

IP Address, MAC Address, and Port Address

IP Address (Internet Protocol Address):

An IP address is a unique identifier assigned to a device on a network, allowing it to communicate with other devices over the internet or a local network. It is similar to a home address, which helps locate a house in a city.

Suppose your laptop is connected to Wi-Fi, and you visit a website (www.google.com). Your laptop has an IP address, say 192.168.1.10, assigned by the router. When you request Google's homepage, your laptop sends the request with its IP address, and Google's server (e.g., 142.250.190.78) responds accordingly.

MAC Address (Media Access Control Address):

A MAC address is a unique hardware identifier assigned to a network interface card (NIC) of a device. It operates at the data link layer and helps in identifying devices in a local network.

When you connect to a Wi-Fi router, the router assigns your device an IP address, but it still recognizes your device using its MAC address. If two devices have the same IP address but different MAC addresses, the router can still differentiate between them.

Port Address:

A port address helps direct data to the correct application on a device. While an IP address identifies a device, the port number ensures the data reaches the right service (e.g., web browsing, email, or file transfer).

When you visit <https://www.google.com>, your computer sends a request to Google's server on port 443 (HTTPS). The server recognizes the request and responds through the same port, ensuring the correct application (web browser) receives the data.

Analogy for Understanding:

Think of a hotel as a network:

- The IP Address is like the hotel's street address (identifies the building).
- The MAC Address is like a room number.
- The Port Number is like a specific service inside the room.

Check IP Address

The IP address can be either:

- **Private IP** (Assigned by your router for local network communication)
- **Public IP** (Assigned by your Internet Service Provider for internet access)

ipconfig

Look for:

- **IPv4 Address** → Your private IP (e.g., 192.168.1.100)
- **Default Gateway** → Your router's IP (e.g., 192.168.1.1)

To check your **public IP**, open a browser and search "**What is my IP**" on Google.

Check MAC Address:

The MAC Address (Physical Address) is assigned to your laptop's network adapter

ipconfig /all

Find Physical Address (e.g., 00-1A-2B-3C-4D-5E).

Check Open Ports:

A port number helps identify specific network services running on your laptop.

netstat -ano

This will display active ports and the process ID (PID).

