Réseau - Adressage IPv6

Difficulté : Intermédiaire

Notions : adressage réseau, protocole IP, IPv6

Lesson Plan: Introduction to IPv6

1. Why IPv6?

- The limitations of IPv4 (address exhaustion).
- The need for a larger address space.

2. IPv6 Basics

- Address format (128-bit vs. IPv4’s 32-bit).
- Types of IPv6 addresses: Unicast, Multicast, and Anycast.
- Address notation and shorthand representation.

3. IPv6 vs. IPv4

- Improved routing efficiency.
- No need for NAT (Network Address Translation).
- Auto-configuration capabilities.
- Enhanced security features (IPSec integration).

4. IPv6 Addressing and Subnetting

- Prefix notation (e.g., `/64`, `/128`).
- Global unicast addresses vs. link-local addresses.

5. IPv6 Implementation and Transition Mechanisms

- Dual-stack approach.
- Tunneling methods (6to4, Teredo, etc.).
- NAT64 for IPv4-to-IPv6 compatibility.

6. Practical Exercises

- Configuring IPv6 on network devices.
- Testing IPv6 connectivity and troubleshooting.

7. DHCP in IPv6 (DHCPv6)

- **Differences from IPv4 DHCP**
  - IPv6 supports both **stateful** and **stateless** address configuration.
  - IPv6 devices can use **SLAAC (Stateless Address Autoconfiguration)** or **DHCPv6** for address assignment.
- **DHCPv6 Modes**
  - **Stateful DHCPv6:** Similar to IPv4 DHCP, provides IP addresses and other network configurations dynamically.
  - **Stateless DHCPv6:** Does not assign IP addresses but provides additional configuration details like DNS servers.
- **Interaction with Router Advertisements (RA)**
  - IPv6 routers send **RA messages**, indicating whether devices should use SLAAC, DHCPv6, or both.
  - Flags in RA messages control whether clients should request addresses via DHCPv6.
- **Practical Considerations**
  - Configuring **DHCPv6 servers and clients**.
  - Using **prefix delegation** for automatic subnetting.
  - Understanding the role of **Relay Agents** in DHCPv6 networks.

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