Assignment : 02

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Class : M.Tech CSE

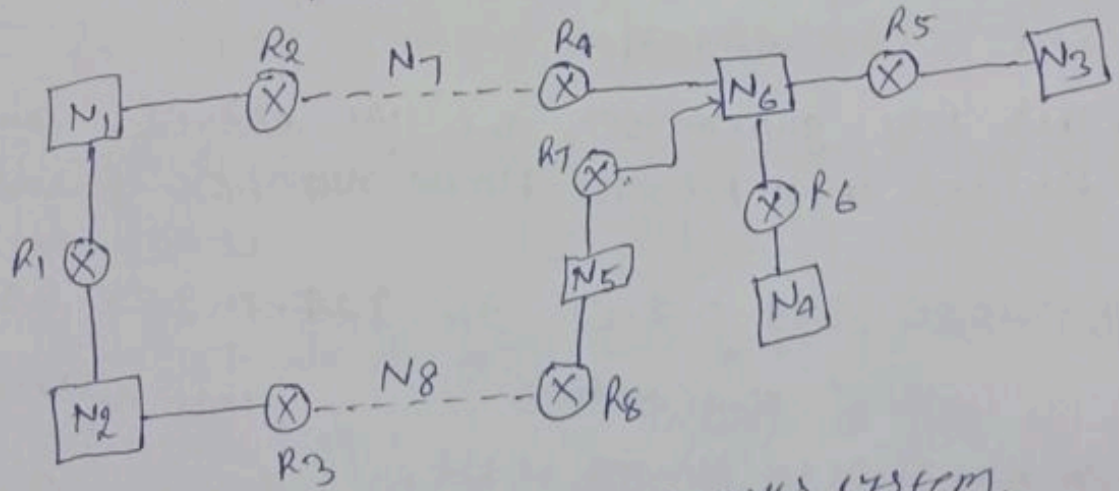
Subject : Advanced computer network.

Q.1) Show the autonomous system with the following specifications.

a) There are eight networks (N_1 to N_8)
b) There are eight routers (R_1 to R_8)
c) N_1, N_2, N_3, N_4, N_5 and N_6 are Ethernet LANs.
d) N_7 and N_8 are point to point WANs.
e) R_1 connects N_1 and N_2
f) R_2 connects N_1 and N_7
g) R_3 connects N_2 and N_8
h) R_4 connects N_7 and N_6
i) R_5 connects N_6 and N_3
j) R_6 connects N_6 and N_4
k) R_7 connects N_6 and N_5
l) R_8 connects N_8 and N_5

Which of the networks is a transient network? Which is a stub network?

Soln: Since N_7 and N_8 are point to point WANs. It is represent as dotted line.



Autonomous system.

- N_1, N_2, N_5 and N_6 are transient network which connected to multiple router.
- N_3 and N_4 are stub network which connected to single router.

Q.2) Exactly describe why we can not use the CIDR notation for the following blocks.

a) AD HOC block with the range 224.0.2.0 to 224.0.255.255

b) The first reserved block with the range 224.3.0.0 to 231.255.255.255

c) The second reserved block with the range 234.0.0.0 to 238.255.255.255.

since CIDR (Classless Inter-Domain Routing) notation can not be used for the blocks.

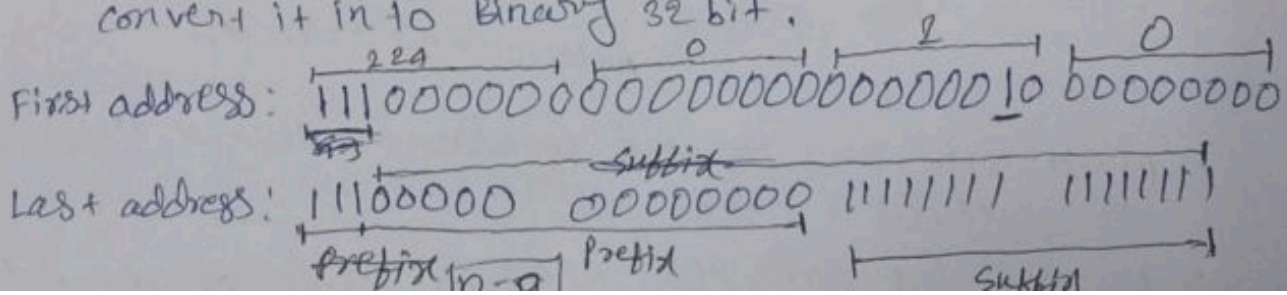
- To check CIDR notation for a range of address where 1st and last address are given
  i) find the prefix length which can be denoted as n
  ii) in the 1st address suffix should be all 0's and in the last address, suffix should be all 1's. If it doesn't satisfy then you can't use CIDR notation.
  iii) This test guarantees the 1st address can be divided into present block number of addresses

Now,

for range 224.0.2.0 to 224.0.255.255

↑ First address ↑ last address

convert it in to Binary 32 bit.



The block does not pass the test because there is one 1 in the suffix of the first address.

Now
for Range 224.3.0.0 to 231.255.255.255

First address: 11100000 00000011 00000000 00000000
Prefix
All suffix should be zero

Last address: 11100111 11111111 11111111 11111111
Prefix
↑
Same match in both address

- Also This block does not pass the test because there are 1200 1's in the suffix of the first address.
- This block can be split into several smaller CIDR blocks in the future.

HOW: for range 234.0.0.0 to 238.255.255.255

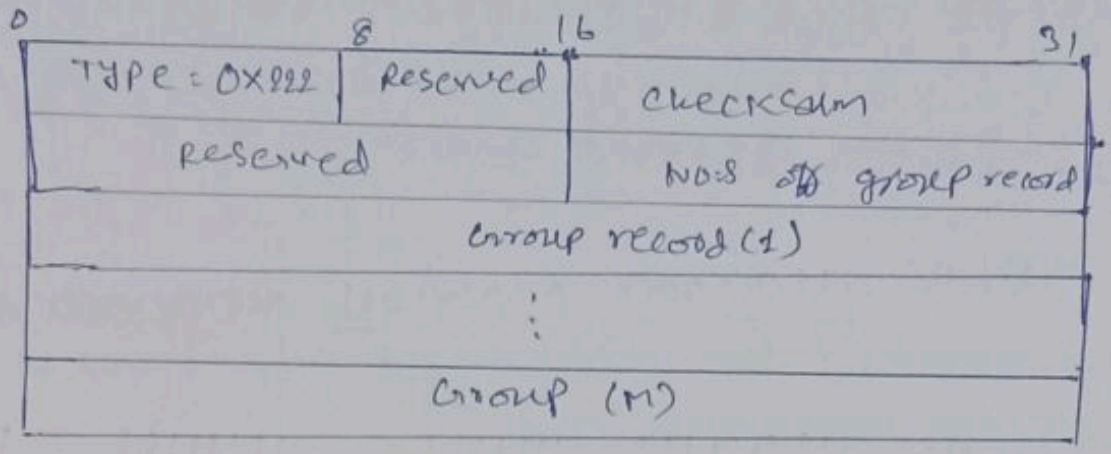
First address: 11101 010 00000000 00000000 00000000
Last address: 11101 110 11111111 11111111 11111111

Also, This block does not pass the test because there is one 1 in the suffix of the 1st address and one zero in the suffix of the last address.

This block can split into several smaller CIDR blocks in the future.

Q.3) The content of an IGMP message in hexadecimal notation:

22 00 F9 C0 00 00 00 02



a) What is the type?

First 8 bit shows the type, membership report

Here 0X22 → 34 is a report message.

[NOTE: 0X11 → query message]

b) What is the checksum?

$(F9,C0)_{16} = (240+9, 192+0)_{10} = (249, 192)_{10}$

$= (1111\ 1001\ 11000000)_2$ ~~= 11111100 1~~

c) What is the no:s of records?

$(0002)_{16} = 2$

Q.4) Show the socket state table for a host with two sockets S1 and S2. S1 is the member of group 232.14.20.54 and S2 is the member of the group 232.17.2.8. S1 likes to receive multicast messages only from 17.8.5.2; S2 likes to receive multicast messages from all sources except 130.2.4.6

Ans:

Socket	Multicast Group	Filter	Source Address
S1	232.14.20.54	Include	17.8.5.2
S2	232.17.2.8	Exclude	130.2.4.6

- As per given details S1 is the member of group 232.14.20.54 and it wants to receive the message only from the address 17.8.5.2 multicast message.
- S2 is the member of group 232.17.2.8 and wants to receive from any source except 130.2.4.6 that has been exhibited in the socket table.

Q.5) Change the following IP multicast address to Ethernet multicast addresses. How many of them specify the same Ethernet address?

a) 224.18.72.8

b) 235.18.72.8

c) 237.18.6.88

d) 224.88.12.8

It can be convert using two step.

Step-1) We write the rightmost 23 bits of IP address in hexadecimal. This can be done by changing the rightmost 3 bytes to hexadecimal and then subtract 8 from the leftmost digit if it is greater or equal to 8.

Step-ii) We add the result of step-1 to the starting Ethernet multicast address, which is 01:00:5E:00:00:00.

Now,

a) Given: Multicast IP address 224.18.72.8

Step-1: 12:48:08

↳ 12<8 Don't subtract 8

16	224	0
	14	

16	18	2
	1	

16	72	8
	4	

Step-2: 01:00:5E:12:48:08

Ans

E0

No need only 24 bit (rightmost ~~leftmost~~)

$18 = (12)_{16}$

~~$(72)_{16} = (48)_{10}$~~

$(72)_{10} = (48)_{16}$

b) Multicast IP address; 235.18.72.8

Step-1 Last 24 ~~Hex~~ bit in Hex ~~EB:~~

12:48:08

Step-2 Multicast IP address

01:00:5E:12:48:08

c) IP; 237.18.6.88

Hex

Step-1

12:06:58

16	237
	14

16	88	8
	5	

$(58)_{16}$

Step-2 01:00:5E:12:06:58

ds IP address: 224.88.12.8

Step-1 58:0C:08

Step-2: Multicast Ethernet address
01:00:5E:58:0C:08.

Out of four multicast ~~Ethernet~~ IP address, two Ethernet multicast address is same.

Multicast IP address ⟶ Multicast Ethernet add

224.18.72.8 ⟶ 01:00:5E:12:48:08

225.18.72.8 ⟶ 01:00:5E:12:48:08.