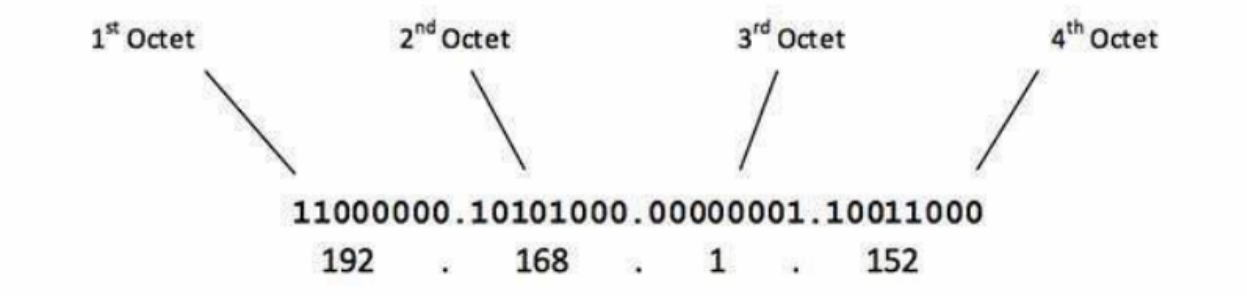
Experiment Number 4: Study of IP Address Configuration

Classes of IP Address:

Internet Protocol hierarchy contains several classes of IP Addresses to be used efficiently in various situations as per the requirement of hosts per network. Broadly, the IPv4 Addressing system is divided into five classes of IP Addresses. All the five classes are identified by the first octet of IP

Address.

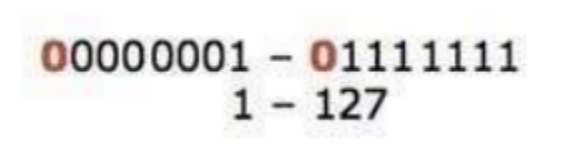


The addresses are

1. **Class A**—Used in LAN and WAN networks
2. **Class B**-- Used in LAN and WAN networks
3. **Class C**-- Used in LAN and WAN networks
4. **Class D**—Used for Multicasting
5. **Class E**—Reserved for Future use (Research and Development).

Class A Address

- The first bit of the first octet is always set to 0 zero. Thus, the first octet ranges from 1 – 127.



- The default subnet mask [A subnet mask is a number that distinguishes the network address and the host address within an IP address] for Class A IP address is 255.0.0.0.

Class B Address

- Class B Address an IP address which belongs to class B has the first two bits in the first octet set to 10, i.e.
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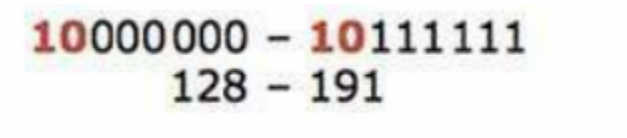
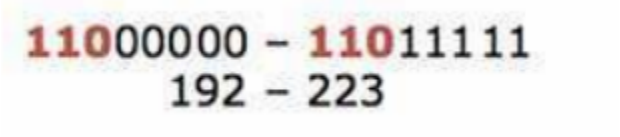


- The default subnet mask for Class B is 255.255.x.x.

Class C Address

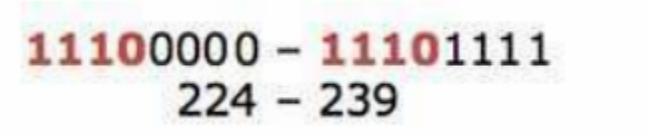
- The first octet of Class C IP address has its first 3 bits set to 110, that is



- The default subnet mask for Class C is 255.255.255.x

Class D Address

- Very first four bits of the first octet in Class D IP addresses are set to 1110, giving a range of



- Class D is reserved for **Multicasting**.

- In multicasting data is not destined for a particular host, that is why there is no need to extract host address from the IP address, and Class D does not have any subnet mask.

Class E Address

- This IP Class is reserved for experimental purposes only for R&D or Study.
- IP addresses in this class ranges from 240.0.0.0 to 255.255.255.254. Like Class D, this class too is not equipped with any subnet mask.

Static and Dynamic Address:

Static Address:

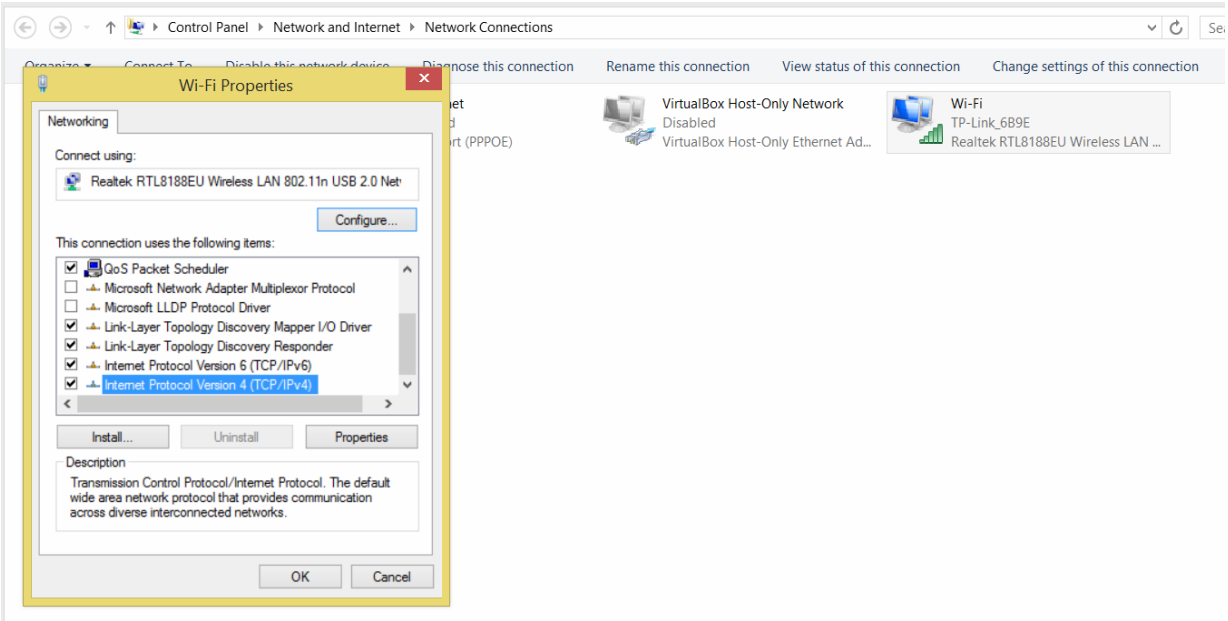
- Static IP address is a fixed address assigned to a device manually by a network administrator while the dynamic IP address is an address assigned to a device automatically by a DHCP server.
- Static IP address is a fixed IP address assigned to the device manually.
- It was the original method to assign IP addresses to the devices in the network.
- Here, for each computer, the network administrator has to open the network configuration page and manually type the IP address.
- Additionally, the administrator should also include details such as subnet mask and default gateway.
- Moreover, this process had to be followed on all the devices in the network.
- Thus, it is difficult to assign static IP addresses when there are a large number of devices in the network.

Dynamic Address:

- A dynamic IP address is an address obtained from a Dynamic Host Configuration Protocol (DHCP) server.
- It assigns a device with dynamic IP address, subnet mask, default gateway, and a DNS server.
- In a Microsoft computer, selecting the option "**obtain an IP address automatically**" in the network property window will set the device to obtain an IP address dynamically.
- The dynamic IP address changes frequently.
- Each time the device connects to the network, the dynamic IP address changes.
- When the device tries to connect to the network, the DHCP server provides a dynamic address.
- When the user types a URL on the web browser, the DNS server maps the domain name to the IP address.
- Overall, Dynamic IP addressing is automatic and it makes managing a network easier.

Configuration steps:

1. Click on Start -> Run -> type ncpa.cpl -> OK
2. Right click on any active network connection



3. Select Internet Protocol Version 4 (TCP/IPv4) -> Properties.
4. Click on ‘Use the following IP address’.
5. Provide the IP address
6. Click on Subnet mask [automatically identifies]
7. Provide the default gateway [Apart from IP address]
8. Click on OK -> Close

Checking the IP address can be done as follows:

1. Right Click on cmd -> Run as administrator
2. Give ipconfig command