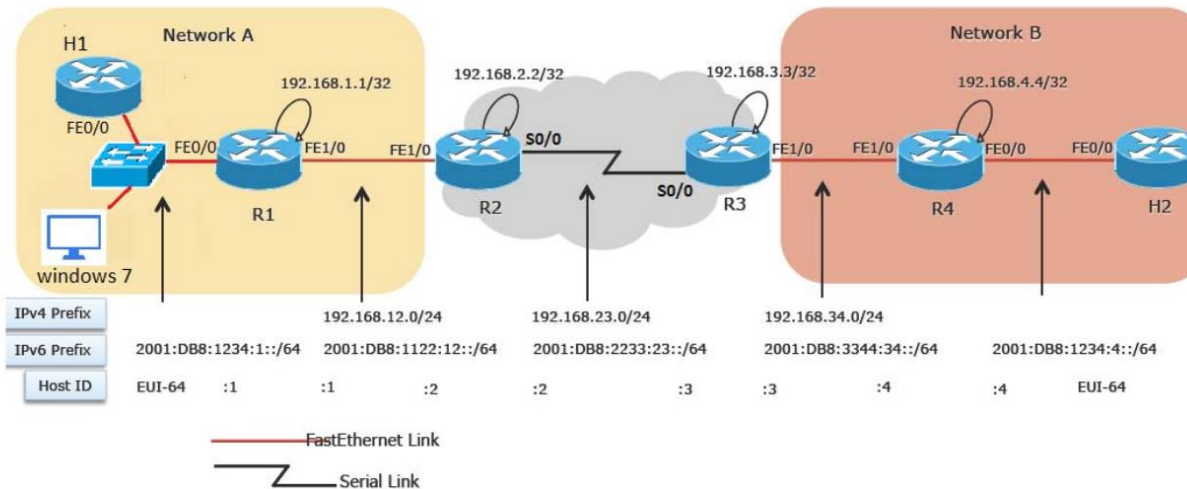


Lab : Manual and automatic Tunneling in IPv6



- Disable IPv6 routing protocols on all router
- Configure IPv4 address on Serial2/0 interface of R2 & R3, use 192.168.30.<router xx>/24
- Configure tunnel interfaces on R2 & R3 and configure them for manual tunneling
- Enable RIPng on both tunnel endpoints and other relevant interfaces on all four routers
- Enable EIGRPv6 over the tunnel
- Enable mutual redistribution between EIGRPv6 and RIPng on R2 & R3
- Use show commands to view the IPv6 routing table and tunnel interface statistics
- Use ping to verify IPv6 connectivity between H1 & H2

Task 1

- First disable both OSPFv3 and BGP on all routers
- Remove the IPv6 address on Serial2/0 interface of R2 & R3


```
(config)#no ipv6 router ospf 1
(config)#no router bgp <your AS>
(config)#interface Serial2/0
(config-if)#no ipv6 address
(config-if)#no ipv6 enable
```
- Configure IPv4 address on Serial2/0 interface of R2 & R3


```
(config)#interface Serial2/0
(config-if)#ip address 192.168.30.<router #> 255.255.255.0
```
- Configure a tunnel interface using tunnel0


```
(config)#interface tunnel 0
```
- Use an IPv6 unnumbered address from the FastEthernet1/0 interface


```
(config-if)#ipv6 unnumbered FastEthernet1/0
```
- Identify the source and destination address of the tunnel, followed by the tunnel mode

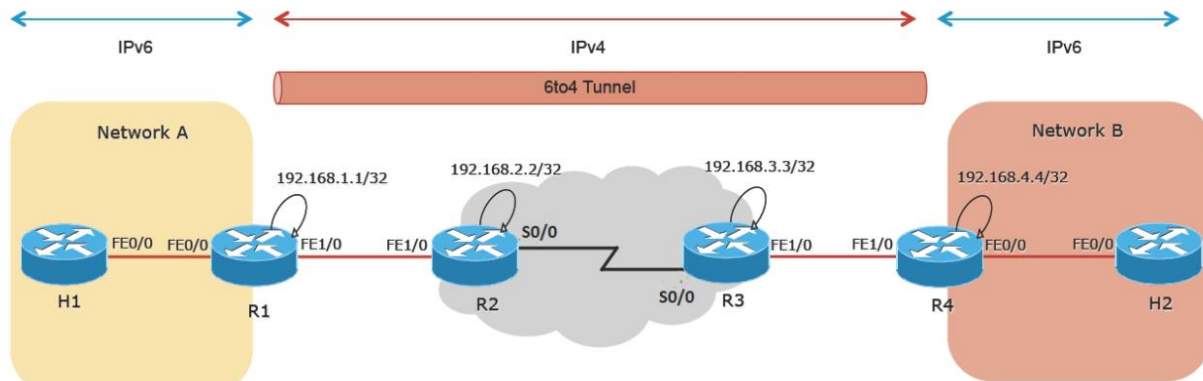

```
(config-if)#tunnel source Serial2/0
```

```
(config-if)#tunnel destination <peer's IPv4 address>
(config-if)#tunnel mode gre ip
```

- **Enable RIPng on all four routers**
(config)#ipv6 router rip lab
(config-rtr)#redistribute connected
- **Enable RIPng on FastEthernet 0/0 and FastEthernet 1/0 interfaces on R1 & R4, and FastEthernet 1/0 interfaces on R2 & R3**
(config-if)#ipv6 rip lab enable

- **Configure EIGRPv6 AS 1 on the routers R2 & R3 with a Router-ID**
(config)#ipv6 router eigrp 1
(config-rtr)#router-id 192.168.30.xx (where xx is your router #)
- **Enable EIGRPv6 on tunnel interfaces on R2 and R3**
(config)#interface tunnel 0
(config-if)#ipv6 eigrp 1
- **Enable mutual redistribution on R2 and R3 between RIPng and EIGRPv6**
(config)#ipv6 router eigrp 1
(config)# no shutdown
(config)#redistribute rip lab metric 10000 10 255 1 1500
(config)#ipv6 router rip lab
(config)#redistribute eigrp 1 metric 5
- **Verify that RIPng updates are carried over the tunnel**
#show ipv6 route
- **Look at Tunnel 0 debugs & statistics**
#debug tunnel
#show interface tunnel 0 accounting
- **Verify connectivity between R1 & R4 using the ping command**
#ping <global IPv6 address of FastEthernet0/0 of peer>
- **Verify connectivity between H1 & H2 using the ping command**
#ping <global IPv6 address of peer Host>

Automatic Tunneling in IPv6



Task-1: Configuring a 6to4 Tunnel

- To clean up, disable the tunnel0 interface on R2 & R3
(config)#no interface tunnel 0
- Erase the global and unique-local addresses in addition to the prefix advertisements on the FastEthernet0/0 interface of R1 & R4
(config)#interface FastEthernet0/0
(config-if)#no ipv6 address
(config-if)#no ipv6 nd prefix 2001:DB8:1234:<router #>::/64 60 0
(config-if)#no ipv6 nd prefix 2003:DB8:ffff:<router #>::/64 300 300
(config-if)#no ipv6 nd prefix fc00:0:0:<router #>::/64 300 300
- Erase the global and unique-local addresses on FastEthernet 1/0 of all routers and disable IPv6
(config)#interface FastEthernet1/0
(config-if)#no ipv6 address
(config-if)#no ipv6 enable
- Disable IPv6 on R2 & R3
(config)#no ipv6 unicast-routing
- Configure IPv4 addresses on R2 & R3 (refer to Table 3)
(config)#interface FastEthernet1/0
(config-if)#ip address <address from Table 3>
(config-if)# interface Serial 2/0
(config-if)#ip address <address from Table 3>
- Configure IPv4 address on FastEthernet 1/0 of R1 & R4
(config)#interface FastEthernet1/0
(config-if)#ip address <address from Table 3>
- Enable IPv4 routing on all routers and verify IP connectivity between R1 and R4 FastEthernet 1/0 interfaces

RouterNumber	FastEthernet1/0	Serial2/0
R1	192.168.12.1	
R2	192.168.12.2	192.168.23.2
R3	192.168.34.3	192.168.23.3
R4	192.168.34.4	

Table 3: Assigned IPv4 Addresses

- Configure a 6to4 prefix on FastEthernet0/0 interface of R1 & R4 using **Table 4**

```
(config-if)#ipv6 address 2002:<ipv4 encoded in hex>::/64  
eui-64
```
- Configure the 6to4 tunnel on tunnel1 interface using IPv6 unnumbered command to FastEthernet0/0. Add a route for 2002::/16 pointing to that tunnel interface

```
(config)#interface tunnel 1  
(config-if)#ipv6 unnumbered FastEthernet0/0  
(config-if)#tunnel source FastEthernet1/0  
(config-if)#tunnel mode ipv6ip 6to4  
(config)#ipv6 route 2002::/16 tunnel1
```
- Enable RAs on E0/0 by using the ND command with the 6to4 subnet prefix assigned to your LAN. Use 5 minutes (300 seconds) for the lifetime.

```
(config-if)#ipv6 nd prefix 2002:<ipv4 encoded in hex>::/64  
300 300
```

Router Number	IPv4Address	Address in Hex	6to4Address
R1	192.168.12.1	C0A8:0C01	2002:C0A8:0C01::/64
R4	192.168.34.4	C0A8:2204	2002:C0A8:2204::/64

Table 4 : 6to4 Addresses for FastEthernet 0/0

- Verify that your Host now has an IPv6 address that was automatically configured with the 6to4 subnet prefix
#show ipv6 interface FastEthernet0/0
- Look at Tunnel 1 debugs & statistics
#debug tunnel
#show interface tunnel 1 accounting
- Verify IPv6 connectivity using the ping command on the Hosts. Use the 6to4 IPv6 address of the remote host as destination address of the ping command
#ping **<address of remote host>**