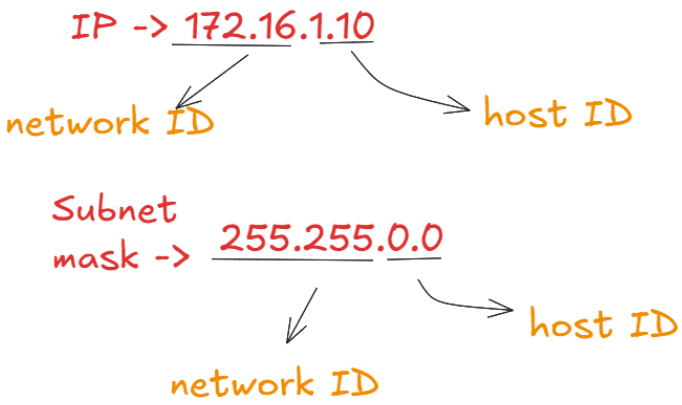


host ID = IPv4 Address.

Subnet mask -> 255.225.224.0

224 = 11100000

11111111 . 11111111 . 11100000 . 00000000

Network ID (19 bits)

Host ID (13 bits)

255.255.255.0 → Subnet

255.255.255.1

255.255.255.2

255.255.255.3

.
.
.
.

255.255.255.254

255.255.255.255

255.255.0.0 → Subnet

255.255.0.1

255.255.0.2

.
.

255.255.0.255

255.255.1.0

.
.

255.255.1.255

255.255.255.255

Subnetting

>> Subnetting is done by changing the default subnet mask.

>> With subnetting, we can create multiple subnets.

255.255.255.0 ⟶ 11111111 . 11111111 . 11111111 . 00000000

Total numbers of bit = 8+8+8+8 = 32

Total numbers of bits with 1st = 8+8+8+ = 24

No. of IP address we can create/
No of values we can have = [2 ^ (total no. of bits - total no. of bits w 1)] - 2

= [2 ^ (32-24)] -2

= [2^8]-2

= 256 -2 = 254 IPv4 address = no. of hosts address.

>> With the subnet as 255.255.255.0 we can have 254 hosts in 1 network.

No. of subnets we can create:

255.255.255.0 ⟶ 11111111 . 11111111 . 11111111 . 00000000

Borrow 1 bit from the network ID

Max. -> 255.255.255.255

255.255.255.128 ⟵ 11111111 . 11111111 . 11111111 . 10000000
(new subnet mask)

1st half	2nd half
255.255.255.1 - 255.255.255.127	255.255.255.128 - 255.255.255.255

>> 2 networks (subnets) with 126 host address.

Total bits we have w 1's (after borrowing) = 25

Total bits we had w 1's (before borrowing) = 24

No. of subnets = [2 ^ (total bits after - total bits before)]

= 2 ^ (25-24) = 2 ^ 1 = 2

255.255.255.0 ⟶ 11111111 . 11111111 . 11111111 . 00000000

Borrow 2 bits from the network ID

Max. -> 255.255.255.255

255.255.255.192 ⟵ 11111111 . 11111111 . 11111111 . 11000000

(new subnet mask)

Total bits we have w 1's (after borrowing) = 26

Total bits we had w 1's (before borrowing) = 24

No. of subnets = [2 ^ (total bits after - total bits before)]

= 2 ^ (26-24) = 2 ^ 2 = 4

No of. IP address in each = [2 ^ (total no. of bits - total no. of bits w 1's)] - 2

= [2 ^ (32-26)] -2

= [2^6]-2

= 64 -2 = 62 IPv4 address = no. of hosts address.

255.255.255.0 -> Network Address

Subnet1 -> 255.255.255.1 - 255.255.255.62

255.255.255.63 -> Broadcast Address

255.255.255.64 -> Network Address

Subnet2 -> 255.255.255.65 - 255.255.255.126

255.255.255.127 -> Broadcast Address

255.255.255.128 -> Network Address

Subnet3 -> 255.255.255.129 - 255.255.255.190

255.255.255.191 -> Broadcast Address

255.255.255.192 -> Network Address

Subnet4 -> 255.255.255.193 - 255.255.255.254

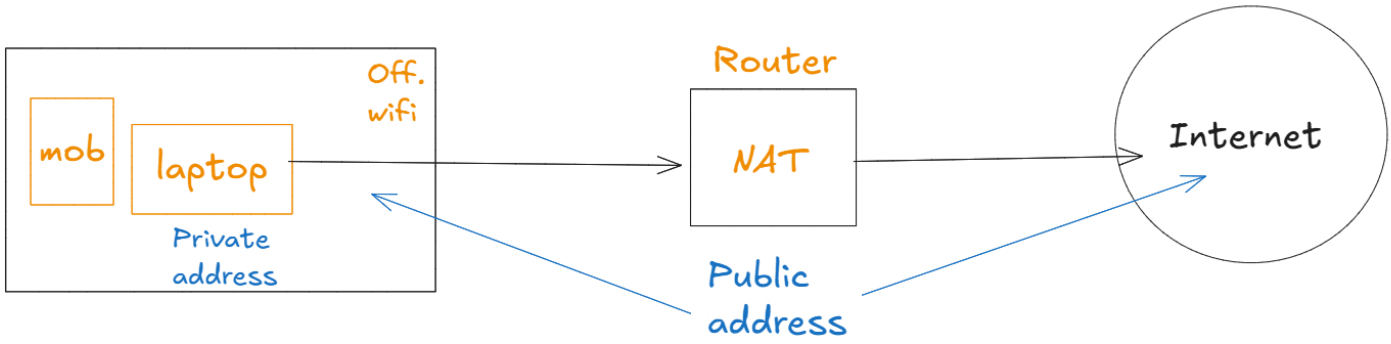
255.255.255.255 -> Broadcast Address

>> 4 networks (subnets) with 62 host address in each.

Public IP & Private IP

Public IP:

-> Public IP address is a globally unique identifier which is assigned to device/ network (router) by an ISP.



-> Public IP address is a globally unique identifier which is assigned to device/ network (router) by an ISP.

-> Public IPs only can access the Internet.

-> Public IP is registered on the Internet, and those register Public IP's can access the Internet

Private IP:

-> Private IP's can only be used inside a local network (LAN) such as the office/home.

-> Private IP's are attached to all the devices inside the network.

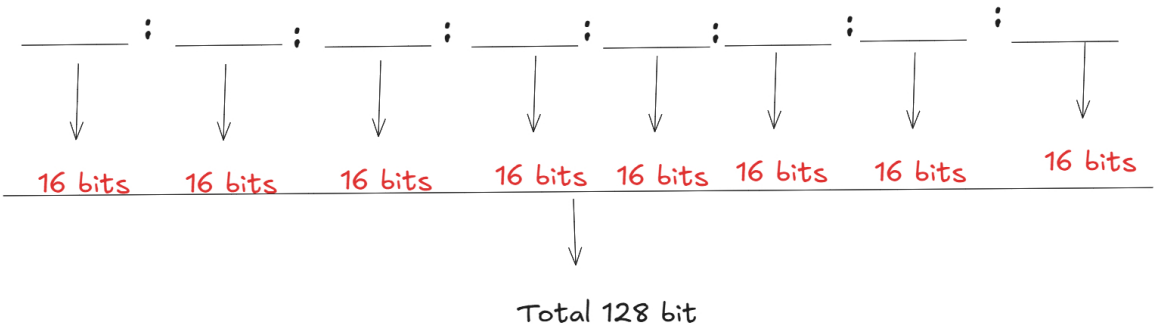
-> Private IP cannot access the Internet directly.

IPv6 (Internet Protocol Version6)

-> It was introduced because IPv4 has only 4.2 billion host addresses.

-> IPv6 is 128-bit address.

-> IPv6 is divided into 8 parts of 16 bit each, which are separated by a colon (:)



R&D on Network Address &
Broadcast Address

CIDR (Class Inter Domain Routing)

10.0.0.1/24

→ 24 bits out of 32 is been reserved for the I P address as the 'Network ID'.

00001010.00000000.00000000.00000001

No of hosts = 2 ^(32-24)
2 ^ 8 = 254

10.0.0.1/16

-> 16 bits out of 32 is been reserved for the IP address as the 'Network ID'.

No of hosts = 2 ^(32-16)
2 ^ 8 = 65636