Assignment – 02

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Section: 23

Q1

i

$2^n - 2 = 16382$

$\therefore n = 14$

network bit → $32 - 14 = 18$

Subnet mask → 255.255.192.0

ii

42.1.0.0/18

iii

	Hosts	
LAN A →	2000	→ 42.1.0.0/21
LAN B →	1022	→ 42.1.8.0/22
LAN C →	512	→ 42.1.12.0/23
WAN1 →	2	→ 42.1.16.0/30
WAN2 →	2	→ 42.1.16.4/30

Q2

i

The netwl uses PAT.

i) More internal users than public IPs.

ii) All employees can access internet simountinously.

iii) PAT modified both IP address and source port to keep track of multiple session.

1. Assign dedicated Public IPs to directors using static NAT, so their traffic doesn't compete in PAT pool.
2. Configure QOS (Quality of service) to prioritize traffic from directors internal IPs.
3. Set higher bandwidth allocation and lower latency queue for their IP range

That's how they will get consistent speed.

Q3

i) $\frac{5086-20}{1244-20} = 5$

ii) $(5086-20) - (1244 \times 4) + 20$

$= 190$

iii) $\frac{4 \times (1244-20)}{8} = 612$

iv) The identification field is a 16 bit value set by the sender each original packet.

It is used to uniquely identify fragments belonging to the same original packet for

reappamblx

v

Router discards packet and send ICMP "Fragmentation needed but DF set" error to source

4

i

ip route 0.0.0.0 0.0.0.0 S2 10

ii

ip route 0.0.0.0 0.0.0.0 192.168.10.100 11

5

a) R_1, R_2, R_3 → Link state Routers

Link state routers send hello packets for neighbours

R_1, R_2 and the ISP Provider will send routing updates. inefficient →

1) Bandwidth waste

2) Slower Convergence

Man

3. Loop risk
4. No topological awareness

c

i) fe80:0000:0000:0000:1c35:67ab:3f2c:d81e

ii) 2607:0060:0000:0805:0000:0000:0600:0000

iii) fd00:0abc.1234:5678:0000:0000:0000:0000:00

Q7

i

Source mac address in PCA's MAC Address

Destination MAC address in broadcast Address (FF-FF-FF-FF-FF-FF)

ii

PCB receives the broadcast ARP req and checks the target IP Address inside the ARP packet. Since the target ARP matches PCB's own IP Address, PC B knows it is meant for it and sends an ARP reply.

iii

Router R1 drops the ARP request because ARP is a Layer-2 broadcast and routers do not forward broadcast frame across network.

Q8

i

DHCP request are broadcast based. Routers don't forward broadcasts by default.

Broadcast DHCP req not forwarded by intermidiate router (no DHCP relay config

ii

1) Configure DHCP Relay on the router connected to the new subnet. ip Helper-address <DHCP server IP>
2) Install a local DHCP server on the new subnet

Q9

The user should use Traceroute. Traceroute shows the path packets take to reach the destination are identified where packets are dropped or delayed. It hints each hop along the path to the business application servers. It shows latency, "Request timed out" on failure.

Q10

Dual stack.

because →

1) Allows ~~the~~ router to run both IPv4 and IPv6 simultaneously
(i) internal IPv4-only systems remain

accessible to IPV4

iii) IPV6 capable systems can communicate with external IPV6 collaborators directly

iv) No encapsulation overhead for internal traffic.

v) Avoids protocol translation issues.

Q11

i

when switch S1 receive the packet it examind the destination mac Address. Since the switch table already Contains entries for all device, S1 findo that PC C is reachable via its interface connected to S2. Therefore, S1 forwards the frame only through the specific interface. It doesn't flood or broadcast the frame.

ii

Switches are called transparent because end devices are unware of their presence. In this scenario PC B sends data to C without knowing that switches S1, S2 and S3 forward the frame. The switches forward frames internally using MAC tables without modifying them.