TRƯỜNG ĐẠI HỌC CÔNG NGHỆ THÔNG TIN - ĐHQG-HCM
KHOA MẠNG MÁY TÍNH VÀ TRUYỀN THÔNG

ĐỊNH TUYẾN TĨNH

STATIC ROUTING

QUẢN TRỊ MẠNG VÀ HỆ THỐNG

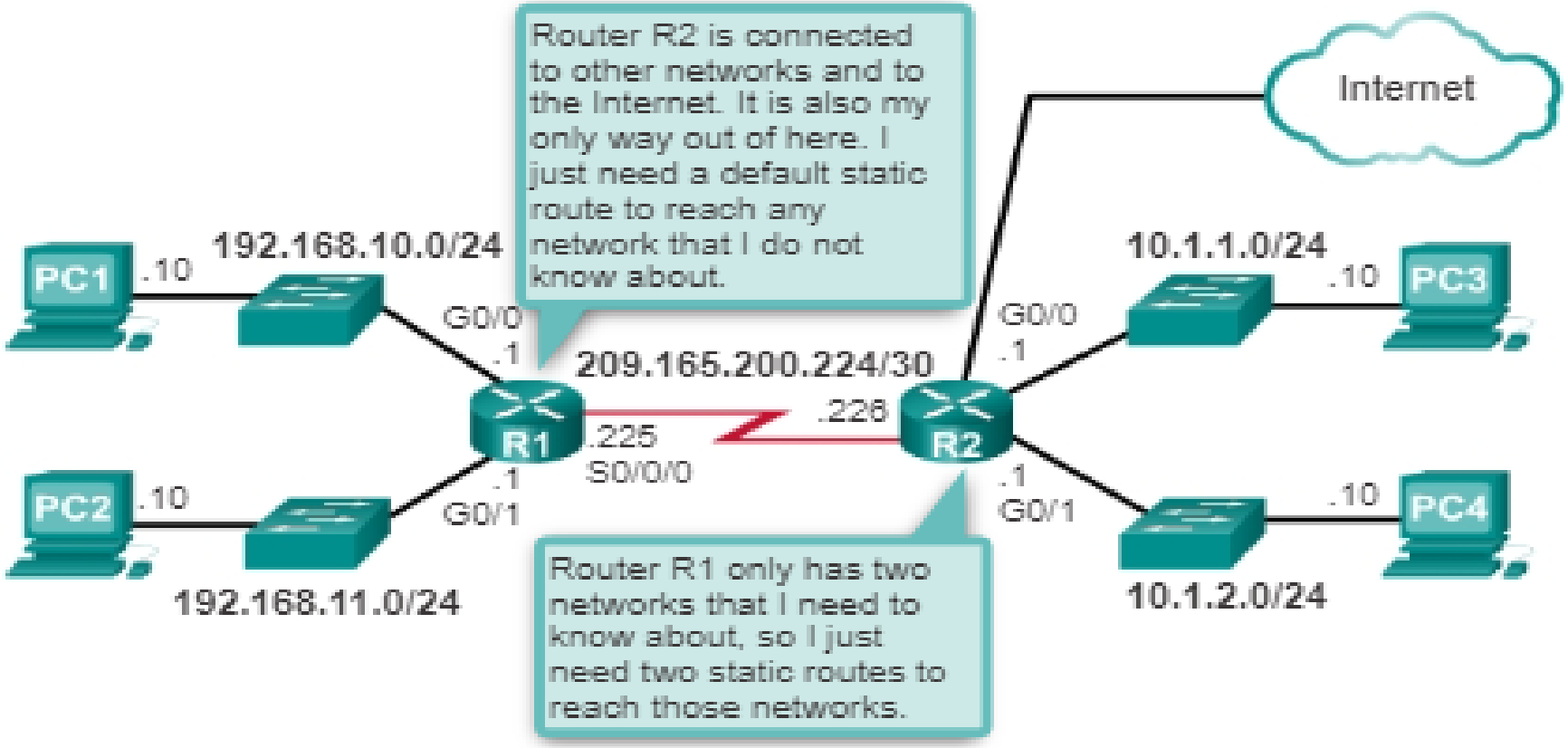
Networks and Systems Administration

Bùi Thanh Bình

CONTENT

- Static route
- Type of static routes
- Configurate Static and Default static route

STATIC ROUTE



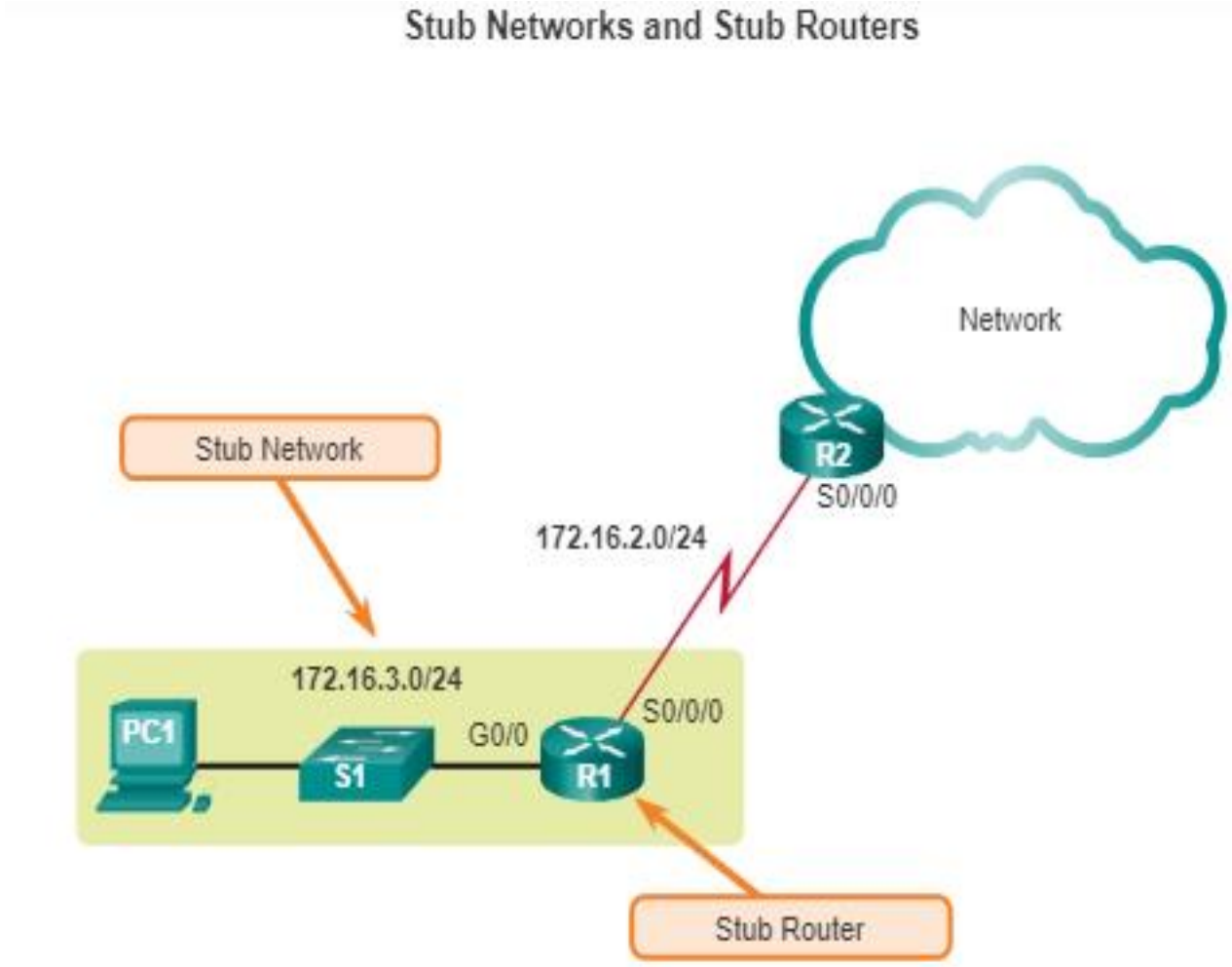
STATIC ROUTE

- Advantages:
  - Static routes are not advertised, better security.
  - Static routes use less bandwidth, CPU
  - The path a static route uses to send data is known.

- Disadvantages:
  - Initial configuration and maintenance is time-consuming.
  - Configuration is error-prone in large networks.
  - Administrator is required to maintain changing route information.
  - Does not scale well with growing networks; maintenance becomes cumbersome.
  - Requires complete knowledge of the whole network

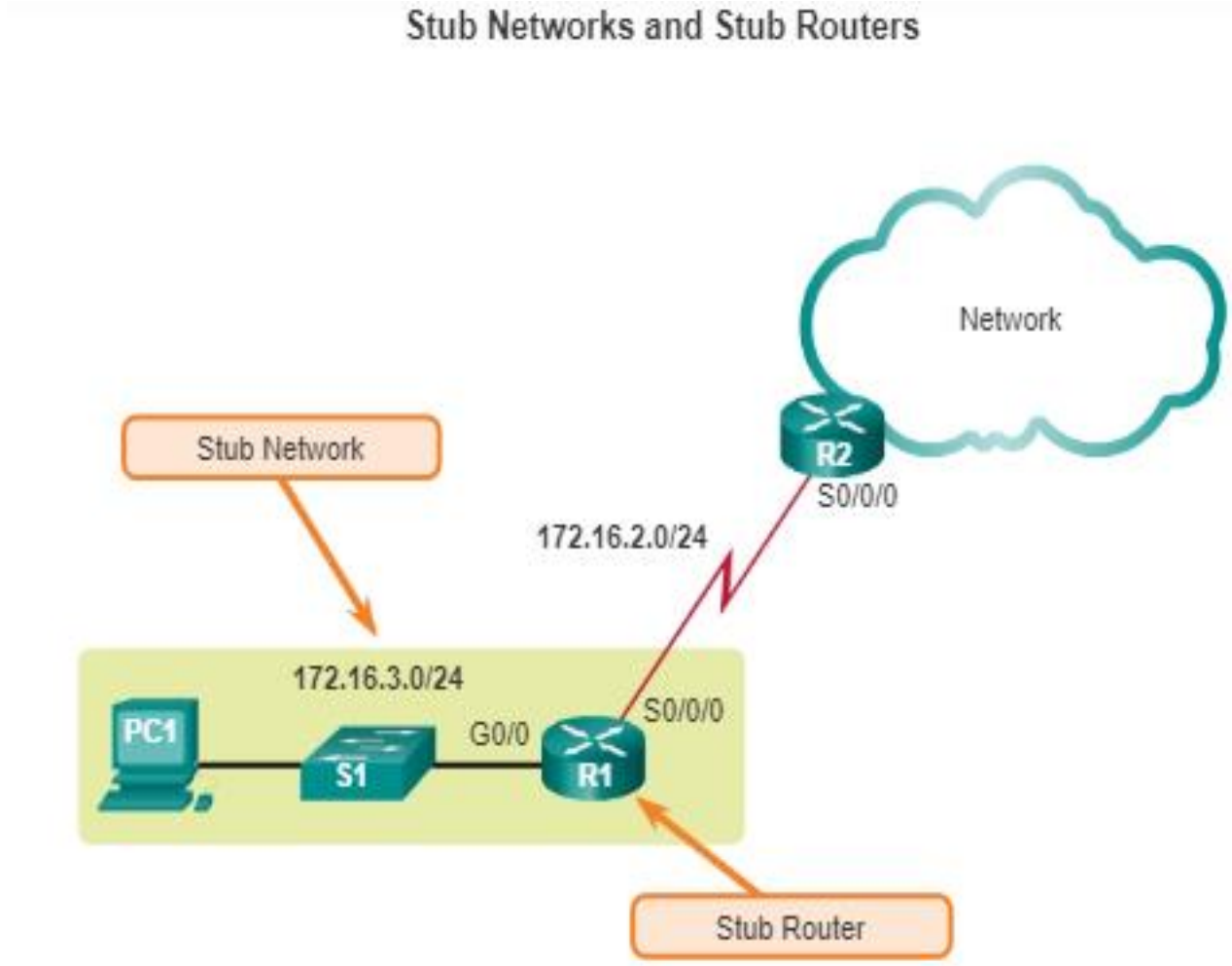
STATIC ROUTE

- When to use Static routes?
  - Smaller networks
  - Routing to and from stub networks.
  - Using a single default route



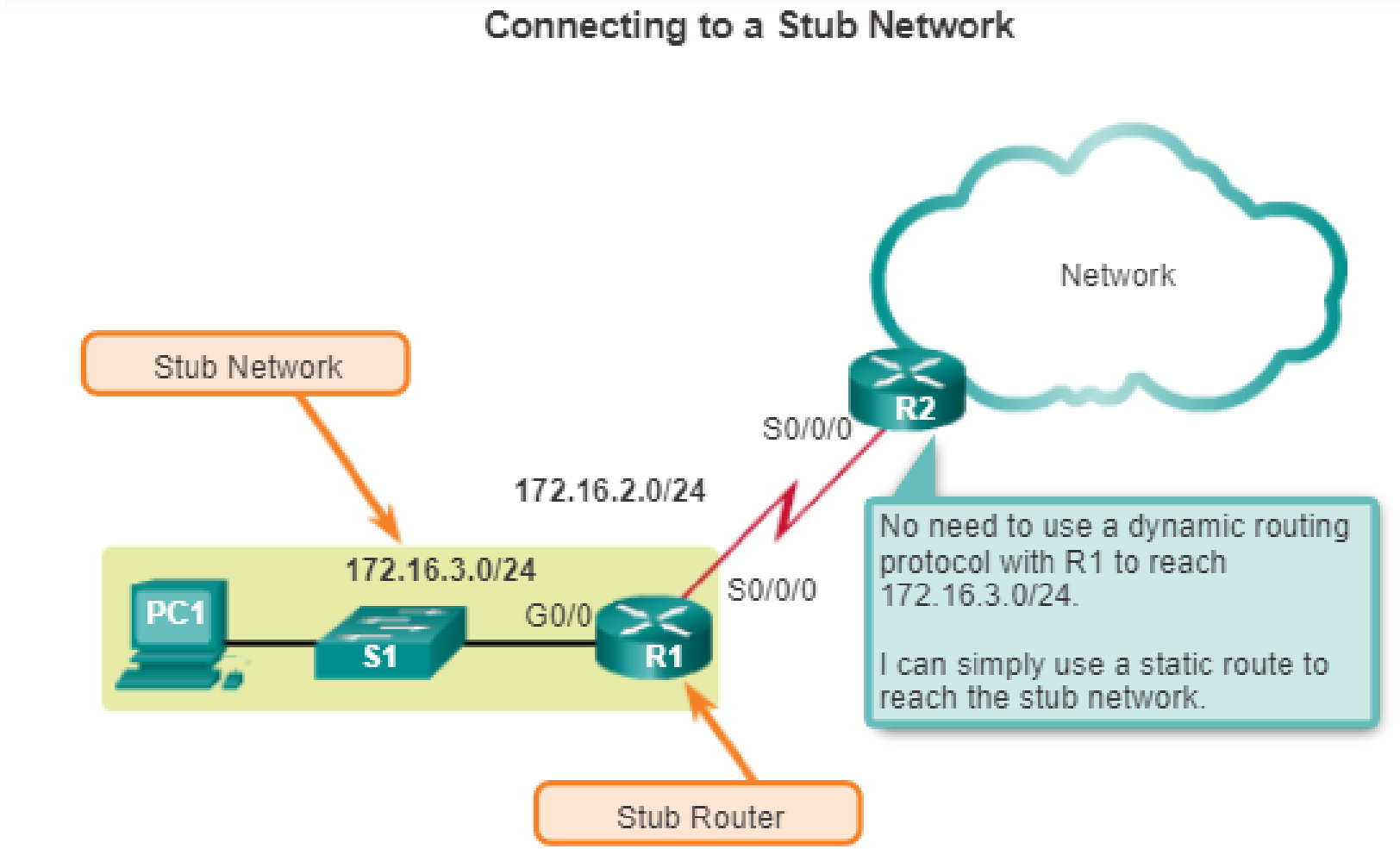
TYPE of STATIC ROUTES

- Standard static route
- Default static route
- Summary static route
- Floating static route



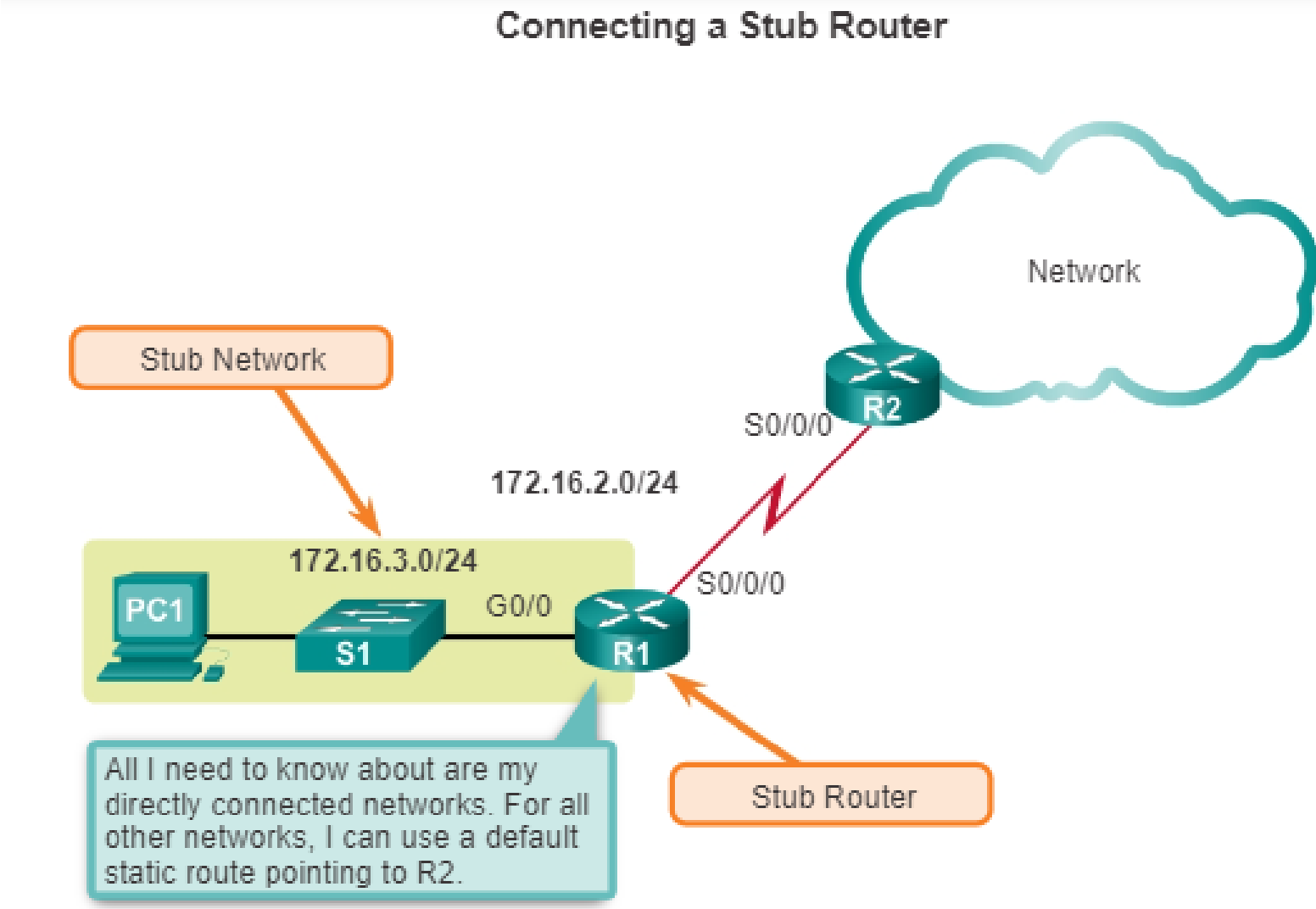
TYPE of STATIC ROUTES

- **Standard static route**
- Default static route
- Summary static route
- Floating static route



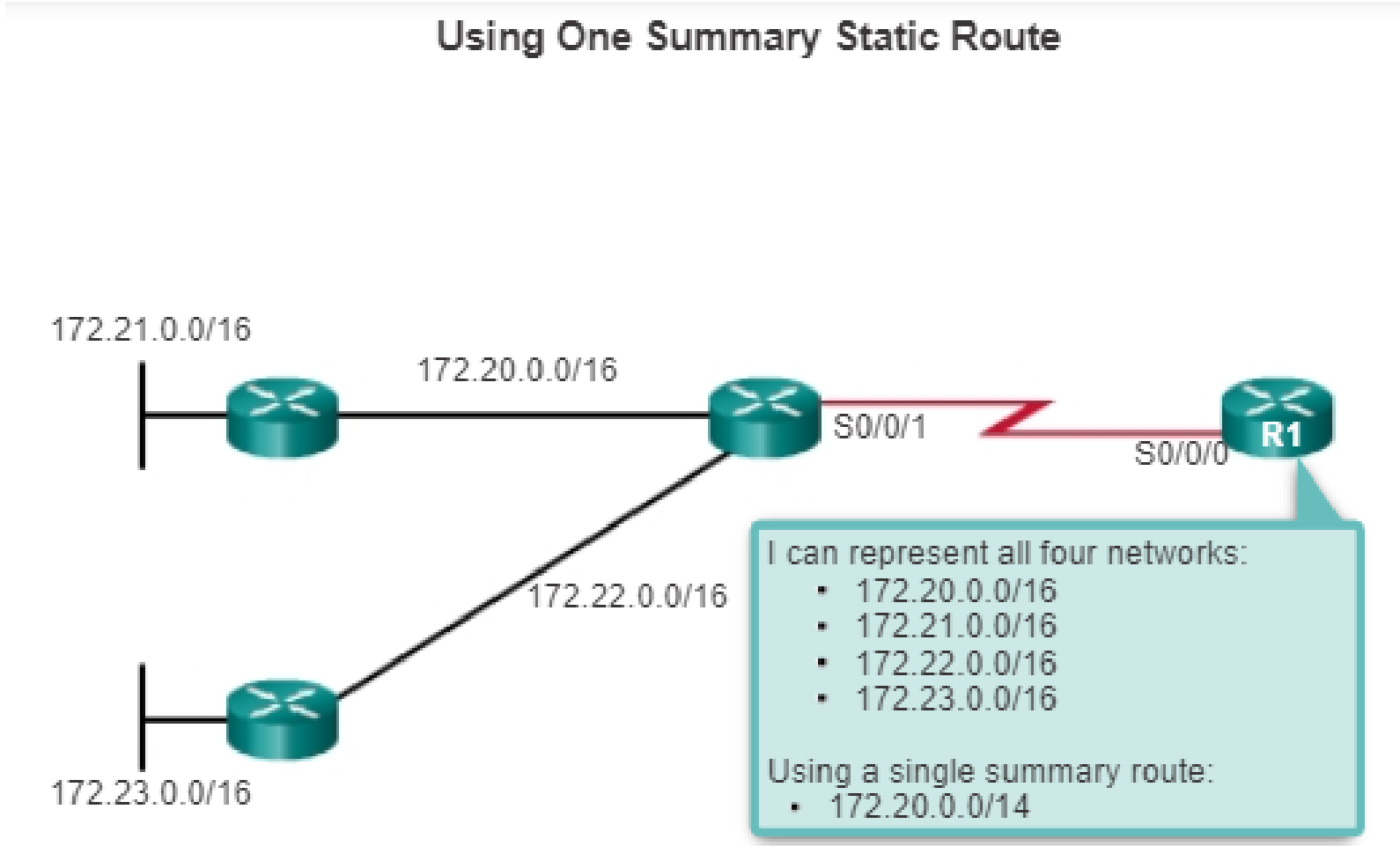
TYPE of STATIC ROUTES

- Standard static route
- **Default static route**
- Summary static route
- Floating static route



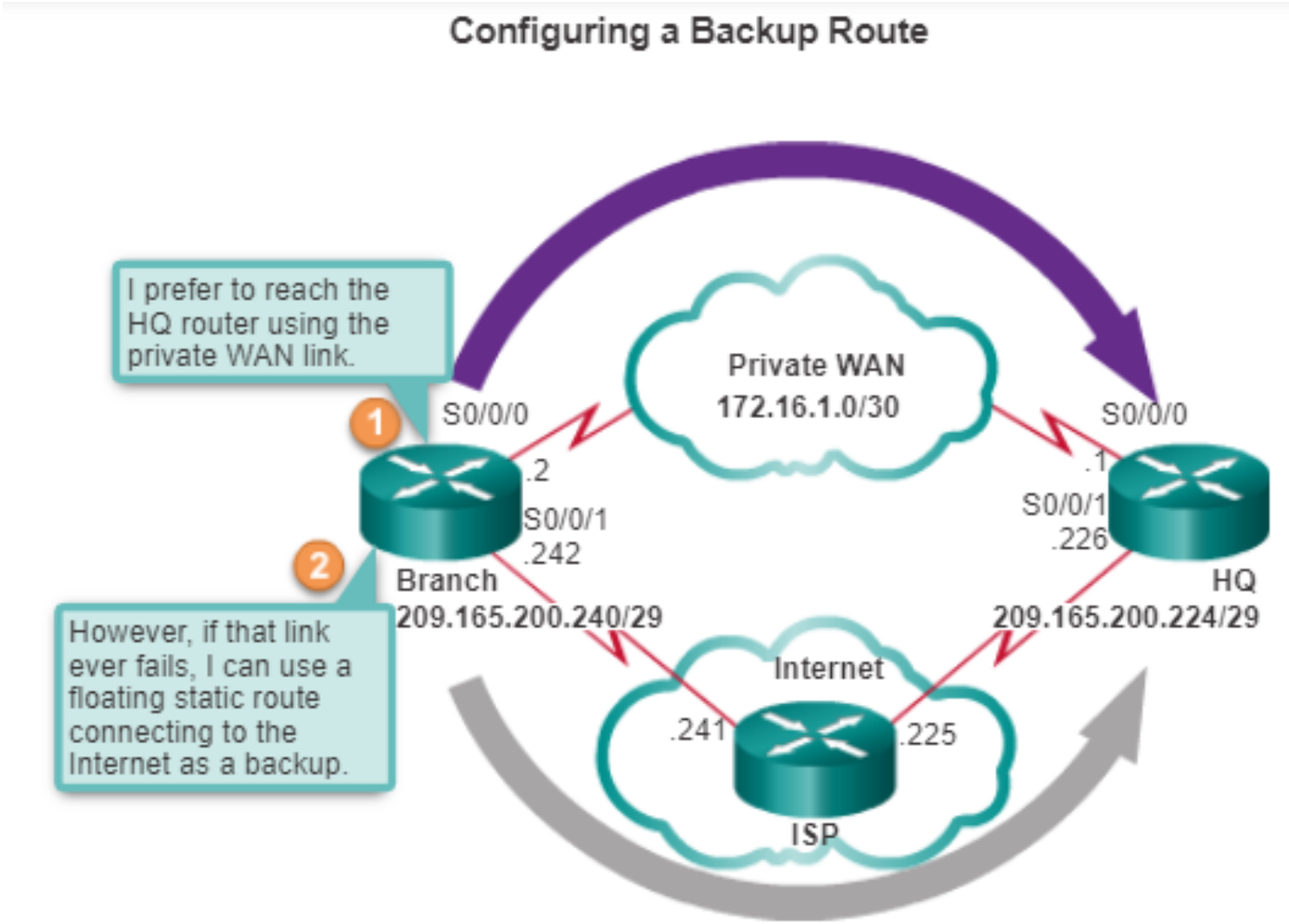
TYPE of STATIC ROUTES

- Standard static route
- Default static route
- **Summary static route**
- Floating static route



TYPE of STATIC ROUTES

- Standard static route
- Default static route
- Summary static route
- **Floating static route**



CONFIGURATE STATIC ROUTES

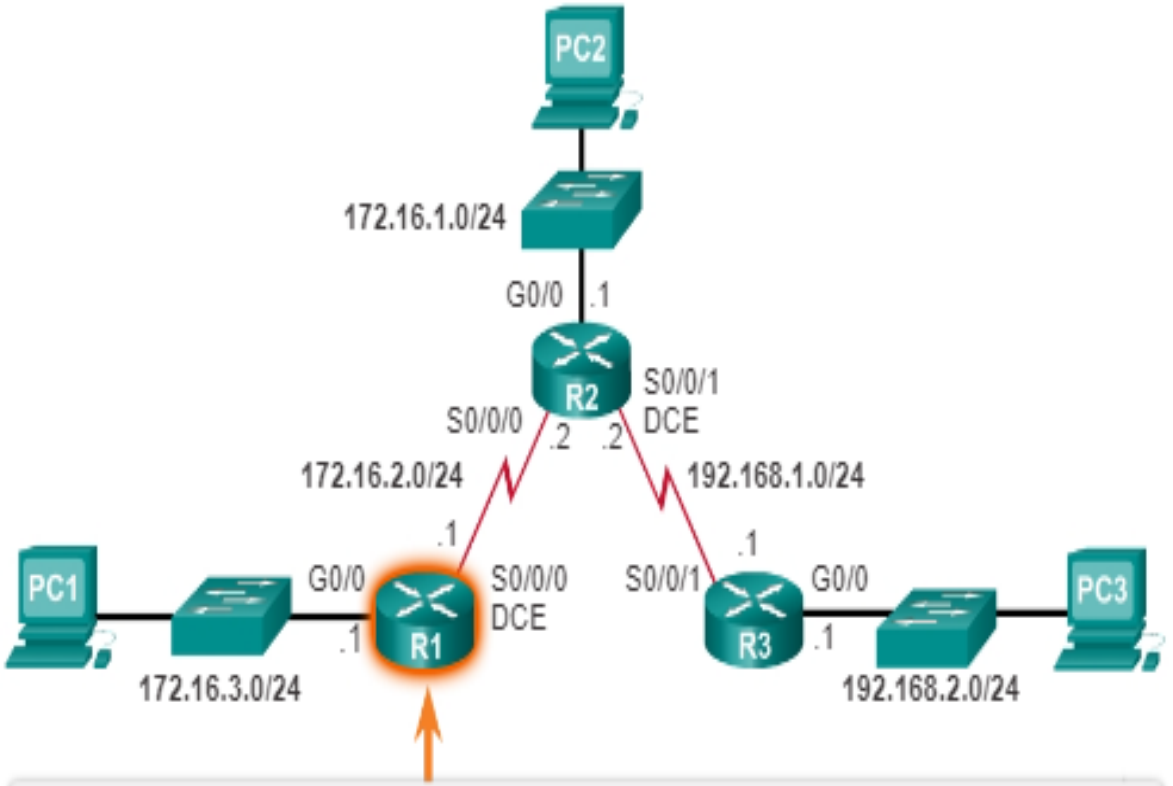
`ip route` Command Syntax

```
Router(config)# ip route network-address subnet-mask
{ip-address | exit-intf}
```

Parameter	Description
`network-address`	Destination network address of the remote network to be added to the routing table.
`subnet-mask`	• Subnet mask of the remote network to be added to the routing table. • The subnet mask can be modified to summarize a group of networks.
`ip-address`	• Commonly referred to as the next-hop router's IP address. • Typically used when connecting to a broadcast media (i.e., Ethernet). • Commonly creates a recursive lookup.
`exit-intf`	• Use the outgoing interface to forward packets to the destination network. • Also referred to as a directly attached static route. • Typically used when connecting in a point-to-point configuration.

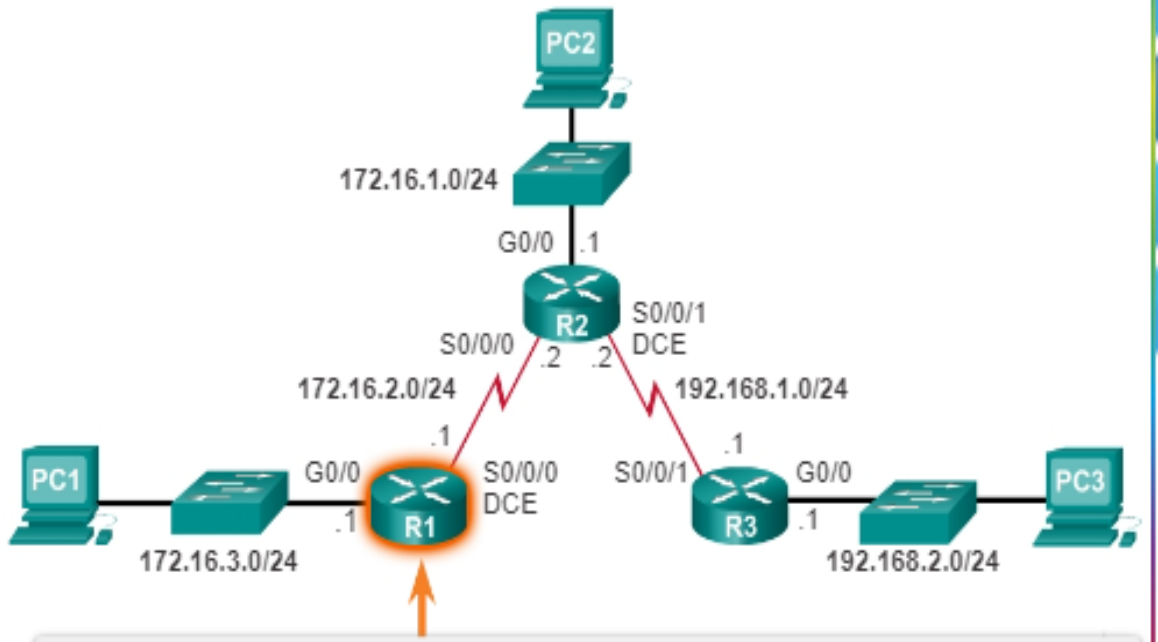
CONFIGURATE STATIC ROUTES

Configuring Next-Hop Static Routes on R1




```
R1(config)# ip route 172.16.1.0 255.255.255.0 172.16.2.2
R1(config)# ip route 192.168.1.0 255.255.255.0 172.16.2.2
R1(config)# ip route 192.168.2.0 255.255.255.0 172.16.2.2
R1(config)#
```

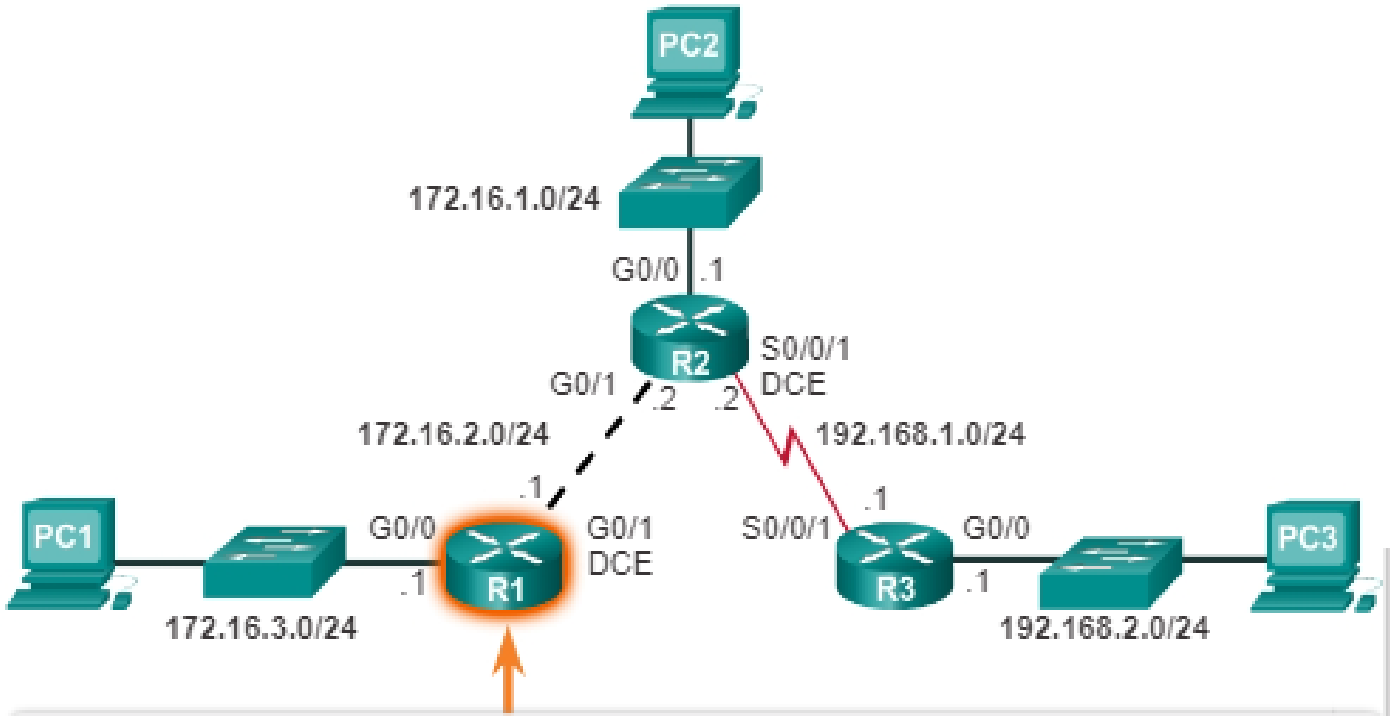
Verify the Routing Table of R1




```
R1# show ip route | begin Gateway
  172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
S    172.16.1.0/24 [1/0] via 172.16.2.2
C    172.16.2.0/24 is directly connected, Serial0/0/0
L    172.16.2.1/32 is directly connected, Serial0/0/0
C    172.16.3.0/24 is directly connected, GigabitEthernet0/0
L    172.16.3.1/32 is directly connected, GigabitEthernet0/0
S    192.168.1.0/24 [1/0] via 172.16.2.2
S    192.168.2.0/24 [1/0] via 172.16.2.2
```

CONFIGURATE STATIC ROUTES

Configure Fully Specified Static Routes on R1

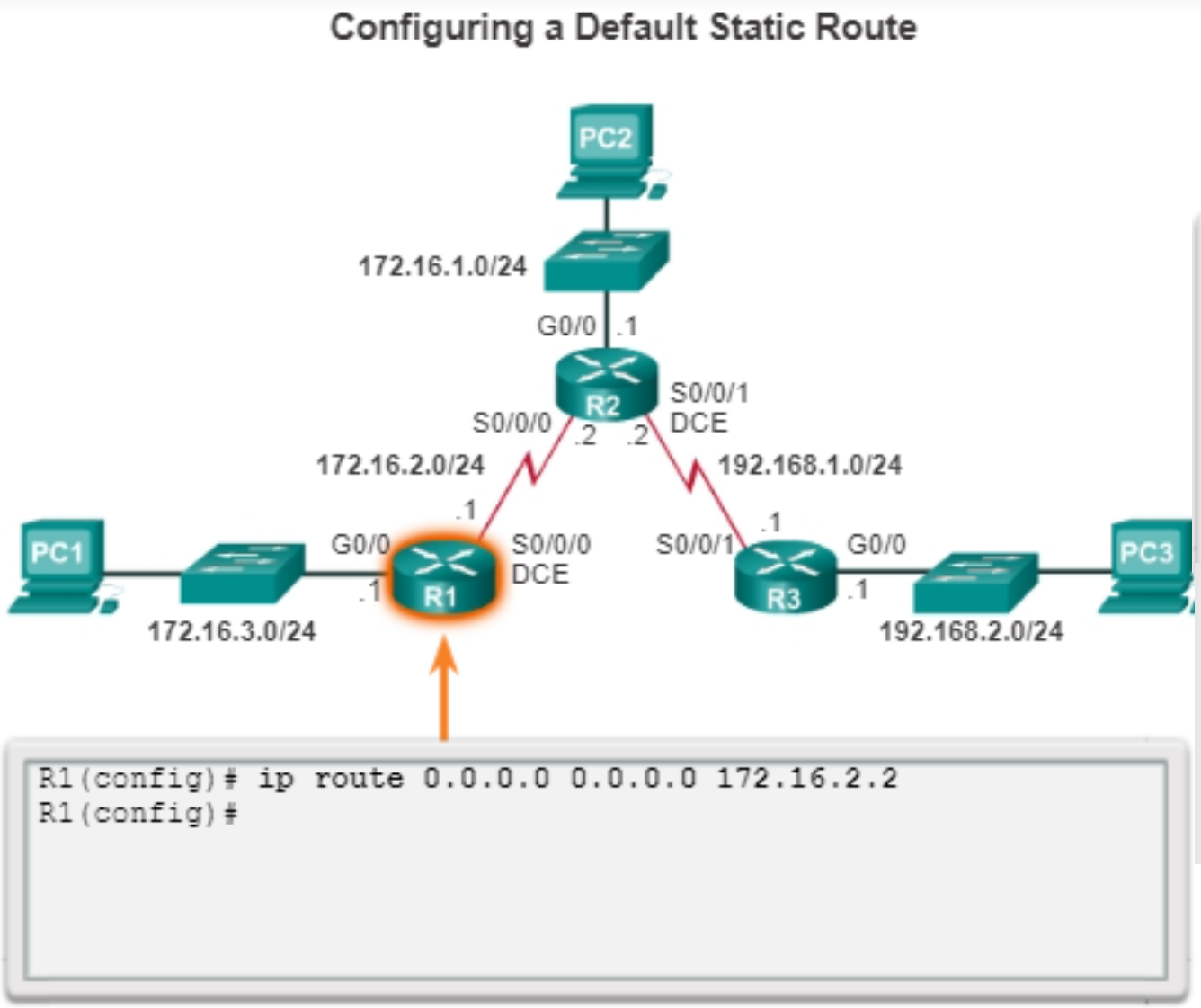



```
R1(config)# ip route 172.16.1.0 255.255.255.0 G0/1 172.16.2.2
R1(config)# ip route 192.168.1.0 255.255.255.0 G0/1 172.16.2.2
R1(config)# ip route 192.168.2.0 255.255.255.0 G0/1 172.16.2.2
R1(config)#
```

```
R1# show ip route | begin Gateway
Gateway of last resort is not set

      172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
S        172.16.1.0/24 [1/0] via 172.16.2.2, Serial0/0/0
S     192.168.1.0/24 [1/0] via 172.16.2.2, Serial0/0/0
S     192.168.2.0/24 [1/0] via 172.16.2.2, Serial0/0/0
R1#
```

CONFIGURATE STATIC ROUTES




```
R1# show ip route static
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, i - IS-IS,
       su - IS-IS summary, 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,
       H - NHRP, l - LISP, + - replicated route,
       % - next hop override

Gateway of last resort is 172.16.2.2 to network 0.0.0.0



S* 0.0.0.0/0 [1/0] via 172.16.2.2
R1#
```