**1.VPC (virtual private cloud):**

**Network basics:**

1.**What is network:**

**A network refers to a group of interconnected devices that are able to communicate and share resources with each other**. This can include computer networks, such as local area networks (LANs) or wide area networks (WANs), as well as networks of other devices such as smartphones, tablets, and Internet of Things (IoT) devices.

2.**what is a static network:**

**A static network is a type of network that remains fixed or unchanging over time, meaning that the connections and relationships between the nodes (individual components of the network) remain constant.** In a static network, the nodes are typically connected in a fixed, predetermined pattern that does not change unless the network is manually reconfigured.

**3.what is a dynamic network**

**A dynamic network is a type of network where the connections and relationships between nodes change over time, based on factors such as the behavior of the nodes themselves or external events.** Social networks, for example, are dynamic networks where the connections between individuals may change based on factors such as changes in their social relationships or their activity on the network.

4. **what is an IP address:**

**An IP address, or Internet Protocol address, is a unique numerical label assigned to every device connected to a computer network that uses the Internet Protocol for communication.** The IP address is used to identify and locate devices on the network, allowing them to communicate with each other and with devices on other networks.

IP addresses are typically represented in a 32-bit binary format, although they are usually written in a dotted decimal notation format, which separates the four sections of the address by periods. For example, an IP address in dotted decimal notation might look like this: 192.168.0.1.

Tracert google.com(in command prompt)

Ip config:

Eg: Ex1: Class C : End users

Tatal network Bit 8 + 8 + 8 + 8 =32 Bits

Default Gateway . . . . . . . . . : 192.168.0.1

IPv4 Address. . . . . . . . . . . : 192.168.0.119

Subnet Mask . . . . . . . . . . . : 255.255.255.0-255

Total Network occupied Bit : 8 + 8 + 8 + 0 = 24 bits

5**.what is host Id:**

**In computer networking, a host ID is a unique identifier that is assigned to a device on a network. The host ID, along with the network ID, makes up the complete IP address of the device.**

The host ID is used to identify a specific device on the network, while the network ID identifies the network to which the device is connected. The combination of the two IDs allows packets of data to be correctly routed between devices on the network.

In an IP address, the host ID is the portion of the address that identifies the specific device on the network, while the network ID identifies the network itself. For example, in the IP address 192.168.0.1, the host ID is "1" and the network ID is "192.168.0".

**Eg:** **Network ID : 192.168.0**

**Host ID:119**

**6) subnet mask:**

A subnet mask is a 32-bit value used in Internet Protocol (IP) networks to define the network and host portions of an IP address. It is used in conjunction with an IP address to determine which part of the address is the network ID and which part is the host ID.

**7) classful network:**

Ex2: Class B : ISP

Tatal network Bit 8 + 8 + 8 + 8 =32 Bits

Default Gateway . . . . . . . . . : 192.168.0.1

IPv4 Address. . . . . . . . . . . : 192.168.185.72

Subnet Mask . . . . . . . . . . . : 255.255.0.0

Total Network occupied Bit : 8 + 8 + 0 + 0 = 16bits

Min = 0

MaX = 255

Total = 0-255 = 256IPS

Network ID : 192.168.

Host ID:185.72

How many IPS ?

2^(total network bit - occupied bits) -2 = total ips

2^(32-16) -2 = 65534 ips

Ex3: Class A : Broadband(TCS)

Tatal network Bit 8 + 8 + 8 + 8 =32 Bits

Default Gateway . . . . . . . . . : 192.168.0.1

IPv4 Address. . . . . . . . . . . : 192.168.185.72

Subnet Mask . . . . . . . . . . . : 255.0.0.0

Total Network occupied Bit : 8 + 0 + 0 + 0 = 8bits

Min = 0

MaX = 255

Total = 0-255 = 256IPS

Network ID : 192.

Host ID:168.185.72

How many IPS ?

2^(total network bit - occupied bits) -2 = total ips

2^(32-8) -2 = 16,777,214 ips

**ClassFul network**:

**1) We can’t change network**

**2) We can’t customize network**

**3) It is use octa dec , 0’s or 8’s**

**8) Router:**

A router is a networking device that connects multiple networks together and forwards data packets between them. Routers are typically used to connect a local area network (LAN) to the internet or to other networks, such as a wide area network (WAN) or a metropolitan area network (MAN).

**9) modem:**

A modem is a device that modulates and demodulates signals in order to transmit data over a communication channel. The term "modem" is short for "modulator-demodulator".

In the context of computer networking, a modem is typically used to convert digital signals from a computer or other digital device into analog signals that can be transmitted over a telephone line or other communication channel. The modem at the receiving end then demodulates the analog signals back into digital signals that can be understood by the receiving device.

**10) private ip and public ip:**

A **private IP** address is an IP address that is used to identify devices on a private network. Private IP addresses are not publicly routable on the internet and are designed to be used only within a private network, such as a home or business network.

These private IP addresses can be assigned to devices on a private network by a router or other network device that supports Network Address Translation (NAT).

Public Ip:

A public IP address is a unique identifier assigned to a device that is connected to the internet. This address is used to identify the device and communicate with it from other devices and servers on the internet.

Public IP addresses are assigned by the Internet Assigned Numbers Authority (IANA) to internet service providers (ISPs), who in turn assign them to individual users and devices. These addresses are globally unique, meaning that no two devices on the internet can have the same public IP address at the same time.

11) NAT:

Network Address Translation (NAT) is a process used by routers to modify the source and/or destination IP address and port number information of IP packets as they pass through the router. NAT allows multiple devices on a private network to share a single public IP address, which is typically assigned by an internet service provider (ISP).

NAT works by creating a mapping between the private IP address and port number used by a device on the internal network and a public IP address and port number used by the router on the external network. When a device on the internal network sends a packet out to the internet, the router modifies the source IP address and port number information in the packet to match its own public IP address and port number.

**12) subnetting:**

Subnetting is the process of dividing a single IP network into multiple smaller subnetworks, each with its own unique network ID and range of IP addresses. Subnetting is commonly used to help manage large IP networks by organizing devices into smaller, more manageable groups.

Subnetting works by borrowing bits from the host portion of an IP address and using them to create a separate network ID. The number of bits borrowed determines the number of subnets that can be created, and the number of available host addresses within each subnet.