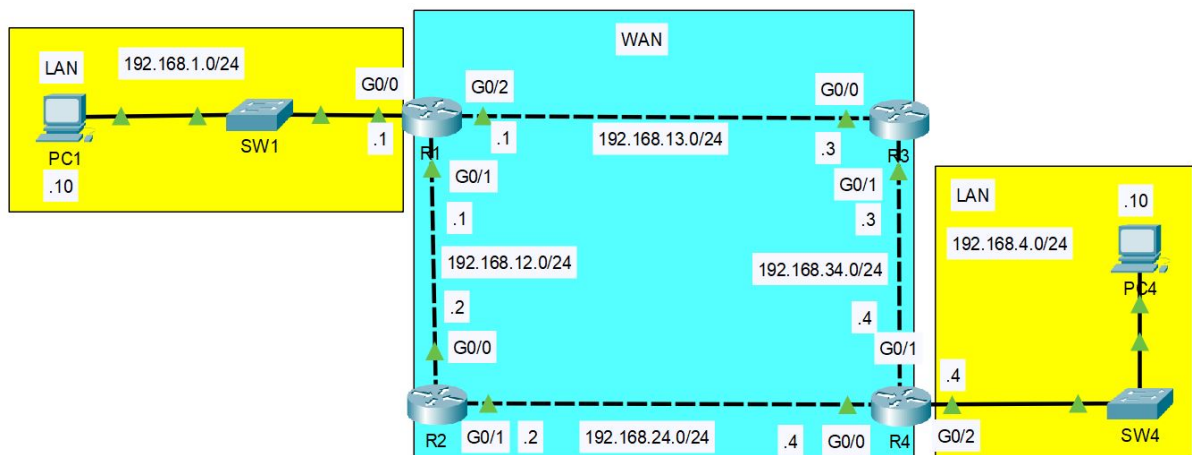# DAY 12 - Static Routing

Purinat33

Static Routing

Review: `Local` & `Connected` Routes:


```
R2>en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int g0/0
R2(config-if)#ip address 192.168.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#int g0/1
R2(config-if)#ip address 192.168.24.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#do show ip int brief
Interface              IP-Address      OK? Method Status                 Protocol
GigabitEthernet0/0     192.168.12.2    YES manual up                     up
GigabitEthernet0/1     192.168.24.2    YES manual up                     up
GigabitEthernet0/2     unassigned      YES NVRAM  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

```
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.12.0/24 is directly connected, GigabitEthernet0/0
L        192.168.12.2/32 is directly connected, GigabitEthernet0/0
     192.168.24.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.24.0/24 is directly connected, GigabitEthernet0/1
L        192.168.24.2/32 is directly connected, GigabitEthernet0/1
```

The following routes are automatically added to the routing table for each interface with an IP address configured:

1. `C` - **Connected**:
   (a) A route to the network the interface is connected to. (With the actual netmask configured on the interface).
2. `L` - **Local**:
   1. A route to the actual IP address configured on the interface. (With a `/32` netmask)

   R2 knows how to reach its own IP addresses and destinations in its connected networks, **but** it doesn't know how to reach destinations in remote networks.

- **Knows**:
  - `192.168.12.0/24` (including `192.168.12.2/32`)
  - `192.168.24.0/24` (including `192.168.24.2/32`)
- **Doesn't know**:
  - `192.168.1.0/24`
  - `192.168.13.0/24`
  - `192.168.34.0/24`
  - `192.168.4.0/24`

Default Gateway
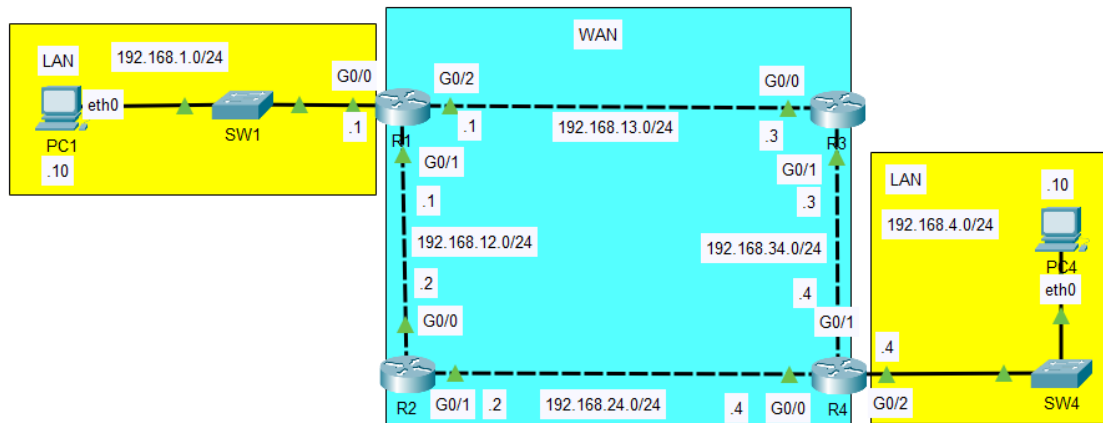
- End hosts like **PC1** and **PC4** can send packets directly to destinations *within* their connected network.
    - **PC1** is connected to `192.168.1.0/24`
    - **PC4** is connected to `192.168.4.0/24`
- To send packets to destinations *outside* their local network, they must send the packets to their **Default Gateway**.
    - Configuring interfaces on a Linux PC:
        * **PC1** Linux Config:

```
iface eth0 inet static
        address 192.168.1.10/24
        gateway 192.168.1.1
```

        * **PC4** Linux Config:

```
iface eth0 inet static
        address 192.168.4.10/24
        gateway 192.168.4.4
```

- The **Default Gateway** configuration is also called a **Default Route**:
    - It is a route to `0.0.0.0/0` = all netmask bits set to `0`.
        * Includes all addresses from `0.0.0.0` to `255.255.255.255`
        * The **Default Route** is the **_LEAST_** specific route possible, because it includes **_All_** the IP addresses.
            · `0.0.0.0/0` = 4,294,967,296 IP addresses.
        * The **Local Route** is the **_MOST_** specific route possible, because it includes **_One_** IP address.
            · `192.168.1.1/32` = 1 IP address.
- End hosts usually have no need for any more specific routes.
    - They just need to know that *"To send packets outside my local network,*

I should send them to my default gateway."

IP and MAC relationship