Network address: - 10.100.128.0/17

Given subnet = 11 = (1011) 4 bit Subnet = 24 = 16

. need to bonnow 4 bits from Host bit addness

Network bit = 17+4 host = 11

2) Subnet mask

117

17+4 = 21

11111111 - 1111111. 111111000.000000000 248 - 0 355 355

subnet mask = 255.258.248.0

1210 00/2001 01 -7 8 101388

3) 10.100.128.0 /21

1111111 1111111 11110000.0000000

11

tostbit

octet = 3

subnet generation = 2048

 $=2^3=8$  Usable = 2048-2 = 2046

Subnet 1:- 10.100.128.0/21

. : Host address nange :-

10-100.128.1 - 10.100. 135.357

First address: - 10.100.128.0 Broad cast address: - 10.100.135.255

subnet 2:- 10.100.136.0/21

subnet 3:- 10-100. . 144. 0/21

Subnet 4 !- 10.100. 152.0/21

subnet 5:- 10-100. 160.0 /21

subnet 6 => 10.100.168.0/21

subnet 7 => 10.100.176.0121

subnet 8 => 10.100.184.0121

subnet 9 -> 10.100. #8 192.0/21

subnet 10 -> 10.100.200.0121

subnet 11 -> 10.100.208.0/21

(3) ... CIDR notation 11th subnet network addness

= 10. 100.398.0/24

(5) .. Host address range

10.100.208.1 - 10.100.215.259

Defore

10.100.128.0/17

: usable Host =  $2^{32-17} - 2 = 32766$ 

Aften

10.100.128.0/21

... usable Host = 32-21 - 2 = 2046

.. Most addness lost ton subnetting process = 39766 - 2046 = 30720 (5)

10.100.128.0/21

No of host = 2 (10) 2bit

- Network bit = 33-2 = 30bit

new network address = 10.100.128.0/30

IIIIIII. IIIIIII. IIIIIII DO L $\rightarrow 2^2 = 4$  host

-: New subnetmask:-355.255-255.252 /30

Two usable spaddness are

- 1 10.100.128.1
- 2 10.100.128-2

10.100.128.3 -> first address 10.100.128.3 -> broadcest 11 Pont addressing: — is a mechanism used in computer networking to identify specific services/processes nunning on a device within a network.

why do we need?

- 1 multiplexing
- 2 TCP/IP networking connection establishment
  - 3) virguley intality of process help differentiate between vanious services/ protocols nunning on device
- 1) Well-known pont :- 0-1023 HTTP → 80 HTTPS → 443 FTP → 21
- 2) Registered pont :- 104 49151
- 3) Dynamic/private port :- 49151 65535

#### what is default gateway?

point for network that serves as the exit

point for network that c thom a local

network to other network. It acts as
a nouter to connect local network to

external network such as Internet

-> connect local network w to other network

192.168.10.0128 -- default gateway :- 192.168.10.1

#### Feautures

- 1 Traffice Rooting (forwarding
- 2) Internet Access (can noute to other network)
- (3) Network Address Translation
  - 9 Finewall functionality
  - (3) act DHCP services
- 6 supposts Oos (Quality of senvice)

#### Host Forwarding Decision techinque:-

(local norting)

-) is a method used by individual hosts
to determine how to forward network
traffice destined for different network.

- 1) Packets are alwas created at source
- 2) Routing Table: each host device eneate their
- 3) Destination IP:- a host can send packet to

  (3) Itself: 127.0.0.1
  - 2 Locals host: (another hoston sameLAN)
  - 3 Remote host: Not in same LAN
  - next hop determination;
- (9) Source device determine where the destination is Local on nemote

  For determination it use own IP address and subnetmes k with destination IP address
- (5) Local traffice handled by host intentace

  Remote traffic 11 11 by default gateway of

  LAN

Point to point

netens to a communication link
that connects two node directly with a
dedicated link. without any intermediany
device

peen to peen

netenes to network anchitecture where all peens Inode have equal cababilities and nesponsibility. each node can act as both client and server shones nesource directly.

# what are the key elements of network protocol?

- 1) Syntax: define the structure and tonmat of data being transmitted Packet headen, data field
- 2) semantics: define the maning and Interpetition of exchanged between Levice
- (3) Timing :- condination & synchonization between devices.

what are functions provided by network protocol?

- 1 Addressing & Identification
- 2 Data encapsulation
- 3 packet tonwarding Routing
- (4) ennon detection connection
- (5) How control
- 6) Network management
- (7) security & Encryption

- 8 Reliability
  (gunanterdeliveny)
- (3) sequencing

what are the network protocol requirements?

- 1) an identifyed senden neceiven
- 2) comman Language grammen
- 3) speed timing of delivery
- (4) Admowledgementand confinmation of nequinements.

what are the four fundamental characteristic of data communication

- 1) Delivery: must deliver to connect destination
- 2) Accuracy :- must deliven accurate
- 3 Timeliness :- timely manner deliver
- (4) Titter :- nefens to the vaniation in packet annivel time.

- (a) what are the town chanacteristic of Reliable Network?
- 1) fault tolenance :- nefens to the ability of Nctwork
  to continue operating &
  providing service even in the
  presence of failure

Hildianold has Hillidias Fire

- 2 scalibility
- (3) Qos (Quality of service) :- prioritize and manage network truffice to ensure specific level of performance, relaibility
- (4) Network security

what are the benitits of layered model?]

- 1 Modulan Design :- divdie complex task intosepanate Logen
- 2 Interopenability
- 3 Easien Désign a simplified design implementation
- (9) Flexibility and Extensibility
- 3 Easy thoubleshooting and debugging
- 6 standardization value

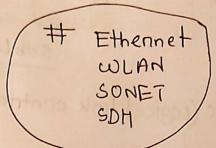
## Physical Layer

1) Physical characteristic of intenface and transmission medium

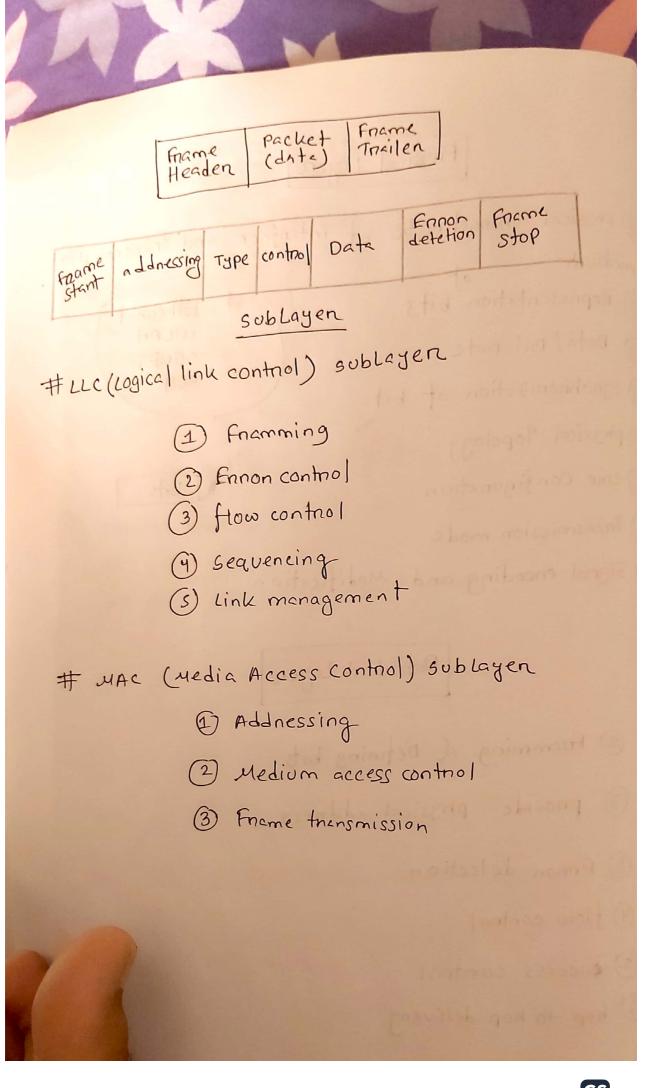
- 2 Representation bits
- 3 Data/ Bit trate
- 4) Synchronization of bit
- 5 physical Topology
- ( Line Configuration
- 7 Transmission mode
- (8) Signal encoding and Modification

Data Link Layen

- 1 Framming 4 Defining bits
- 2) provide physical address
- 3 Ennon detection
- 4) flow control
- (3) access control
- (6) hop to hop delivery



bits



Network Lazer

1 Host to host packet delivery

IPUY IPUG ICMUY ICMUG

- 2) logical Addressing
- 3) Routing (Route determination, selection)
- (9) providies best effort service

Transport Layer

- (1) TCP, UDP
- @ Reliable process to process delivery
- 3) pont addressing
- (4) Ennon detection
- (3) flow control
- 6) connection control
- 7) Data segmentation and reassemble
- (8) Describe the format of nequest/nesponse in between client-Senven
- 3) connection establishment and termination
- (10) pata multeplexing

#### Session Layer

- 1 Dialog control
  - 2) synchnonization
  - 9 Login logout
  - (4) sension establishment a manging

#### Presentation Layer

- 1) Translation, formating
- 2 compnession
- 3) Energption

PNG JPG

11/1/ 11/1/

Application Layen

- 1) providing service access to user
- 2) file transfer, access, management
- (3) mail (email) and dinectory Services.

FTP, HTTP, HTTPS, ONS

19 2.168.400/21

1111111 . 11111111 . . 11111000.0000000

Subnet mesk :- 255. 255. 248. 0

subnets :- 32

Host :- 211 = 2048

subnet :- 192.168.40.0121

192.168.40.1 - 192.168.47.354

destination 192.168.1.27 192.168.1.7 1022 SOUNCE Sounce sounce Mac IP

DATA CRC

Date Link Ethennet frame

sounce socket i- IP + pont 192.168.1-27:1022

# what is NAT?

NAT is Network address trianslation which works by trianslating IP (private) address used within a local network into a public IP address assigned by 2SP (Internet Service provider).

address to communicate with device outside the local and Network using the public

#### HOW NAT WONKS

- (1) In local Network, device ane assigned private IP address. (which are not routable in Internet)
- 2) NAT act as gateway between local network and Internet.

- 1) It has both private IP address with local Network and a public IP assigned by ISP mapping mapping that weeps track of private IP address and their co-nespond public IP address translation.
- (9) when a device from local network wents to communicate with a device on Internet, NAT nowten modifyies the source IP of outgoing packets to its own public IP
- It allows multiple device within assingte Local network to connect internet using a single internet connection (public Ip address)

## Advantage

- 1) allows a single IP address for multiple device
  - (2) Enhanced Security
- (3) simplified network

  configuration

from a device from local network a marker of

#### disadvantge

- 1 limited Peen-Peen connectivity
- (2) Incheases complexity for Network adminstration
- 3) fully dependent on public IP availability.