IPv6 Address Types: Unique Local Addresses

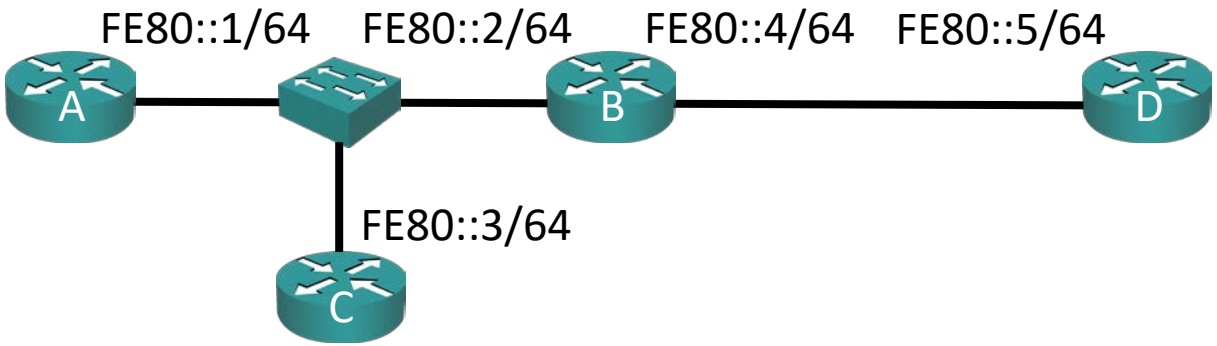
- Unique Local Addresses are similar to IPv4 RFC 1918 private addresses
- They are not publicly reachable
- They are assigned from the range FC00::/7
- Hosts should be assigned /64 addresses

IPv6 Address Types: Link Local Addresses

- Link local addresses are valid for communications on that link only
- They are assigned from the range FE80::/10 – FEB0::/10
- Hosts should be assigned /64 addresses

Link Local Connectivity

- A, B and C have connectivity to each other via the FE80::1, FE80::2 and FE80::3 link local addresses on the same segment
- B and D have connectivity to each other via the FE80::4 and FE80::5 link local addresses on the same segment
- FE80::1, FE80::2 and FE80::3 do not have connectivity to FE80::4 or FE80::5



IPv6 Address Types: Link Local Addresses

- Link local addresses can be used for communications which should not be forwarded beyond the local link, like routing protocol hello packets and updates
- They are mandatory on IPv6 enabled Cisco router interfaces

IPv6 Address Types: Link Local Addresses

- Link Local addresses are automatically generated with EUI-64 addresses on IPv6 enabled Cisco router interfaces
- The EUI-64 address can be overridden with manual configuration

Link Local Address Auto Generation

- New router with no IPv6 configuration:

```
R1#sh ipv6 int brief
FastEthernet0/0          [up/up]
    unassigned
FastEthernet1/0          [administratively down/down]
    unassigned
FastEthernet2/0          [up/up]
    unassigned
FastEthernet3/0          [administratively down/down]
    unassigned
```

Link Local Address Auto Generation

- Configuring a global unicast address enables IPv6 on the interface

```
R1(config)#ipv6 unicast-routing
R1(config)#int f0/0
R1(config-if)#ipv6 add 2001:db8:0:1::1/64
R1(config-if)#int f2/0
R1(config-if)#ipv6 add 2001:db8:0:0::1/64
```

Link Local Address Auto Generation

- EUI-64 Link Local addresses are automatically generated

```
R1#sh ipv6 interface brief
FastEthernet0/0            [up/up]
    FE80::C801:2FFF:FE24:0
    2001:DB8:0:1::1
FastEthernet1/0            [administratively down/down]
    unassigned
FastEthernet2/0            [up/up]
    FE80::C801:2FFF:FE24:38
    2001:DB8::1
FastEthernet3/0            [administratively down/down]
    unassigned
```

Manual Link Local Address Configuration

- Link local addresses are valid on the local link only so you can use the same address on multiple interfaces

```
R1(config)#int f0/0
R1(config-if)#ipv6 address fe80::1 link-local
R1(config-if)#int f2/0
R1(config-if)#ipv6 address fe80::1 link-local
```

Multiple IPv4 Addresses

```
R1(config)#int f0/0
R1(config-if)#ip address 10.10.10.1 255.255.255.0
R1(config-if)#ip address 192.168.10.1 255.255.255.0
R1#sh run int f0/0
interface FastEthernet0/0
 ip address 192.168.10.1 255.255.255.0

R1(config)#int f0/0
R1(config-if)#ip address 172.16.0.1 255.255.255.0 secondary
R1#sh run int f0/0
interface FastEthernet0/0
 ip address 172.16.0.1 255.255.255.0 secondary
 ip address 192.168.10.1 255.255.255.0
```

Multiple IPv6 Addresses

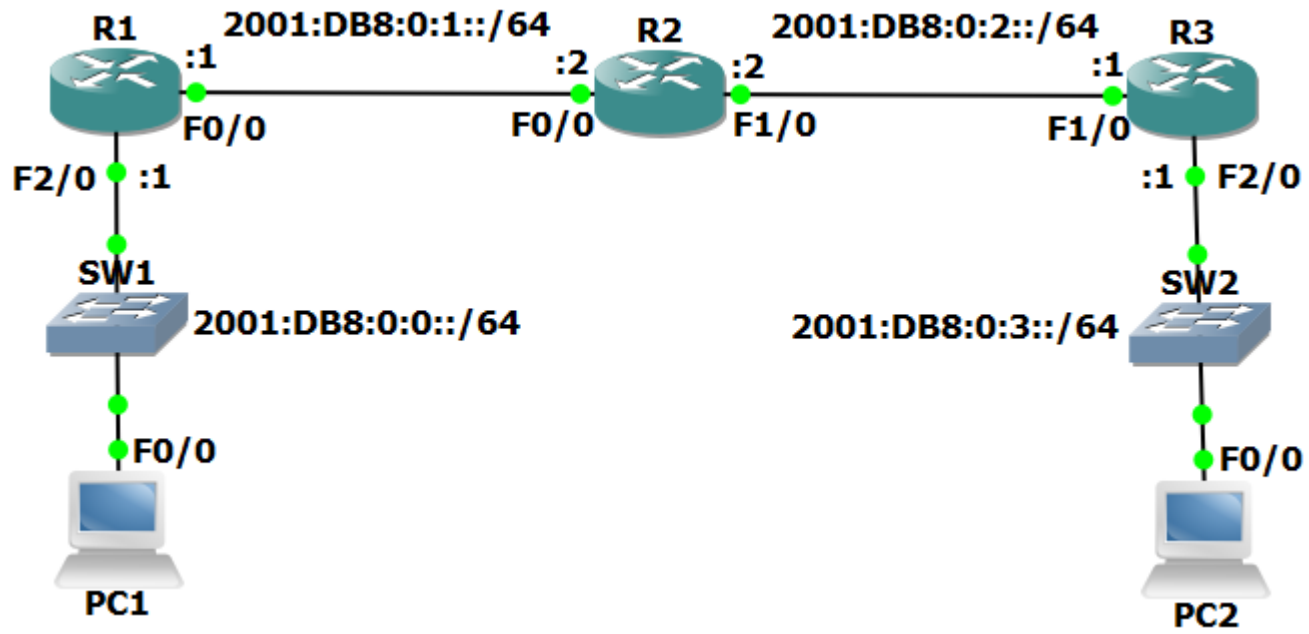
```
R1(config)#int f0/0
R1(config-if)#ipv6 address FE80::1 link-local
R1(config-if)#ipv6 add 2001:db8:0:0::1/64
R1(config-if)#ipv6 add 2001:db8:0:1::1/64

R1#sh run int f0/0
interface FastEthernet0/0
 ip address 172.16.0.1 255.255.255.0 secondary
 ip address 192.168.10.1 255.255.255.0
 ipv6 address FE80::1 link-local
 ipv6 address 2001:DB8::1/64
 ipv6 address 2001:DB8:0:1::1/64
```

Multiple IPv6 Addresses Summary

- Link local addresses are mandatory on IPv6 enabled interfaces
- Global unicast and Unique local addresses are optional
- You can have multiple addresses on the same interface
- One link local address for routing protocol traffic and one global unicast address for normal routing is typical

Lab


R1
2001:DB8:0:1::/64
R2
2001:DB8:0:2::/64
R3
:1
:2
:2
:1
F0/0
F0/0
F1/0
F1/0
F2/0
:1
:1
F2/0
SW1
SW2
2001:DB8:0:0::/64
2001:DB8:0:3::/64
F0/0
F0/0
PC1
PC2