

Static IP Configuration on Windows Machine

Theory

The goal of this lab is to understand how to set up a static IP address on a Windows computer. Mastering this skill is important for configuring network devices in situations where a fixed IP address is needed to maintain consistent network connectivity.

Background information :

1. IP Address: A unique numerical label assigned to each device on a network, allowing it to send and receive data. It can be static (manually configured) or dynamic (assigned by DHCP). **192.168.1.10** - This could be the IP address of a computer or smartphone on a home network.

2. Subnet Mask: A 32-bit number used alongside an IP address to divide the network into subnetworks, identifying the network and host portions of an address. **255.255.255.0** - This subnet mask indicates that the first three octets (192.168.1) represent the network portion, and the last octet (.10) represents the host.

3. Default Gateway: The IP address of a router that directs traffic from a local network to external networks, such as the internet, typically used when a device needs to communicate with a device outside its own subnet. **192.168.1.1** - This is the default gateway.

4. DNS Server: A server that translates domain names (like www.example.com) into IP addresses, allowing users to access websites using human-friendly names instead of numeric IP addresses. It acts as the internet's phonebook. **8.8.8.8** - This is one of Google's public DNS servers, used to resolve domain names into IP addresses.

Material and equipment:

Windows machine.

Administrator rights on machine to modify network settings.

Static IP Configuration Steps

Step 1: Open the Command Prompt:

The initial step is to identify the computer's current IP address, subnet mask, and default gateway. To do this, open the Command Prompt, right-click on it, and select "Run as administrator."

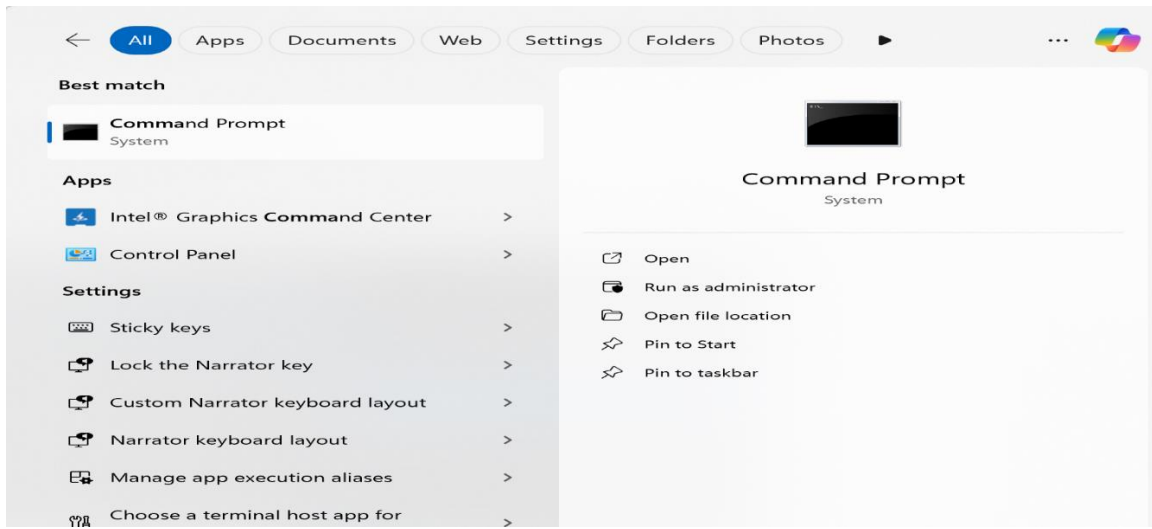


fig : Opening command prompt

Step 2: Take Note of Your Subnet Mask and Gateway:

Open Command Prompt and type the command `ipconfig /all` to display your network configuration settings. Under the Wireless LAN adapter section, you will find the current IP address, subnet mask, default gateway, and DNS server information.

Prompt: `ipconfig`

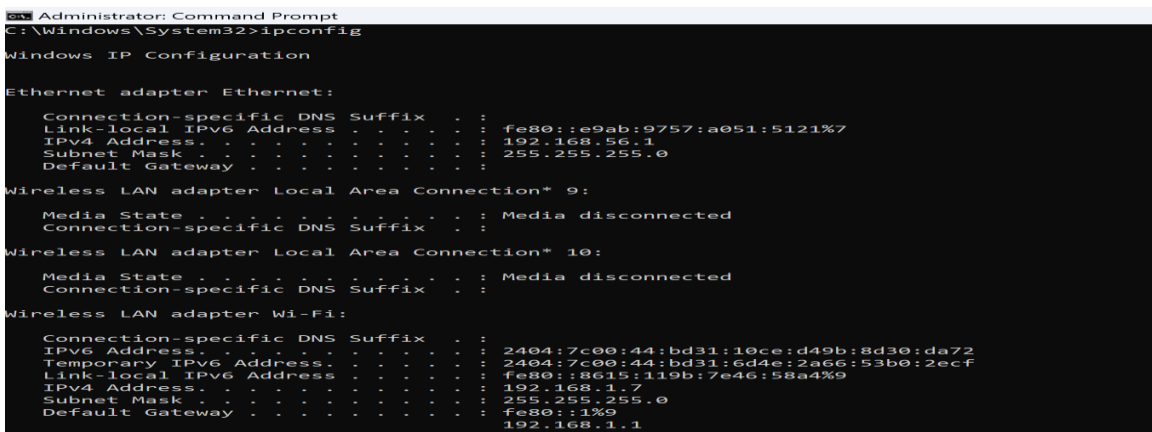


fig: ip config to see network info

Step 3: View Network Connections:

Use the Windows Start menu to search for "network connections" and select the "View network connections" option. This will display all the available network interfaces on your computer.

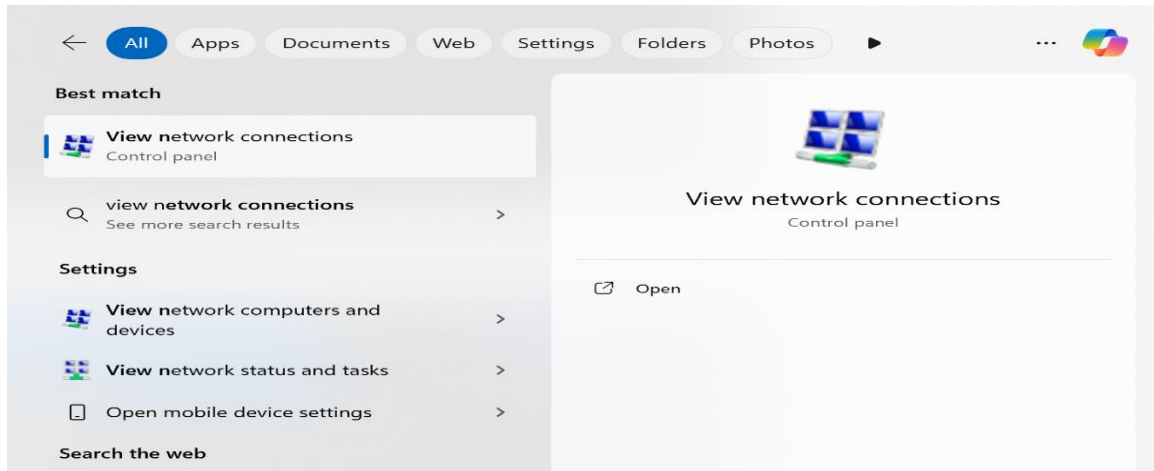


Fig: searching for network connection

Step 4: Open Network Properties

Right-click on the Wi-Fi or Ethernet connection (depending on your active connection type) and select "Properties" from the menu to access the network settings for that connection.

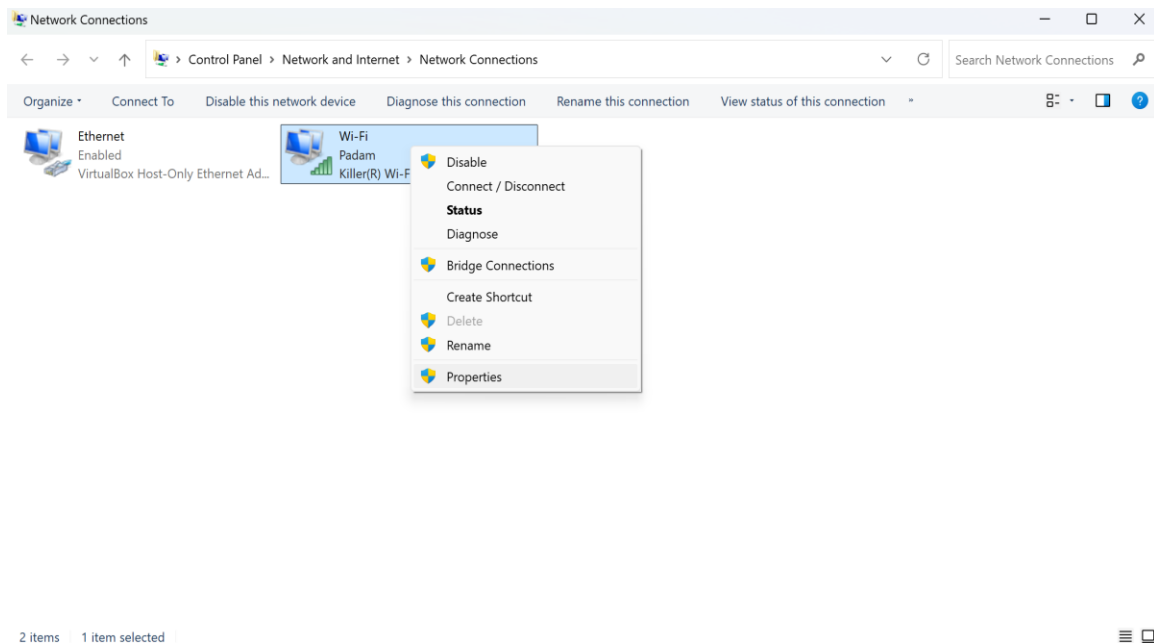


fig: opening network properties

Step 5: Find IPv4 Settings

Find the Internet Protocol Version 4 entry in the pop-up window that appears and double-click on it.

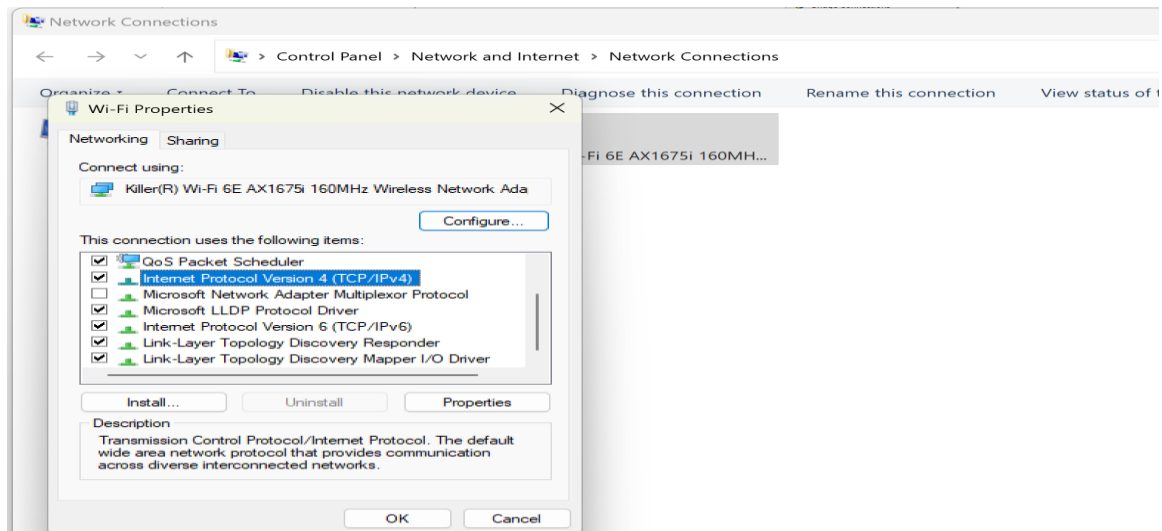


fig: accessing IPv4 protocol

Step 6: Change the setting from DHCP to static.

In the new menu that appears, click Use the following IP address.

Click OK to finalize.

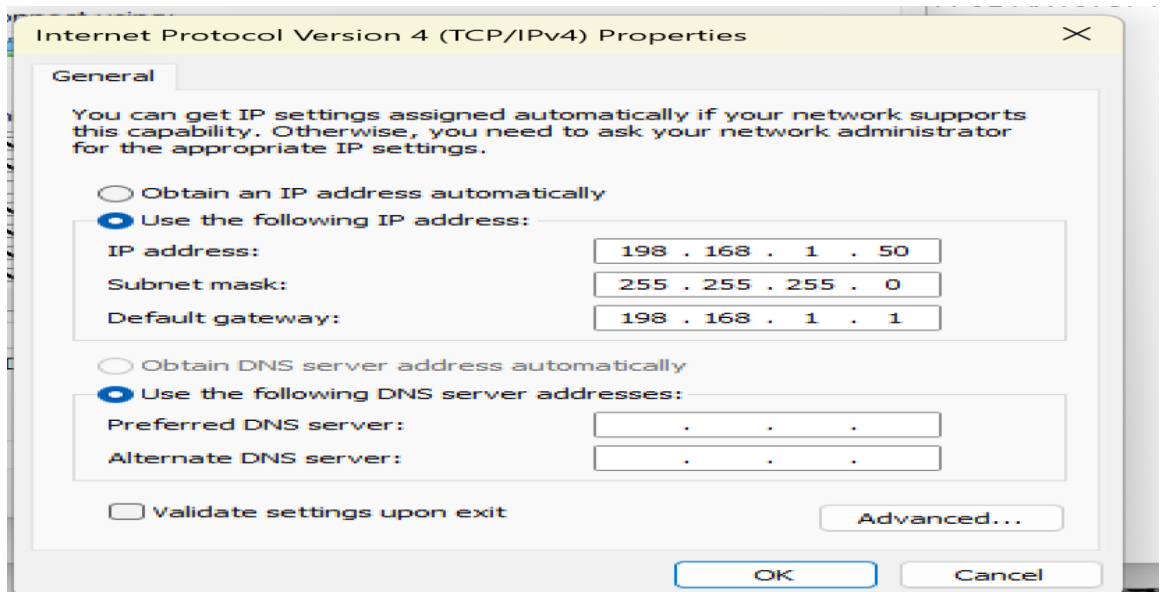


fig: changing ip address

Step 7: Check whether IP Address have been changed or not:

Finally, open CMD again and use ipconfig to check if your IP address has been changed.

```
C:\Windows\System32>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::e9ab:9757:a051:5121%7
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Local Area Connection* 9:

    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. . . . . : 2404:7c00:44:bd31:10ce:d49b:8d30:da72
    Temporary IPv6 Address. . . . . : 2404:7c00:44:bd31:5cc9:31cf:73eb:93f9
    Link-local IPv6 Address . . . . . : fe80::8615:119b:7e46:58a4%9
    IPv4 Address. . . . . : 198.168.1.50
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::1%9
                                198.168.1.1
```

fig: result of changing ip address

Step 8: Network Connectivity Test:

Here to test the network connectivity we check `ping google.com` command returns a response, indicating successful network connectivity.

```
C:\Windows\System32>

C:\Windows\System32>ping google.com

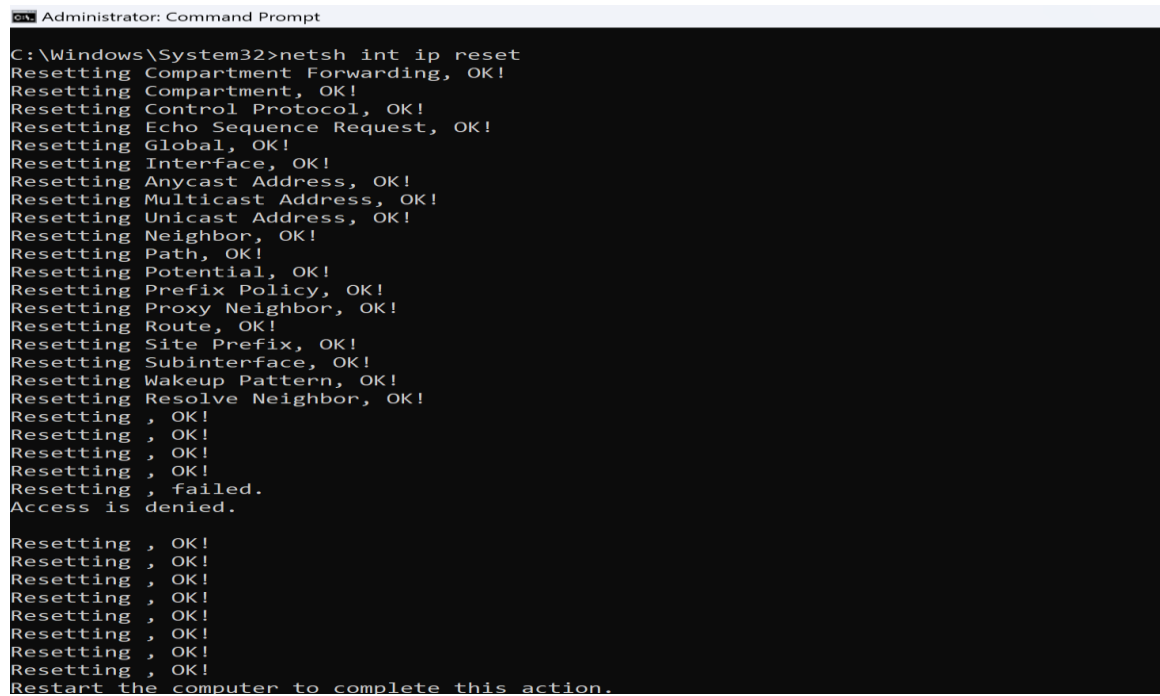
Pinging google.com [2404:6800:4007:81b::200e] with 32 bytes of data:
Reply from 2404:6800:4007:81b::200e: time=40ms
Reply from 2404:6800:4007:81b::200e: time=49ms
Reply from 2404:6800:4007:81b::200e: time=85ms
Reply from 2404:6800:4007:81b::200e: time=144ms

Ping statistics for 2404:6800:4007:81b::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 40ms, Maximum = 144ms, Average = 79ms
```

fig: checking network connectivity by using ping command

Step 9: Post-Configuration Testing:

A successful ping test indicates that the static IP configuration is correct and that the machine has maintained internet connectivity.



```
Administrator: Command Prompt
C:\Windows\System32>netsh int ip reset
Resetting Compartment Forwarding, OK!
Resetting Compartment, OK!
Resetting Control Protocol, OK!
Resetting Echo Sequence Request, OK!
Resetting Global, OK!
Resetting Interface, OK!
Resetting Anycast Address, OK!
Resetting Multicast Address, OK!
Resetting Unicast Address, OK!
Resetting Neighbor, OK!
Resetting Path, OK!
Resetting Potential, OK!
Resetting Prefix Policy, OK!
Resetting Proxy Neighbor, OK!
Resetting Route, OK!
Resetting Site Prefix, OK!
Resetting Subinterface, OK!
Resetting Wakeup Pattern, OK!
Resetting Resolve Neighbor, OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , failed.
Access is denied.

Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Resetting , OK!
Restart the computer to complete this action.
```

fig: testing after configuration

Conclusion

In this lab, a static IP address was successfully configured on a Windows machine. By carefully following the steps and verifying the configuration through command prompt outputs, the network settings were correctly applied, ensuring stable connectivity to the network.