* Networking :

1. IP address : ⇝ Generate unique address to a device connected to a network.

- Standard to create IP : IPV4 / V6

IPV4 ⟶ Samples ┬ 172. 16. 3. 4
└ 10. 1. 2. 4

172. 16. 3. 4
↓
can vary between
0 - 255

IP address
↓
4 bytes (or) 32 bits.
(Seperated by .)

1 Byte = 8 bits.

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

$\Rightarrow 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1$
$= 255$

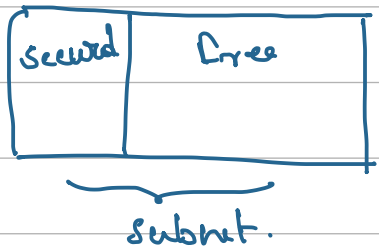
* Subnetting : If there a wifi network of free access to everyone then if someone got hacked all the other devices connected to that network may be under risk.

- So in order to avoid that we will create a secure network where even the network got accessed by hacker data will be safe.

→ with subnetting we have security, privacy & isolation.

Subnet ← Private ~ no internet
Public ~ have internet connection.

* CIDR — Classless Intermediate Domain Routing.
- used to define the IP ranges between the subnets



for example, we have subnet and it has some IP address and these IP's needed to be split between the subnets.

- Then CIDR can be used to assign the 'IP's'.

- for example we need 256 IP's for '1' subnet then we can define the CIDR as :,

172. 2. 2. 0 / 0

why '0' means we know each byte was 0-255 the 3 remaining can be static and only the last one can be used.

→ If you want 2 IP's

172. 2. 3. 0/31

now this is being calculated.

32 − 31 = 1

⇒ $2^1 = 2$ ⇒ 2 IP address.

IP address / 8 = class A

" / 16 = class B

" / 24 = class C

* OSI model : (Open systems Interconnection)

- It has 7 layers !

1. DNS resolution → checks for the domain we are searching
2. TCP Handshake

2 way / 3 way (popular) / 4 way

just checks the connection with server.

layer 7 : Application layer.

https
http
FTP

} types of the request.

→ Request initiation will be done.

layer 6: Presentation layer.

layer 7
layer 6
layer 5
} Browser level.

- encryption / formatting.

layer 5: Session

- It will maintain the session like once we login we will be in that account.

layer 4: Segmentation.

- protocol will be defined TCP/UDP

layer 3: Router. (Networking).

source IP + Destination IP } packets.

layer 2: Data link.

Based on the medium data is transformed b/w Packets / frames.

Router → Packets.
cabels → Frames.

layer 1 :- Physical layer.

Optical cabels → electronic signals.

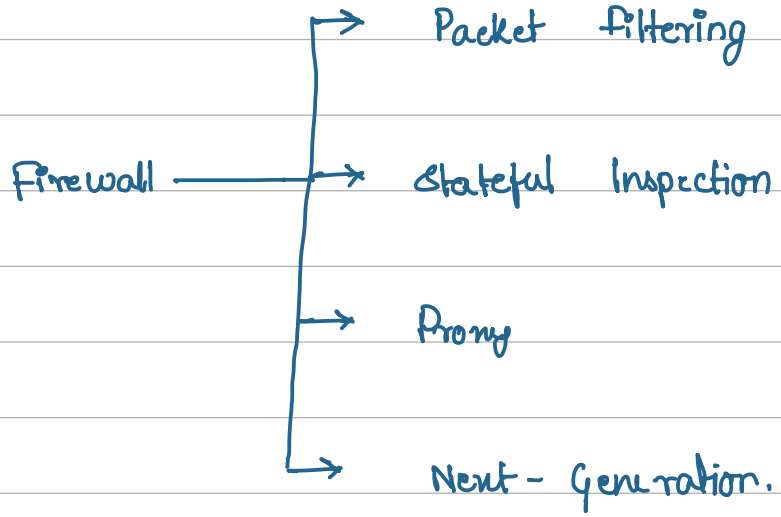
TCP :- (Transmission Control protocol) ⇝ Reliability

UDP :- (User datagram protocol) ⇝ Speed

will choose them based on the Speed Vs Reliability.

* NAT (Network address Translation) :

* VLAN :- Virtual Local Area Network.



* Best practices for securing a firewall:

- use firewall
- Enable Encryption
- Regular updates
- Implement strong access controls
- Monitor network activity.