(1) FLSM with Static Routing ★

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Fixed length Subnet Mask

Consider a network 192.168.10.0
we have to create 5 subnetworks.

Sol^n. → To make 5 subnetworks we have to borrow 3 bits from host ID.

As Default Subnet Mask of this network is. - 255.255.255.0
because this is Class C Network.

convert Subnet Mask into Binary

11111111.11111111.11111111 | 00000000
NID | HID

To create Subnetworks we always have to borrow some bits from host ID and convert 0's into 1's

$2^3 \longleftrightarrow 8$
$2^2 \longleftrightarrow 4$
$2^1 \longleftrightarrow 2$
$2^0 \longleftrightarrow 1$

So condition of 5 subnetworks is getting fulfilled in 2^3 that means 3 bits we have to borrow

(2) Now converting 3 0's into 1's

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11111111 . 11111111 . 11111111 . 11100000

it should be in consecutive order from L.H.S.

255 . 255 . 255 . 224 New Subnet Mask

remaining hosts are 256 − 224
= 32

32	32
32	32
32	32
32	32

1 how many bits you are borrowing
→ = 3

2 how many subnetworks you can create if you are borrowing 3 bits
→ $2^3 = 8$ subnetworks.

3 what will the range of each subnetwork.

0 − 31 — 1
32 − 63 — 2
64 − 95 — 3
96 − 127 — 4
128 − 159 — 5
160 − 191 — 6
192 − 223 — 7
224 − 255 — 8

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(4) what will be the network ID's of each subnetwork

1 — 192.164.10.0
2 — 192.164.10.32
3 — 192.164.10.64
4 — 192.164.10.96
5 — 192.164.10.128
6 — 192.164.10.160
7 — 192.164.10.192
8 — 192.164.10.224

(5) what will be the Broadcast ID's of each subnetwork.

1 — 192.164.10.31
2 — 192.164.10.63
3 — 192.164.10.95
4 — 192.164.10.127
5 — 192.164.10.159
6 — 192.164.10.191
7 — 192.164.10.223
8 — 192.164.10.255

(6) what will be the valid IP's or usable IP's of each subnetwork

N - Network ID
B - Broadcast ID

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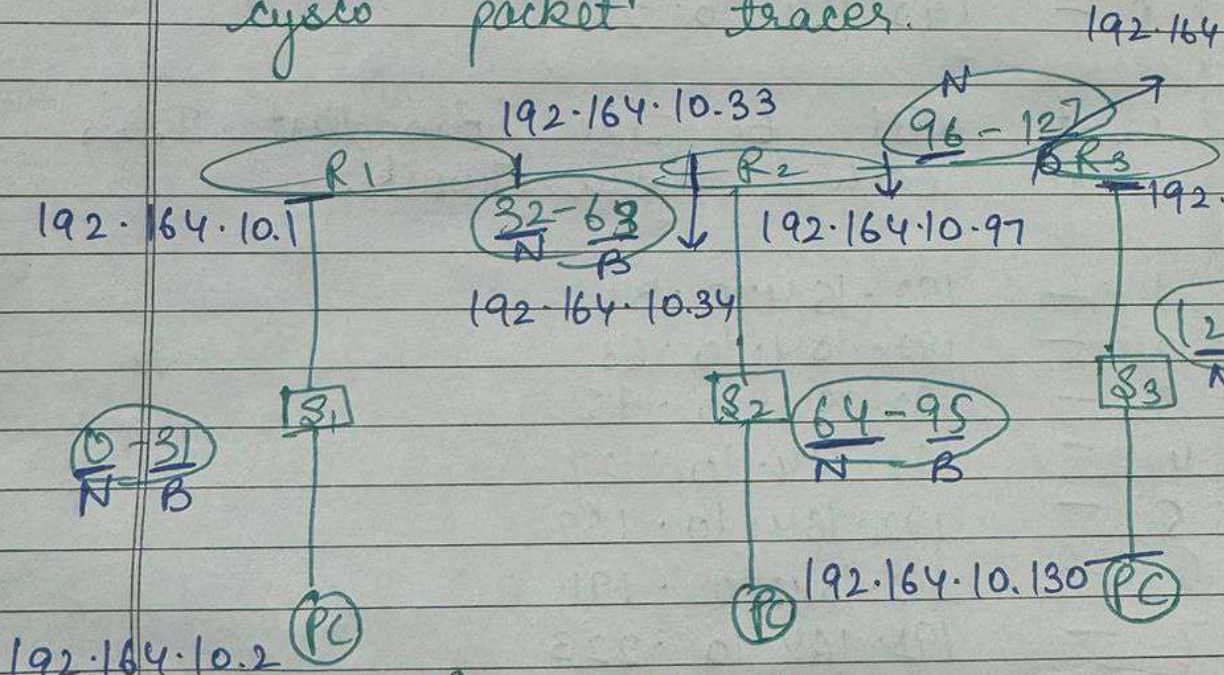
Network	for broadcast		
0 - 31	1	—	192.164.10.1 — 192.164.10.30
32 - 63	2	—	192.164.10.33 — 192.164.10.62
64 - 95	3	—	192.164.10.65 — 192.164.10.94
96 - 127	4	—	192.164.10.97 — 192.164.10.126
128 - 159	5	—	192.164.10.129 — 192.164.10.158
160 - 191	6	—	192.164.10.161 — 192.164.10.190
192 - 223	7	—	192.164.10.193 — 192.164.10.222
224 - 255	8	—	192.164.10.225 — 192.164.10.254

Now to Implement it in cysco packet tracer.



Static Routing at R1

192.164.10.64	192.164.10.96	192.164.10.128
255.255.255.224	255.255.255.224	255.255.255.224
192.164.10.32	192.164.10.32	192.164.10.34

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R2

192.164.10.0	192.168.10.128
255.255.255.224	255.255.255.224
192.164.10.33	192.164.10.98

R3

192.164.10.0	192.164.10.32	192.164.10.64
255.255.255.224	255.255.255.224	255.255.255.224
192.164.10.97	192.164.10.97	192.164.10.97