

for subnet 1 (96 Hosts)

7 bits.

$\therefore 192.168.10.0$   $\begin{cases} 000\ 0000(N) \\ 111\ 1111(H) \end{cases}$

$\Downarrow$   
 $192.168.10.0/25\ (N)$   
 $\uparrow$   
 $192.168.10.127/25\ (H)$

IP for  $(H_2 L_3)$   
 $\Rightarrow 192.168.10.1/25$

for subnet 2, (64 Hosts)  
 $\therefore$  remaining 7 bits.

$\therefore$  IP ranges:-

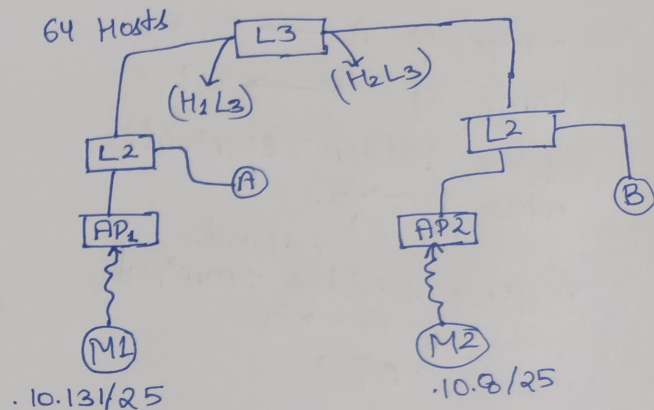
$192.168.10.128/25\ (N)$   
 $\uparrow$   
 $192.168.10.255/25\ (H)$

IP for  $(H, L_3)$   
 $192.168.10.129/25$

Let's Assume the IP's of  $M_1$  and  $M_2$  are following

IP  $M_1$ :-  $192.168.10.131/25$

IP  $M_2$ :-  $192.168.10.8/25$



i) Let's suppose M1 does not know routing table is.

Subnet	Mask	Next hop	Interface
10.0	/25	.10.129	—
10.128	/25	direct	

As IP of M2:-

192.168.10.8

8

255.255.255.128

192.168.10.0

↓

It will match with the subnet 192.168.10.0/25.

M1 will try to forward this to it's gateway (or next hop). which is (—.10.129)

But it does not have the MAC address of this hop. So, it will run an ARP request till this interface.

SIP:- 192.168.10.131/25  
DIP:- 192.168.10.8/25

\* This will remain consistent during data transfer.

Now for ARP request:-  
During broadcast till L3 switch.

i) M1 → to DS=1  
(addr1 MAC AP1      addr2 MAC M1      addr3 FFFF)

ii) AP1 → L2  
(SMAC MAC M1      DMAC FFFF)

iii) L2 → L3  
(SMAC MAC M1      DMAC FFFF)

Here L3 switch will reply to this ARP request with its own MAC address (unicast)

iv) L3 → L2  
(SMAC MAC H1L3      DMAC MAC M1)

v) L2 → AP1  
(SMAC MAC H1L3      DMAC MAC M1)

vi) AP1 → M1 (from DS=2)  
(addr1 MAC M1      addr2 MAC AP1      addr3 MAC H1L3)

Now the data packet will be transferred to L3 switch.

vii) M1  $\xrightarrow{\text{to DS}=1}$  AP1  
 (addr1 addr2 addr3  
 MAC<sub>AP1</sub> MAC<sub>M1</sub> MAC<sub>H2L3</sub>)

viii) AP1  $\xrightarrow{\quad\quad\quad}$  L2 } SMAC: (MAC<sub>M1</sub>)  
 ix) L2  $\xrightarrow{\quad\quad\quad}$  L3 } DMAC: (MAC<sub>H2L3</sub>)

Now at L3, the DIP will be checked according to the Routing table of L3 switch.

Subnet	Mask	Next hop	Interface
.0	/25	direct	.1/25
.128	/25	direct	.129/25

IPdest will match (.0) entry.  
 $\therefore$  The packet should be forwarded via (.1/25) interface.

But, as L3 switch does not know the MAC address of DIP, it will run an ARP request first.

Now during Broadcast of ARP request:-

x) L3  $\xrightarrow{\quad\quad\quad}$  L2 } SMAC: (MAC<sub>H2L3</sub>)  
 xi) L2  $\xrightarrow{\quad\quad\quad}$  AP2 } DMAC: (FFFF)  
 xii) AP2  $\xrightarrow{\text{from DS}=1}$  M2  
 (addr1 addr2 addr3  
 MAC<sub>AP2</sub> MAC<sub>AP2</sub> MAC<sub>H2L3</sub>)

Now M2 will send a unicast reply to L3 switch:-

xiii) M2  $\xrightarrow{\text{to DS}=1}$  AP2  
 (addr1 addr2 addr3  
 MAC<sub>AP2</sub> MAC<sub>M2</sub> MAC<sub>H2L3</sub>)  
 xiv) AP2  $\xrightarrow{\quad\quad\quad}$  L2 } SMAC: - MAC<sub>M2</sub>  
 xv) L2  $\xrightarrow{\quad\quad\quad}$  L3 } DMAC: - MAC<sub>H2L3</sub>

Now as L3 switch knows MAC address of M2, it will forward data packet to M2.

xvi) L3  $\xrightarrow{\quad\quad\quad}$  L2 } SMAC: - MAC<sub>H2L3</sub>  
 xvii) L2  $\xrightarrow{\quad\quad\quad}$  AP2 } DMAC: - MAC<sub>M2</sub>  
 xviii) AP2  $\xrightarrow{\text{from DS}=1}$  M2  
 (addr1 addr2 addr3  
 MAC<sub>M2</sub> MAC<sub>AP2</sub> MAC<sub>H2L3</sub>)