

Understanding IPv4 Addresses

- An IP Address is a **logical address** used in order to **uniquely identify** a device on an IP network.
- It's a **Network Layer** Address
- There are Two Versions:
 - IP version 4 (IPv4)
 - IP version 6 (IPv6)
- This lesson focuses on IPv4, and we'll discuss IPv6 later in the course.



IPv4 Address Anatomy

- Made up of 32 binary bits, which can be divided into a **network portion** and a **host portion** with the help of a subnet mask.
 - The 32 binary bits are broken into four octets (1 octet = 8 bits).
 - Each octet is converted to decimal and separated by a period (dot).
 - For this reason, an IP address is said to be expressed in dotted decimal format.

192 . 168 . 1 . 131

11000000.10101000.00000001.10000011

8 bits = 1 byte = 1 octet

32 bits = 4 bytes = 4 octets

IPv4 Address Anatomy

192 . 168 . 1 . 131
11000000.10101000.00000001.10000011

8 bits = 1 byte = 1 octet

32 bits = 4 bytes = 4 octets

First Octet	Second Octet	Third Octet	Fourth Octet
192 .	168 .	1 .	131
11000000 .	10101000 .	00000001 .	10000011
8 bits	8 bits	8 bits	8 bits

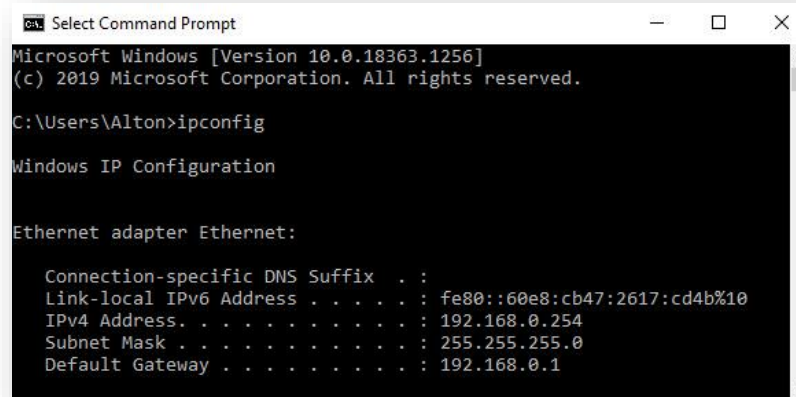
Network and Host Portion

- An IP address is broken down into two parts:
 - **Network Address**
 - Uniquely identifies each network
 - Your Street Name: 7682 **Wilshire Drive**
 - **Host Address**
 - Uniquely identifies each machine on a network
 - Your House Address: **7682** Wilshire Drive
- Network Address + Host Address = IP Address
 - **Wilshire Drive 7682**



IPv4 Address Components

- Each device on a network is assigned an IP address, subnet mask and default gateway:
 - **IP Address:** Unique logical address assigned to each device on a network.
 - **Subnet Mask:** Used by the device to determine what subnet it's on, specifically the network and host portions of the IP address.
 - **Default Gateway:** The IP address of a network's router that allows devices on the local network to communicate with other networks.



```

C:\Users\Alton>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::60e8:cb47:2617:cd4b%10
    IPv4 Address. . . . . : 192.168.0.254
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.0.1

```