**Concept of Subnets, CIDR address schemes, Subnet masks, iptables**

**IPv4 address**:

* Every host and router on internet has an IP address which encodes its network number and host number, combination of the two is unique.
* An IP address does not actually refer to a host but refers to a network interface, so if host is on two networks, it must have two IP addresses.

**Default Mask**:

* An address mask determines which portion of an IP address represents network number and which part represents host number, e.g., IP address, the mask has four octets.
* If a given bit of the mask is 1, the corresponding bit of the IP address is in network portion and if given bit of mask is 0, the corresponding bit of IP address is in host portion.

**CIDR**:

* Classless Inter Domain Routing uses slash(/) notation to specify the mask with IPv4 address.
* The address is given as x.y.z.t/n where x.y.z.t is the IP address and n is the number of 1’s in the default mask.

**Network address**:

* First address of a network is network address.
* It is obtained by ANDing the mask with the IP address (Both in binary form).
* Another method is to set last 32-n bits of the IP address to 0.

**Broadcast address:**

* Last address of a network is broadcast address.
* It is obtained by ORing the complement mask with the IP address(Both in binary form).
* Another method is to set last 32-n bits of the IP address to 1.

**Class:**

* Class of an address is identified by the first byte of address.
* There are currently five classes A, B, C, D and E.
* The range of first byte of each class is:
  + Class A: 0 - 127
  + Class B: 128 - 191
  + Class C: 192 - 223
  + Class D: 224 - 239
  + Class E: 240 – 255

**Subnetting using ipcalc**

* Ipcalc is a Linux command line tool that helps calculate and visualize network addresses and subnet segments
* When managing a network, you will undoubtedly need to deal with subnetting.
* To install ipcalc, simply run one of the commands below, based on the Linux distribution you are using.

$ sudo apt install ipcalc

Get information about the network address:

ipcalc 192.168.20.0

Calculate a subnet for 192.168.20.0/24.

ipcalc 192.168.20.0/24

Calculate a single subnet with 10 hosts:

ipcalc 192.168.20.0 -s 10

If you want to suppress the binary output, you can use the -b option as shown.

ipcalc -b 192.168.20.100