Assignment - 3

Unit - 3

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<u>SCENARIO</u>: A telecom company supports IPv4 and IPv6 using dual-stack routers modern IPv6 LANS

<u>Parameters</u> :-

- RIP vs OSPF
- Hop limit
- protocol comparison
- NAT configuration
- Adress mapping
- Router roles.

<u>Questions</u>:

1. If 10 private IP's use 1 public IP with NAT, how many unique ports are needed?

Ans) 1. NAT (Network Adress Translation):-

2) This maps private IP adresses to a public using port numbers

2) Each private IP connection needs a unique source port on the public IP.

3) So, If 10 private IP's are active simultaneously

4) 10 unique ports are needed.

5) If each private IP opens multi connections.

6) More unique ports are needed

7) NAT typically uses ports form 1024 to 65535

8) A single public IP can support.

9) The thousand of connections via port mapping.

Question:-

2) How does IPv6 avoid the problem?

Ans) i) IPv4 Problem:-

=) IPv4 has only 4.3 billion adresses, leading to adress exhaustion.

2) IPv6 Solution:-

=) IPv6 provides 128-bit adresses, allowing about 340 undecillion (3.4×10^{38}) unique IPs.
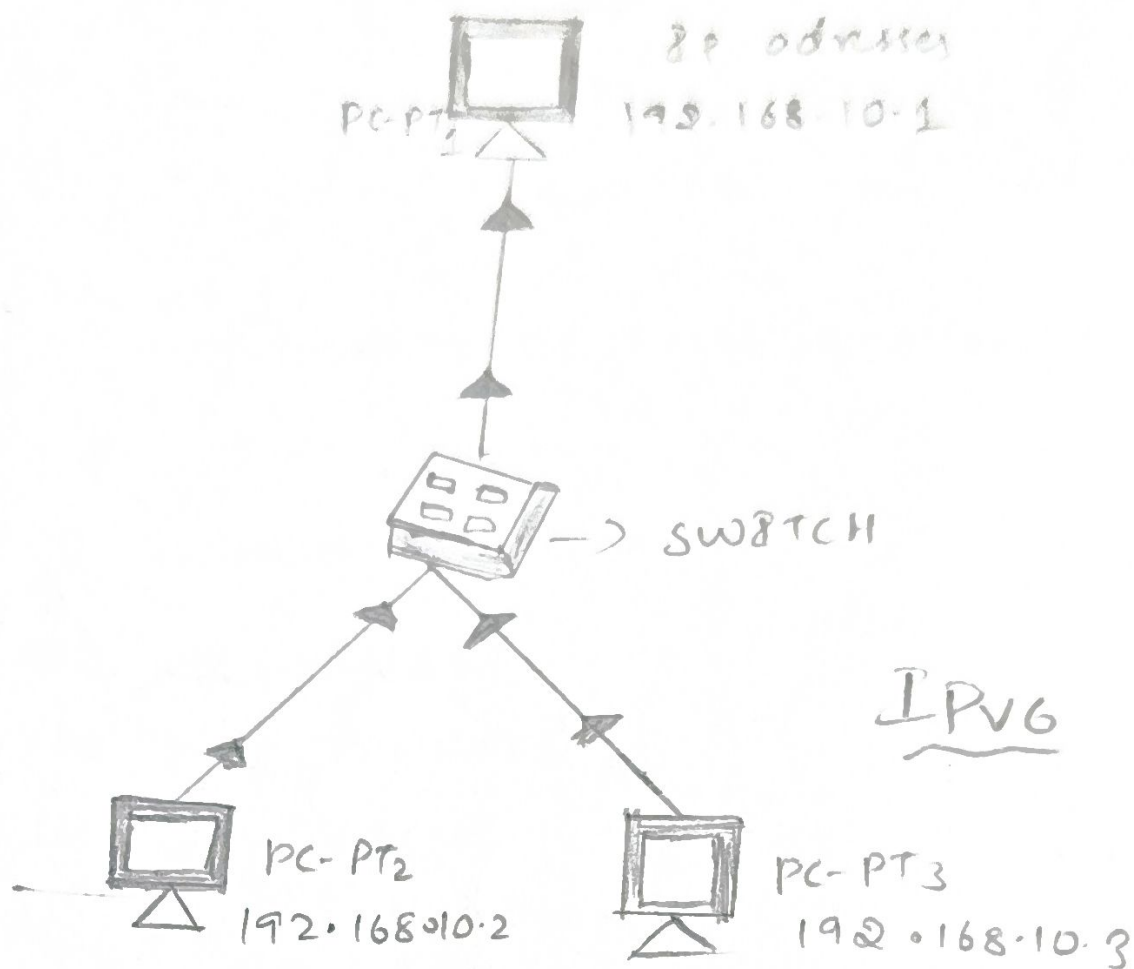
3) The vast adress space removes the need for NAT

4) Every device can have a globally unique IP adress.

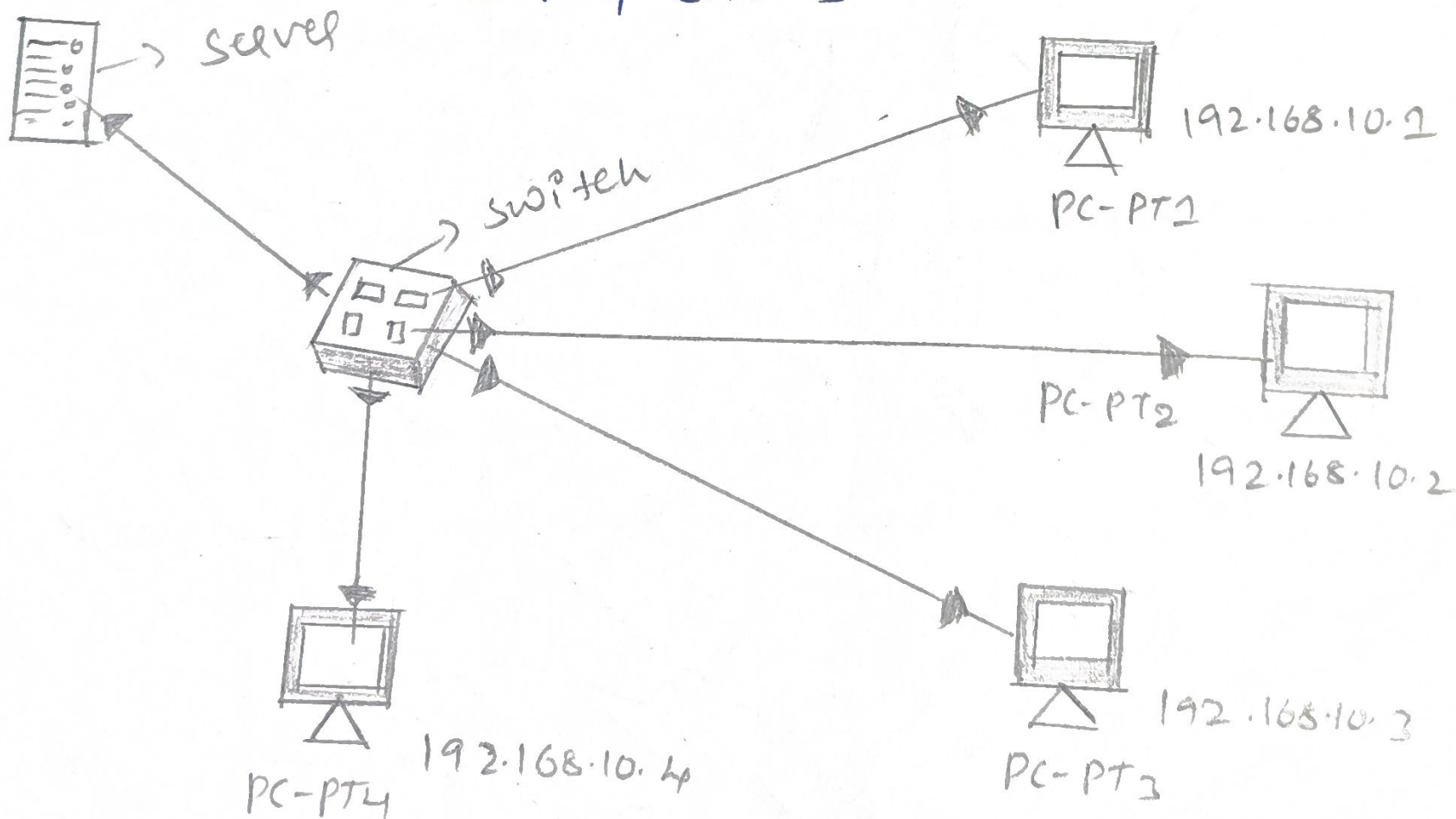5) Simplifies routing and improves end-to-end connectivity

6) Supports features like auto-configuration and enhanced security (IPsec)

7) Reduces Network complexity by eliminating the port mapping and NAT issues.

IPV6 LAN's

PC-PT1 8P odresses
192.168.10.1

→ SW8TCH

IPV6

PC-PT2
192.168.10.2

PC-PT3
192.168.10.3

I Puy LAN's

→ server

→ switch

192.168.10.1
PC-PT1

PC-PT2
192.168.10.2

192.168.10.4
PC-PT4

192.168.10.3
PC-PT3

3) If one NAT device handles 100 connections how - Many mapping are stored?

Ans)

1) NAT:- Network Address Translation the maintains a mapping table to track connections

2) Each active connection requires one mapping entry.

3) A Mapping includes

- private Ip adress
- private port numbers
- public Ip adress
- public port Numbers

4) So, if 100 connections are active.

5) The NAT device will store 100 mappings.

6) These mappings are used to correctly route In coming replies to the correct internal to the -host

7) When a connection closes (or) times out times out, the mapping removed