IPV6 Introduction and RIPng sample Configuration

My Notes:

IPV6:

- 128 Bit notation
- Expressed in “colon hexa decimal “ Notation.
- Each block is represented by Hexadecimal.
- Take first Hexadecimal block. 0000
- Each has 4 bit, so one hexadecimal has 16 bits.

Format Prefixes

- Used to represent different types of IPV6 address scopes.
- Globally Unique IP Addresses
  - First 3 Bits are ‘001’
  - Routable through internet.
  - 0 | 0| 1 | 0/1
  - Ie Starts with 2/3 are Global unique IP Addresses.
- Link local IP Addresses
  - First 10 bits are “ 1111 1110 10 “
  - Used to talk to neighbors only, Not routable at all.
  - Ex: starts with FE8, FE9,FEA,FEB
- Site local IP address.
  - First 10 Bits are “1111 1110 11”
  - Routable within the site.
  - Ex: Starts with FEC,FED,FEE,FEF.
- Multicast IP Addresses.
  - First 8 Bits are “1111:1111”
  - Starts with “FF”

- First 48 Bits = Global routing Prefix.
- 16 bits= Subnet ID
- 64 Bits = Interface ID.
- Internet routers do routing only seeing on first 48 bits only.

LOOPBACK IP IN IPV6.

- At the moment TCP/IP stack is enabled, Link local ip address is picked up by itself.
- It has to begin with FE8,FE9,FEA,FEB.
- SO first Network bits would be FE80:0000:0000:0000, What would be the Host ID?
- Host ID is derived from MAC address of system. MAC is only 48 Bits. Add extra 16 bits it FF-FE in between.
- Ex: 0034:3cfd:9362 split it and make as 0034:3cff:feDF:9362
- This is called EUI – Extended unique Identifier.
- 7th Bit Flipped. Ie, if 1->0 or 0>1
- So 0034 becomes 0234.
- This is called Modified Extended Unique Identifier.
- FE80:0000:0000:0000:01234:3cf:fedf:9362

Expression
- Zero compression Technique.
- Emit all leading zeros.
- Loopback is represented as ::1
- Default route is :: or 0::0.

LAB
- Go to R1 and fa0/0 port. Enable IPV6.
- Check the link local ip address with the above said rules.

How to enable IPV6 On routers
-Ipv6 unicast routing in Global configuration mode.
- Int fa0/0
- Ipv6 enable.

```
R1#sh int fa0/0 | in
R1#sh int fa0/0 | include Hardware
    Hardware is Gt96k FE, address is c200.2764.0000 (bia c200.2764.0000)
R1#
R1#
R1#sh ipv6 interface | in Linn
R1#sh ipv6 interface | in Lin
R1#sh ipv6 interface | in link
    IPv6 is enabled, link-local address is FE80::C000:27FF:FE64:0 [TEN]
    No Virtual link-local address(es):
R1#
```
Static Routing

- IP Address, select Global range. 2000:: (First 48 Bits are matched for routing)
- Subnets are,
- Host IDs would be
- Same for other subnets.

```
R1(config)#ipv6 route 2000:0:2::/48 2000:0:1::2
R3# ipv6 route 2000:0:1::/48 2000:0:2::1
R3#ping 2000:0:1::1
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2000:0:1::1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 16/46/76 ms
RIP WITH IPV6

- Have to enable RIP on interface. No network Command available in IPV6.

```
R3(config)#ipv rip 10 en
R3(config)#ipv router rip 10
R3(config-router)#int fa0/0
R3(config-if)#ipv rip 10 ena
R3(config-if)#end
```

```
R3#sh ipv route
IPv6 Routing Table - 4 entries
Codes: C - Connected, L - Local, S - Static, R - RIP
        U - Per-user Static route, M - MIPv6
        I1 - ISIS L1, I2 - ISIS L2, IA - ISIS intra
        O - OSPF intra, O1 - OSPF inter, OE1 - O
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA e
        D - EIGRP, EX - EIGRP external
R  2000:0:1::/48 [120/2]
    via FE80::C002:27FF:FE64:1, FastEthernet0/0
C  2000:0:2::/48 [0/0]
    via ::, FastEthernet0/0
L  2000:0:2::2/128 [0/0]
    via ::, FastEthernet0/0
L  FF00::/8 [0/0]
    via ::, Null0
R3#wr
```

Building configuration...