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Configuration of IPv6 Address using Packet Tracer

**Basic IPv6 Addressing with Packet Tracer =>**

Design a topology having two subnets each having a switch and connected through router and connect end devices in each subnet.

Link Local Address is an IPv4 Address that is used for communication within a single subnet or link. These are not routable and are intended to be used only within that subnet. These are based on device’s MAC address and identifier of network interface, ensuring uniqueness. They are typically used for neighbour discovery, address resolution and other local network operations.

=> Verify if we can communicate in a subnet using link local address of one device to ping from another device.

=> Configuring Router for IPv6 Addressing

- In a router IPv6 Address is disabled by default so we need to enable that in order to use router over an IPv6 network.

- Go to privileged user mode by enabling the router and get to global configuration mode using configure terminal command.

- Enable IPv6 routing using command IPv6 unicast-routing.

- Configure both the GigabitEthernet interfaces for link local addresses by creating a link local address for both the interfaces and change state to up using the no shutdown command.

- Check by pinging from PC to gateway using link local address.

But here we cannot communicate with an end device of other network for that we need configure routable global unicast address.

Global Unicast Address consists of a 3-bit type identifier followed by 5-bit registry identifier, 16-bit provider identifier, 24-bit subscriber identifier, 32-bit subnet identifier and at end 48-bit node identifier. It allows communication between different networks on the internet.

=> Configuring Global Unicast Address

- Divide the network into subnets having address 2001:DB8:AAAA:A::1/64 and 2001:DB8:AAAA:B::1/64 and configure the interfaces of the router using this addresses.

- Auto configure the global unicast address i.e. IPv6 Address of end device using SLAAC which stands for Stateless Address Autoconfiguration and it automatically configures the interfaces of end devices which also configures default gateway

=> Check connectivity between the subnets by pinging across a device from one subnet to another.

**Connecting Two Networks with IPv6 =>**

Design a basic topology using a single router and two end devices each representing one subnet each. Connect then using a cable through fast ethernet.

=> Configuring the Router

- Go to global configuration mode in CLI then enable IPv6 unicast-routing on router.

- Configure both the interfaces for IPv6 addresses 2001:DB8:1:2F00::/64 and 2001:DB8:1:2F80::/64 using eui-64 command which automatically generates interface identifiers for devices based on MAC address without relying on central address assignment service like DHCPv6.

- Change the state to up by enabling IPv6 and using no shutdown command.

- Verify by using command show IPv6 interface brief command

- Autoconfigure the address and default gateway and end device. This is done by soliciting information from router through router solicitation and router advertisement.

- Check by pinging from end device of one network to another.

**IPv6 Global Unicast Addressing with Packet Tracer =>**

Link local address is an address that is used within specific network segment or link and are valid and unique in particular network segment and not routable beyond it. Generated automatically by device using a special prefix FE80:: which are based on MAC address and identifier of network interface.

1) Verify if end devices in same network can communicate with each other using link-local address.

2) Go to global configuration mode of Router (using configure terminal) command and enable IPv6 unicast addressing.

3) Configure both GigabitEthernet Interfaces with a link-local address and change their state to up.

4) Verify by pinging from PC to the gateway

Here we cannot communicate with end device of other network as we have configured interfaces with link-local address which is routable in one network only. Hence we need to configure interfaces with global unicast address.