

## Suprafin Nag / CSE-ADM / 22157 / CN assignment

7. To design the subnets for the organization given the requirements & the block of addresses, we need to allocate addresses to each subnet according to their required size. Starting address is 14.24.74.0/24, block has 256 addresses.

↳ Subnet Requirement

2 subnets with 64 addresses each	
2	" " 32
3	" " 16
4	" " 4

↳ Subnetting

or for 64 addresses

to get 64 addresses we need to borrow 2 bits from host portion ( $2^6 = 64$ ), leaving us with a subnet mask of /26.

first subnet mask starts with

- 14.24.74.0 & spans 64 addresses.
- 80. Subnet 1: 14.24.74.64 to 14.24.74.127/26
- 80. Subnet 2: 14.24.74.128 to 14.24.74.191/26

or for 32 addresses

to get 32 addresses, we need to borrow 3 bits from ~~that~~ host portion. ( $2^5 = 32$ ), leaving us with /27.  
next available address is 14.24.74.128,

Subnet 3: 14.24.74.128/27.

↳ 14.24.74.128 to 14.24.74.159

Subnet 4: 14.24.74.160/27

↳ 14.24.74.160 to 14.24.74.191

or for 16 bit addresses,

to get 16 addresses, we need to borrow 4 bits from host portion, ( $2^4 = 16$ ), leaving mask of /28.  
available address is, 14.24.74.192

Subnet 5: 14.24.74.192/28

↳ 14.24.74.192 to 14.24.74.207

Subnet 6: 14.24.74.208/28

↳ 14.24.74.208 to 14.24.74.223

Subnet 7: 14.24.74.224/28

↳ 14.24.74.224 to 14.24.74.239

of for 4 addresses

to get 4 addresses, we need to borrow 6 bits from host portion, ( $2^2 = 4$ ), leaving us with 130.

so, available address starts from.

14.24.74.240.

Subnet 8 : 14.24.74.240/30

~~to~~ 14.24.74.240 to 14.24.74.243

Subnet 90 : 14.24.74.244/30

↳ 14.24.74.244 to 14.24.74.247

Subnet 10 : 14.24.74.248/30

↳ 14.24.74.248 to 14.24.74.251

Subnet 11 : 14.24.74.252/30

↳ 14.24.74.252 to 14.24.74.255

∴ This design divides block of 256 addresses into 11 subnets as required by the Organisation.

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## Star & Mesh Topology

↳ Star Topology:- Each device is connected directly with a central hub or switch.

### ↳ Advantages:-

- or easy to management & troubleshooting
- cause all connections converge at a central point.
- or It's relatively easy to add or remove devices without disrupting network.
- or Issues with one device typically do not affect others.

### ↳ Disadvantages:-

- or Failure of central hub or switch can bring down entire network
- or requires more cabling

↳ Mesh Topology:- Every device is connected to every device.

### ↳ Advantages:-

- or Multiple paths ensures multiple backups.
- or Can handle large number of devices.

### ↳ Disadvantages:-

- or Requires careful planning & management due to number of connections
- or Can be expensive due to amount of cable needs.

or more complex to maintain

↳ Comparison -

[Star]

if easy to expand by  
adding more devices  
directly to central  
hub.

its depends on central  
hub's reliability

iii) generally cheaper,  
similar to install

iv) if fault occurs in  
central hub, whole  
network fails.

[Mesh]

is to scale this.  
redundant connection  
required, complex to  
scale.

it offers higher reliability  
due to redundancy.

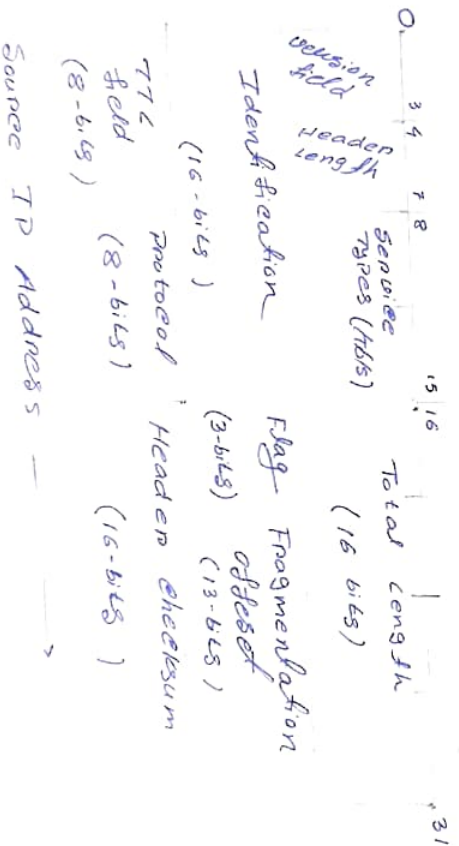
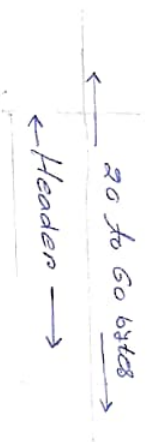
iii) Costlier & complex to  
install

iv) offer better fault  
tolerance as it can  
manage multiple  
failures.

## IPv4 Packet Format:-

IPv4 Packet has a length upto 65536 byte, having 2 part,  
i) Header  
ii) Data

↳ Diagram



IP options (16-bits)      Padding (16-bits)

Data



↳ Discussion :-

of Header checksum:- It use to check the integrity of packet, by validating of the header. This field is recomputed in every router as the TTL field decrement.

of TTL (Time to live):- It determines number of hops, a datagram travel before it is been discarded. TTL is initially said to some value, as it travels through one or more other routers, value decrements.

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