:f51e:69f8:c600:4f06:cf6b:347a:e4cc
    Temporary IPv6 Address. . . . . : fdb4:f51e:69f8:c600:cd57:4668:473d:313
    Link-local IPv6 Address . . . . . : fe80::56b6:5f8b:88d3:6cd5%20
    IPv4 Address. . . . . : 192.168.1.16
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Bluetooth Network Connection:

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

Q2: What is the difference between ipconfig & ipconfig/all?

	purpose	Details shown	usage
Ipconfig	Displays a basic overview of your network interfaces.	IP, Subnet Mask, Default Gateway	you need a quick glance at your IP address and gateway
Ipconfig/all	Displays detailed and complete information about all network interfaces.	Everything from ipconfig plus MAC, DHCP and DNS	when troubleshooting or configuring networks, as it provides comprehensive details.

```
C:\Users\mass>Ipconfig
```

```
Windows IP Configuration
```

```
Unknown adapter Local Area Connection:
```

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

```
Ethernet adapter Ethernet:
```

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

```
Wireless LAN adapter Local Area Connection* 1:
```

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

```
Wireless LAN adapter Local Area Connection* 10:
```

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

```
Wireless LAN adapter Wi-Fi:
```

```
Connection-specific DNS Suffix . : home
IPv6 Address. . . . . : fdb4:f51e:69f8:c600:4f06:cf6b:347a:e4cc
Temporary IPv6 Address. . . . . : fdb4:f51e:69f8:c600:cd57:4668:473d:313
Link-local IPv6 Address . . . . . : fe80::56b6:5f8b:88d3:6cd5%20
IPv4 Address. . . . . : 192.168.1.16
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.1.1
```

```
Ethernet adapter Bluetooth Network Connection:
```

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

```

C:\Users\mass>Ipconfig/all

Windows IP Configuration

Host Name . . . . . : DESKTOP-8RMR47N
Primary Dns Suffix . . . . . :
Node Type . . . . . : Mixed
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : home

Unknown adapter Local Area Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : TAP-Windows Adapter V9
Physical Address. . . . . : 00-FF-59-23-B6-E1
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) Ethernet Connection (2) I219-LM
Physical Address. . . . . : 28-F1-0E-49-DB-61
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 1:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. . . . . : B8-8A-60-92-FA-91
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 10:

Media State . . . . . : Media disconnected

```

Q3: explain how to get the public IP?

What Is My IP?

My Public IPv4: [197.43.52.123](#) 📄

My Public [IPv6](#): Not Detected

My IP Location: Al Mahallah al Kubra, GH EG 📄

My ISP: TE Data 📄

Q4: What is the difference between public ip & private ip?

Public IP: Acts as the address for your entire network on the internet. Only one public IP is typically assigned to a network by an ISP.

Private IP: Used to uniquely identify devices within a local network. Devices behind a private IP connect to the internet through NAT, which translates private IPs to the public IP.

Q5: How does the device get its IP?

1. Dynamic IP Assignment (Most Common)

This method uses the Dynamic Host Configuration Protocol (DHCP), which is usually handled by the router or ISP.

Steps:

- Device Connection:

When a device connects to a network, it sends a DHCP Discover message to request an IP address.

- DHCP Server Responds:

The DHCP server (usually your router) assigns an available IP address from its pool and sends it to the device.

- Lease Time:

The IP address is assigned temporarily for a "lease time." Once the lease expires, the device must request a new IP.

- Network Details Provided:

Along with the IP, the DHCP server also sends information like:

Subnet mask

Default gateway (router's IP)

DNS server addresses

2. Static IP Assignment

In some cases, an IP address is manually assigned to a device.

Steps:

- A network administrator assigns a specific IP address to the device.
- The user enters the IP address, subnet mask, and gateway details manually in the device's network settings.

- The device uses this static IP permanently unless changed.

Use Cases: Servers, printers, or devices needing consistent network access.

3. Public IP Address Assignment

For devices or networks connected to the internet, public IPs are assigned by the ISP.

Steps :

- The ISP assigns a dynamic public IP by default through their DHCP servers.
- If a static public IP is requested, the ISP manually assigns one to your router or modem.

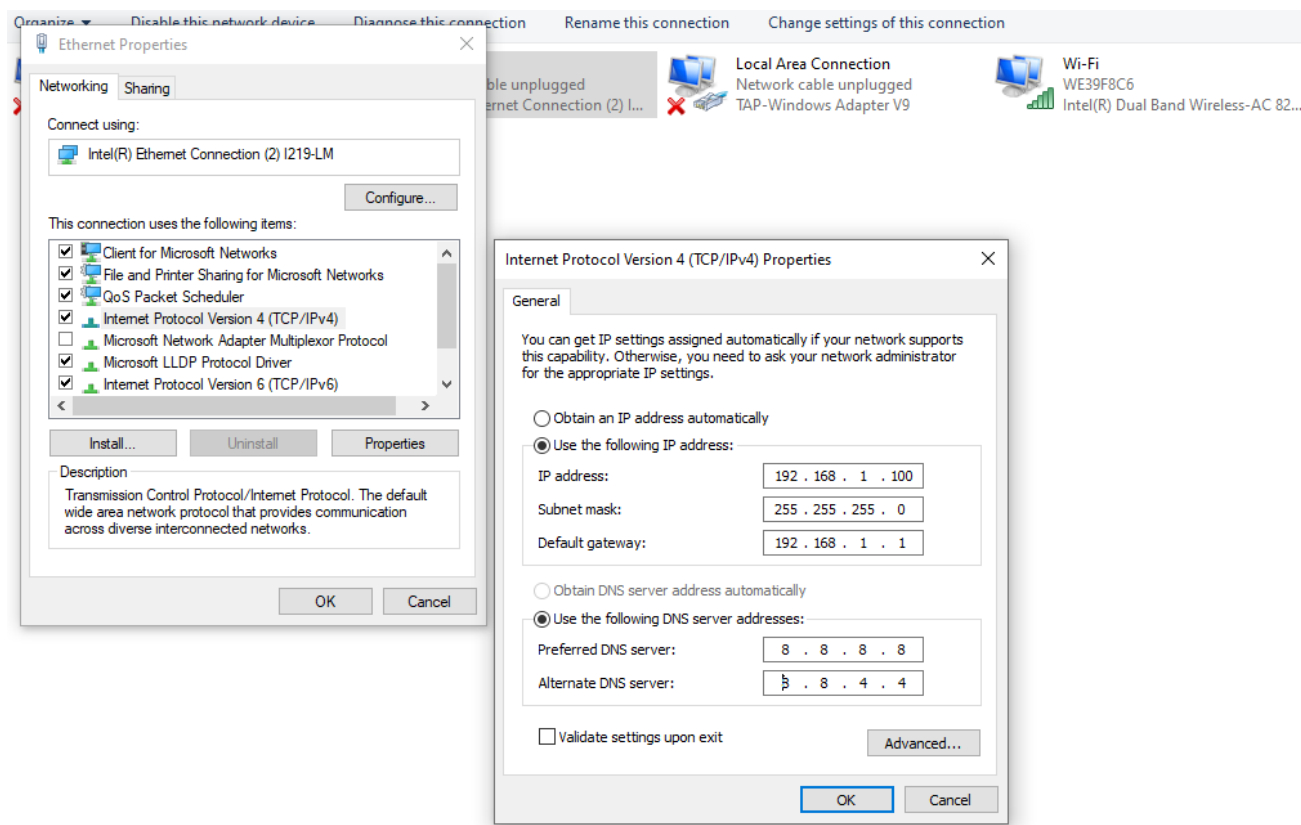
4. Automatic Private IP Assignment

If a device can't contact a DHCP server, it assigns itself an Automatic Private IP Address (APIPA).

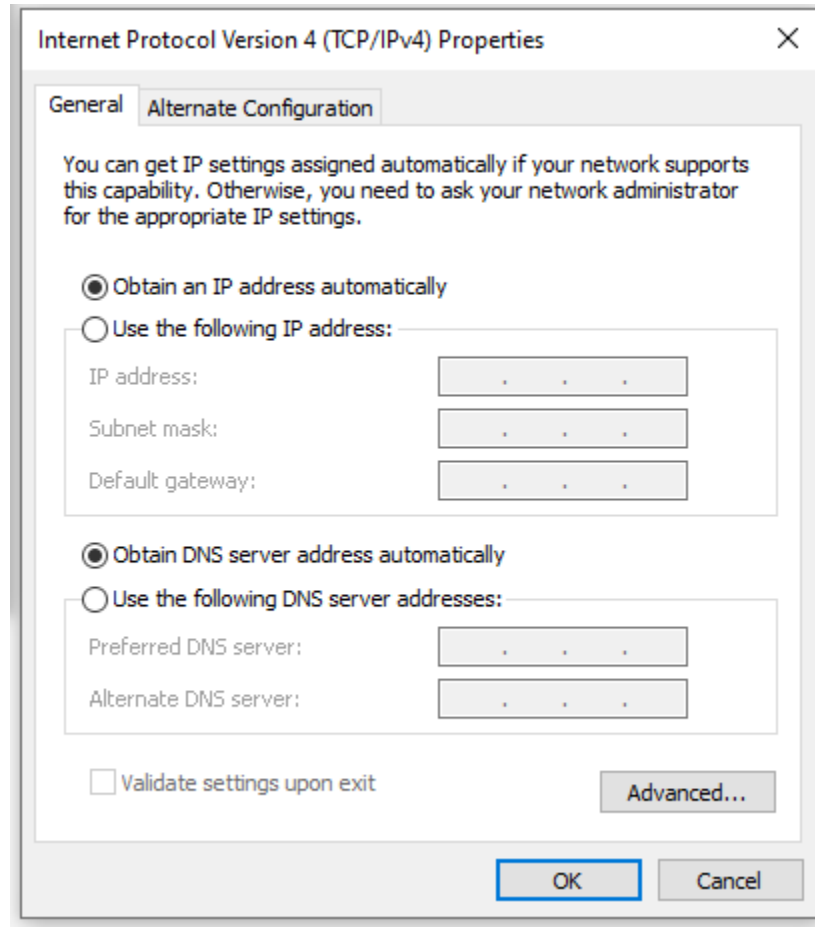
Key Points:

- This is a fallback mechanism.
- The IP range is 169.254.x.x.
- The device can only communicate with other devices in the same network but not access the internet.

Q6: Make your device get its private IP statically?



Q7: Reset your device to get its private IP automatically?



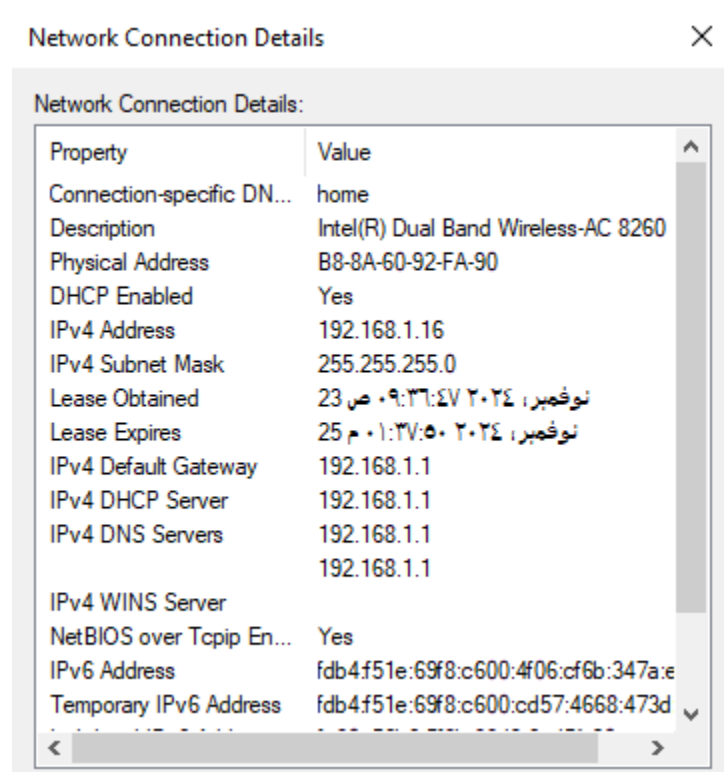
Q8: What do you know about APIPA Address ?

APIPA (Automatic Private IP Addressing) is a feature in operating systems (such as Windows, macOS, and Linux) that allows devices to assign themselves an IP address automatically when they are unable to obtain one from a DHCP server.

Key Characteristics of APIPA

1. **IP Range:**
 - APIPA uses a specific reserved range of IP addresses:
169.254.0.1 to 169.254.255.254.
 - The subnet mask is always 255.255.0.0.
2. **Purpose:**
 - Provides a fallback mechanism for devices to communicate with each other on the same local network when no DHCP server is available.
3. **Local Network Only:**
 - APIPA allows communication only within the same subnet.
 - Devices using APIPA addresses cannot access the internet.
4. **Automatic Assignment:**
 - If a device cannot contact a DHCP server, it will automatically pick an address from the 169.254.x.x range.

Q9: Give me 2 ways to find out your device's MAC address.



```

C:\Users\mass>Ipconfig/all

Windows IP Configuration

Host Name . . . . . : DESKTOP-8RMR47N
Primary Dns Suffix . . . . . :
Node Type . . . . . : Mixed
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : home


Unknown adapter Local Area Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : TAP-Windows Adapter V9
Physical Address. . . . . : 00-FF-59-23-B6-E1
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes


Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) Ethernet Connection (2) I219-LM
Physical Address. . . . . : 28-F1-0E-49-DB-61
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes


Wireless LAN adapter Local Area Connection* 1:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. . . . . : B8-8A-60-92-FA-91
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes


Wireless LAN adapter Local Area Connection* 10:

Media State . . . . . : Media disconnected

```

Q10: What is the difference between getmac & getmac/v ?

```

C:\Users\mass>getmac

Physical Address      Transport Name
=====
B8-8A-60-92-FA-90    \Device\NPF{E09A0BD8-2242-4641-8E84-ABBADC61B840}
28-F1-0E-49-DB-61    Media disconnected
B8-8A-60-92-FA-94    Media disconnected
00-FF-59-23-B6-E1    Media disconnected


C:\Users\mass>getmac/v

Connection Name Network Adapter Physical Address      Transport Name
=====
Wi-Fi           Intel(R) Dual B  B8-8A-60-92-FA-90    \Device\NPF{E09A0BD8-2242-4641-8E84-ABBADC61B840}
Ethernet        Intel(R) Ethern  28-F1-0E-49-DB-61    Media disconnected
Bluetooth Netwo  Bluetooth Devic  B8-8A-60-92-FA-94    Media disconnected
Local Area Conn TAP-Windows Ada  00-FF-59-23-B6-E1    Media disconnected

```

- getmac command: shows a basic list of the **MAC addresses** and the **transport names** of all network interfaces on your computer.
- Getmac/v It provides **more detailed information**, including the **connection status** of each network interface, and the **connection description**

Q11: How can you request a new IP from a DHCP server?

```
C:\Users\mass>ipconfig/release
```

```
Windows IP Configuration
```

```
No operation can be performed on Local Area Connection while it has its media disconnected.  
No operation can be performed on Ethernet while it has its media disconnected.  
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.  
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.  
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.
```

```
Unknown adapter Local Area Connection:
```

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

```
Ethernet adapter Ethernet:
```

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

```
Wireless LAN adapter Local Area Connection* 1:
```

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

```
Wireless LAN adapter Local Area Connection* 10:
```

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

```
Wireless LAN adapter Wi-Fi:
```

```
Connection-specific DNS Suffix . :  
IPv6 Address. . . . . : fdb4:f51e:69f8:c600:4f06:cf6b:347a:e4cc  
Temporary IPv6 Address. . . . . : fdb4:f51e:69f8:c600:cd57:4668:473d:313  
Link-local IPv6 Address . . . . . : fe80::56b6:5f8b:88d3:6cd5%20  
Default Gateway . . . . . :
```

```

C:\Users\mass>ipconfig/renew

Windows IP Configuration

No operation can be performed on Local Area Connection while it has its media disconnected.
No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Unknown adapter Local Area Connection:

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

Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 10:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : home
    IPv6 Address. . . . . : fdb4:f51e:69f8:c600:4f06:cf6b:347a:e4cc
    Temporary IPv6 Address. . . . . : fdb4:f51e:69f8:c600:cd57:4668:473d:313
    Link-local IPv6 Address . . . . . : fe80::56b6:5f8b:88d3:6cd5%20
    IPv4 Address. . . . . : 192.168.1.16
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

```

Q12: Explain what you understand about ARP protocol?

ARP plays a critical role in ensuring that devices on a local network can communicate with each other by resolving IP addresses to MAC addresses, allowing packets to be correctly directed within the network.

Q13. How do we view the contents of the ARP cache?

```
C:\Users\mass>arp -a

Interface: 192.168.1.16 --- 0x14
    Internet Address      Physical Address      Type
    192.168.1.1           b4-f5-1e-69-f8-c6    dynamic
    192.168.1.255         ff-ff-ff-ff-ff-ff    static
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.12            01-00-5e-00-00-0c    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251           01-00-5e-00-00-fb    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
```

Q14. How do we delete the ARP cache?

```
C:\Users\mass>arp -d
The ARP entry deletion failed: The requested operation requires elevation.
```

Q15. How do we view the local routing table?

```

:\Users\mass>route print
=====
Interface List
10...00 ff 59 23 b6 e1 .....TAP-Windows Adapter V9
16...28 f1 0e 49 db 61 .....Intel(R) Ethernet Connection (2) I219-LM
7...b8 8a 60 92 fa 91 .....Microsoft Wi-Fi Direct Virtual Adapter
13...ba 8a 60 92 fa 90 .....Microsoft Wi-Fi Direct Virtual Adapter #2
20...b8 8a 60 92 fa 90 .....Intel(R) Dual Band Wireless-AC 8260
6...b8 8a 60 92 fa 94 .....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1
=====

Pv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway           Interface        Metric
0.0.0.0                    0.0.0.0          192.168.1.1       192.168.1.16     55
127.0.0.0                  255.0.0.0        On-link           127.0.0.1        331
127.0.0.1                  255.255.255.255  On-link           127.0.0.1        331
127.255.255.255            255.255.255.255  On-link           127.0.0.1        331
192.168.1.0                 255.255.255.0    On-link           192.168.1.16     311
192.168.1.16                255.255.255.255  On-link           192.168.1.16     311
192.168.1.255               255.255.255.255  On-link           192.168.1.16     311
224.0.0.0                   240.0.0.0        On-link           127.0.0.1        331
224.0.0.0                   240.0.0.0        On-link           192.168.1.16     311
255.255.255.255             255.255.255.255  On-link           127.0.0.1        331
255.255.255.255             255.255.255.255  On-link           192.168.1.16     311
=====

Persistent Routes:
None

Pv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
1 331 ::1/128 On-link
20 71 fdb4:f51e:69f8:c600::/64 On-link
20 311 fdb4:f51e:69f8:c600:4f06:cf6b:347a:e4cc/128
On-link
20 311 fdb4:f51e:69f8:c600:cd57:4668:473d:313/128
On-link
20 311 fe80::/64 On-link
20 311 fe80::56b6:5f8b:88d3:6cd5/128

```

Q16. Can you tell me which command that could check connectivity between 2 devices?

Ping command

```

C:\Users\mass>ping 127.0.0.1

Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\Users\mass>

```

2. **Sent** equals the **Received** (Sent = 4, Received = 4), it means there is **no packet loss**, and the connectivity is functioning perfectly.

4.

```

C:\Users\mass>ping 10.10.0.10

Pinging 10.10.0.10 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.10.0.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\mass>

```

Request Timed Out: The packets were sent, but no response was received. Possible causes:

- The IP is not active.
- A firewall is blocking ICMP packets.

Q17. Verify the connectivity of the loopback IP address "127.0.0.1" by sending "8" packets which the size of each packet is "50000"?

Q19. What is the meaning of “ DOS Attack” ?

A **DoS (Denial of Service) attack** is a cyberattack designed to make a system, server, or network unavailable by overwhelming it with excessive requests or exploiting vulnerabilities. This disrupts normal operations, preventing legitimate users from accessing the service.

Key points:

- **Single Source:** The attack originates from one source.
- **Techniques:** Includes flooding (e.g., SYN flood, ping flood) or crashing systems via vulnerabilities.
- **Impact:** Causes service downtime, financial losses, and reputational damage.
- **Mitigation:** Use firewalls, rate limiting, and network monitoring to detect and block malicious activity.

This contrasts with a **DDoS attack**, which uses multiple sources for greater disruption.

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