CSE 421

Assignment no - 02

Name : Shuvo Karmokar

ID : 20301441

Section : 23

1. i) Here,

Network bits = 17

Host bits = 32 - 17 = 15

∴ Total hosts = $2^{15} - 2 = 32766$

ii) Subnet mask = 255.255.128.0

Third octale block size = 128 (range 0-127)

Network address = 32.99.0.0

∴ Broadcast address : 32.99.127.255

iii)

Network	Required Hosts	Host bits	Subnet	Network address
LAN A	2000	11	121	32.99.0.0
LAN B	1024	10	122	32.99.8.0
LAN C	3	2	129	32.99.12.0
WAN 1	2	2	130	32.99.12.8
WAN 2	2	2	130	32.99.12.12

2. i) To allow external users to initiate FTP access (port 21) to an internal server static NAT with port forwarding is required.

Public IP 203.0.113.10 : 21 -> Internal 10.0.0.50 : 21

ii) It is using PAT. Because -

- One public IP
- Multiple internal users browsing simultaneously
- Port numbers used to differentiate sessions

3. i) Number of fragments = $\frac{6397}{1624} = 4$

ii) Data size of last fragment = 6397 (16243)

= 1525 bytes

iii) Fragment offset of last fragment:

$\frac{16243}{8} = \frac{4872}{8} = 609$ [offsets are in 8 byte units]

iv) Reassembly at destination -

Uses: Source IP
: Destination IP
: Identification field

- Fragments reordered using fragment offset
- MF flag tells when last fragment arrives.
- Packet is reassembled only when fragments arrives.

v) Significance of MF flag -

MF = 1 → More fragments coming

MF = 0 → Last fragment

4.i) IP route 0.0.0.0.0.0.0.0 <exit-interface> 10

ii) IP route 0.0.0.0.0.0.0.0 <next hop. ip> 20

5. Link state routers (R1, R4, ISP). Because -

- Full topology knowledge
- SPF algorithm
- Event-triggered updates

Distance vector: via periodic routing updates

Link state: via Hello packets and LSPB

6.i) 2001:db8:85a3::8a2e:370:7334

ii) 2607::805:0:0:200e → 2607::805:200e

iii) 3ffe:1900:4545:1003:1200:a0f8:fe21:67cf

7. i) Source MAC -> PC A
Destination MAC -> FF:FF:FF:FF:FF:FF

ii) Router 1 - Drops packet
- Routers do not forward broadcasts

iii) First action after ARP reply:
- PC A updates ARP table
- Sends actual data packet

8. Possible causes:
- NAT/PAT masking users
- Dynamic IP addressing
- Proxy servers
- VPN tunneling
- Lack of lagging
- Shared credentials

9. i) Steps - DHCPREQUEST
- DHCPACK

ii) Renewal failure reasons-
- DHCP server down
- Network issue
- Lease expired
- Address conflict

If renewal fails:
- Device uses APIPA (169.254.x.x)

10. Function - Tests TCP/IP stack
- Local communication
- Troubleshooting

Address - IPV4 : = 127.0.0.1
IPV6 : :: 1

11. i) S2 Actions:
- Checks MAC table
- Forwards to connect port
- Does not flood

ii) Switches are self-learning:
- Learns MAC -> Port mapping incoming frames
- Automatically build forwarding table.