Exp 3: Implement IPV4 and IPv6 Addressing scheme and Test it with comments

Aim:

To implement both IPv4 and IPv6 addressing schemes in a simulated environment and test connectivity between devices

Objective

- To configure IPv4 and IPv6 address on end devices
- To verify connectivity using ping commands
- To observe differences between the two addressing schemes.

Software Required

- Cisco Packet Tracer

Backgroud Theory

What is IP Addressing?

An IP (Internet Protocol) address is a unique identifier assigned to each device on a network. There are two main versions.

IPv4:

- 32 bit address, written as 4 decimal numbers separated by dots (e.g., 192.168.1.1)
- Limited to ~4.3 billion addresses
- Example 192.168. 0.10

IPv6:

- 128-bit address, written in hexa-decimal, separated by colons (e.g., 2001:0db8:85a3::8a2e:0370:7334)
- Provides virtually unlimited number of addresses
- Enable better security and performance features

As IPv4 addresses are nearly exhausted, IPv6 adoption is growing rapidly

Algorithm

1. Create a simple topology with 2PCs and optionally a switch
2. Assign IPv4 address with proper subnet mask
3. Assign IPV6 address with prefix length
4. Test Connectivity using ping commands

5. Observe and comment on response time and address formatting.

Step-by- Step Procedure

1. Design the Network

- Open Cisco Packet tracer
- Drag
    i. 2PCs
    ii. 1 switch (optional)
- Connects PCs to switch using copper straight-through cables

2. Configure IPv4

For PC1

- IP : 192.168. 10.1
- Subnet Mask: 255.255.255.0

For PC2

- IP : 192.168. 10.2
- Subnet Mask: 255.255.255.0

On each PC :

- Go to Desktop → IP Configuration
- Enter the IP ad Subnet mask

3. Configure IPv6

For PC1

- IPv6 address : 2001:db8:0:1::1
- Prefix : /64

For PC2

- IPv6 address : 2001:db8:0:1::2
- Prefix : /64

On each PC :

- Scroll down in IP Configuration window
- Enter the IPv6 address and prefix

4. Test IPv4 Connectivity

From PC1

- Ping 192.168.10.2

Expected Output
Reply from 192.168.10.2 : bytes=32 time <1ms TTL=128

5. Test IPV6 Connectivity
From PC1

- Ping 2001:db8:0:1::2

Expected Output
Reply from 2001:db8:0:1::2 : time <1ms

Result
IPv4 and IPv6 addresses were successfully configured and tested using ping, demonstrating functional communication between devices under both protocols

Pre Viva Questions

1. What is the difference between IPv4 and IPv6?
2. How many bits are there in IPv6 address?
3. What is a subnet mask in IPv4?
4. Why is IPv6 needed?
5. What is the loopback address in IPv6?

Post Viva Questions

1. What does /64mean in IPv6 address?
2. Can an interface have both IPv4 and IPv6 address simultaneously?
3. What are link –local addresses in IPv6?
4. What is the maximum number of hosts in a /24 IPv4 subnet?
5. What is the difference in ping output between IPv4 and IPv6?