IPv6 Address Types

- Global Unicast
- Unique Local
- Link Local

IPv6 Address Types: Global Unicast Addresses

- Global Unicast Addresses are similar to IPv4 public addresses
- They are assigned to an individual host and have global reachability (unless blocked by security policy such as on a firewall)
- They are assigned from the range 2000::/3

IPv6 Address Types: Global Unicast Addresses

- Internet authorities assign blocks from the overall 2000::/3 range to organisations

- A common assignment for a company is a /48 block, eg 2001:10:10::/48

- A smaller or larger size block can be assigned depending on the size of the company

IPv6 Address Types: Global Unicast Addresses

- IPv6 standards state that addresses assigned to individual hosts should use a /64 mask

- The IPv6 address is 128 bits so /64 splits it in half for the network and host portions of the address
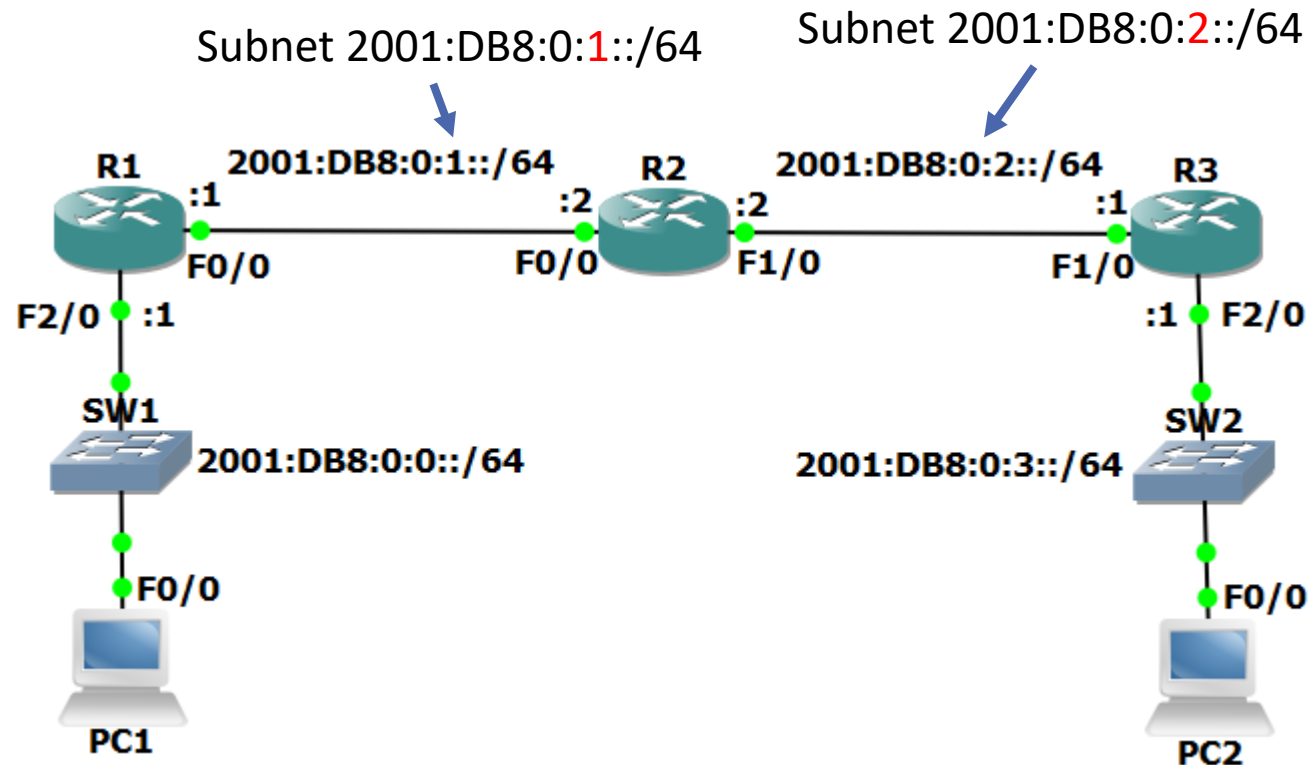
- X:X:X:X:X:X:X:X

Network | Host

IPv6 Address Types: Global Unicast Addresses

- If a company is assigned a /48 address by the Internet authorities and uses /64 host addresses, that leaves 16 bits the company can assign to its internal subnets

- For example, if the company was assigned 2001:10:10::/48 by the Internet authorities, it can assign subnets 2001:10:10:0::/64 to 2001:10:10:FFFF::/64 to its internal network segments

- 16 bits = 65,536 possible subnets

- 64 bits left over = 18,446,744,073,709,551,616 hosts per subnet

- X:X:X:X:X:X:X:X

Company   Host

Subnet

IPv6 Address Types: Global Unicast Addresses

- In this example the company has been assigned 2001:DB8:0::/48 by the Internet authorities

Subnet 2001:DB8:0:1::/64

Subnet 2001:DB8:0:2::/64

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
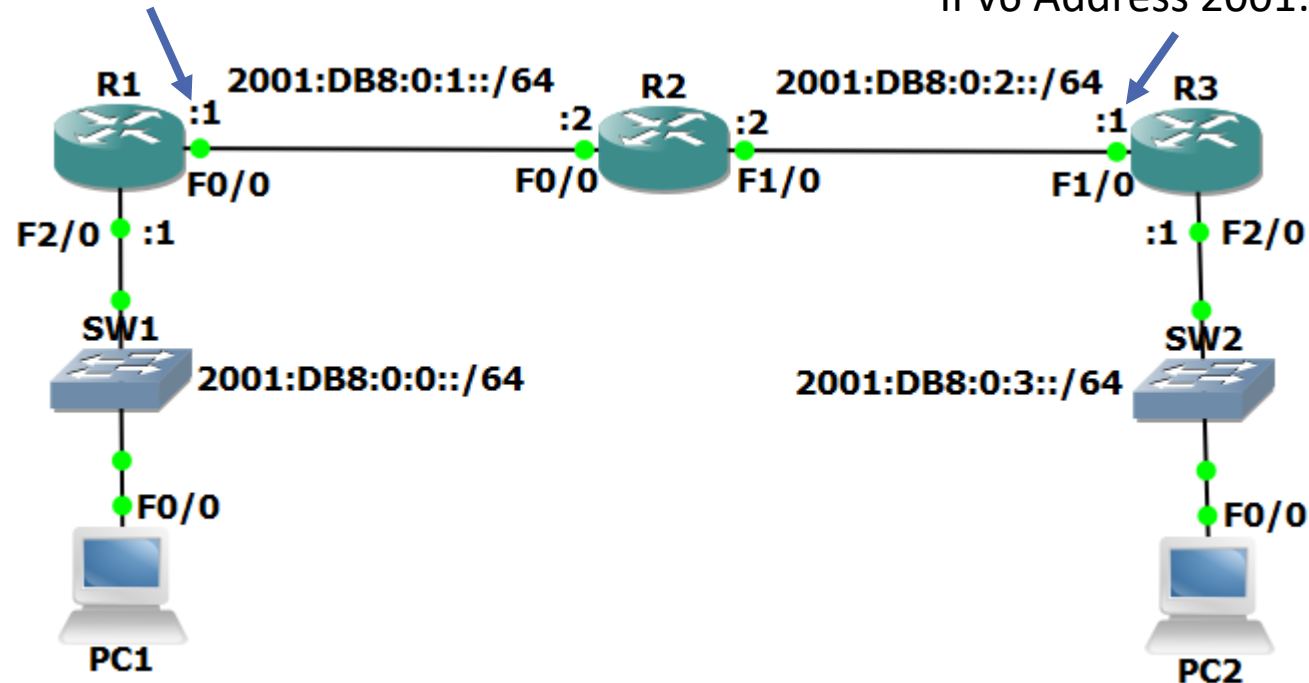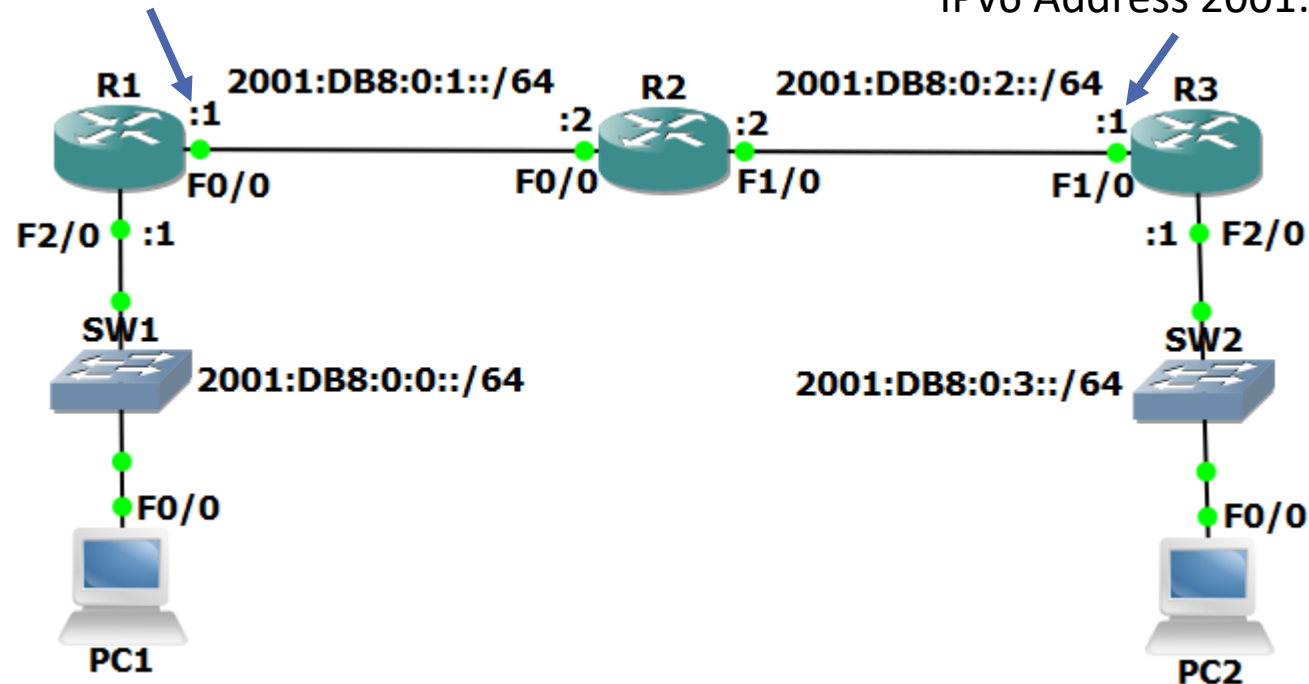
F0/0   F0/0

PC1   PC2

IPv6 Address Types: Global Unicast Addresses

- In this example the company has been assigned 2001:DB8:0::/48 by the Internet authorities

IPv6 Address 2001:DB8:0:1:0:0:0:1/64

IPv6 Address 2001:DB8:0:2:0:0:0:1/64

IPv6 Address Types: Global Unicast Addresses

- In this example the company has been assigned 2001:DB8:0::/48 by the Internet authorities

IPv6 Address Types: Global Unicast Addresses

- Using a /64 for all network subnets including point-to-point links and loopback addresses can seem wasteful, but the official declaration is that the IPv6 address space is so large that it does not create a problem

- Using /64 everywhere simplifies the addressing and enables the use of EUI-64 addresses

Global Unicast Address Configuration

- Enable IPv6 routing first

```
R1(config)#ipv6 unicast-routing
R1(config-if)#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
```