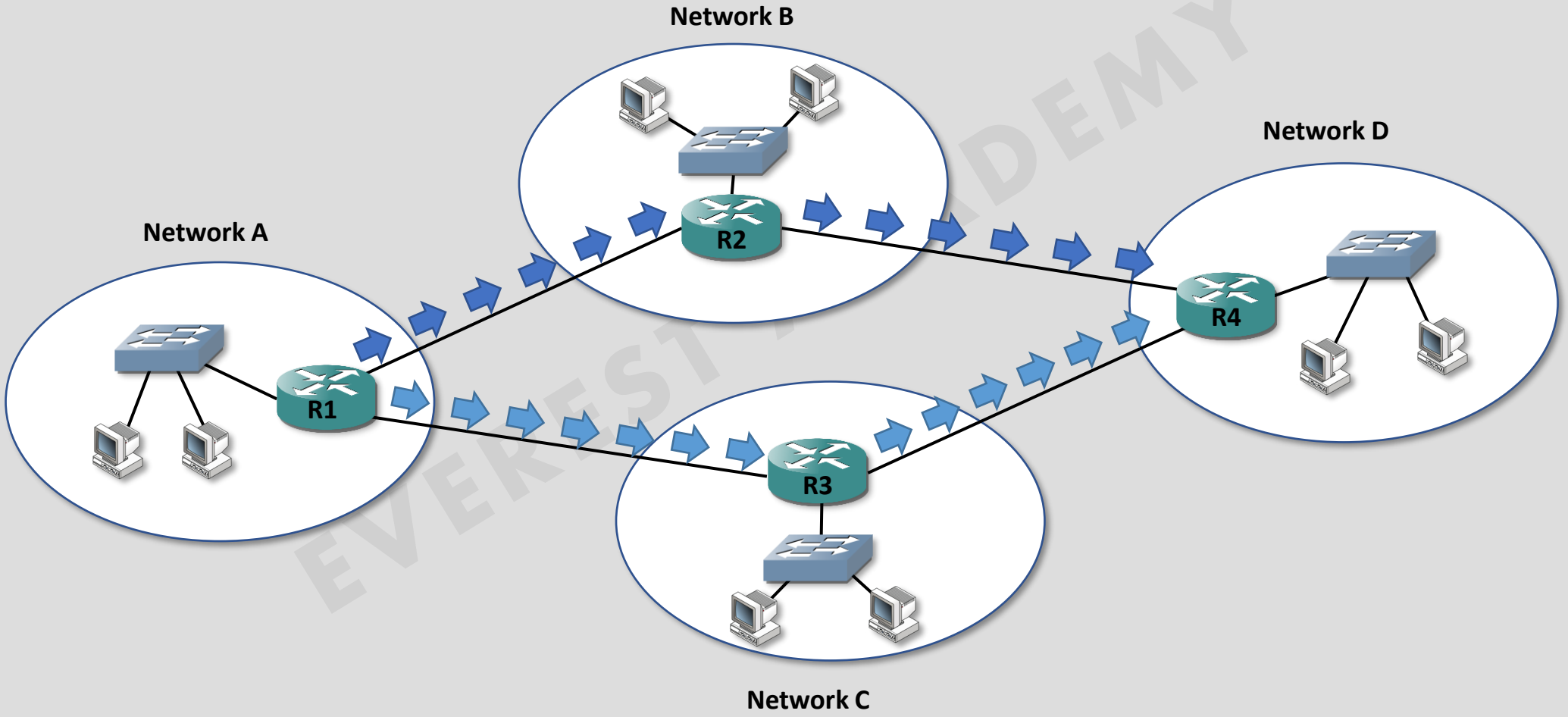
Routing

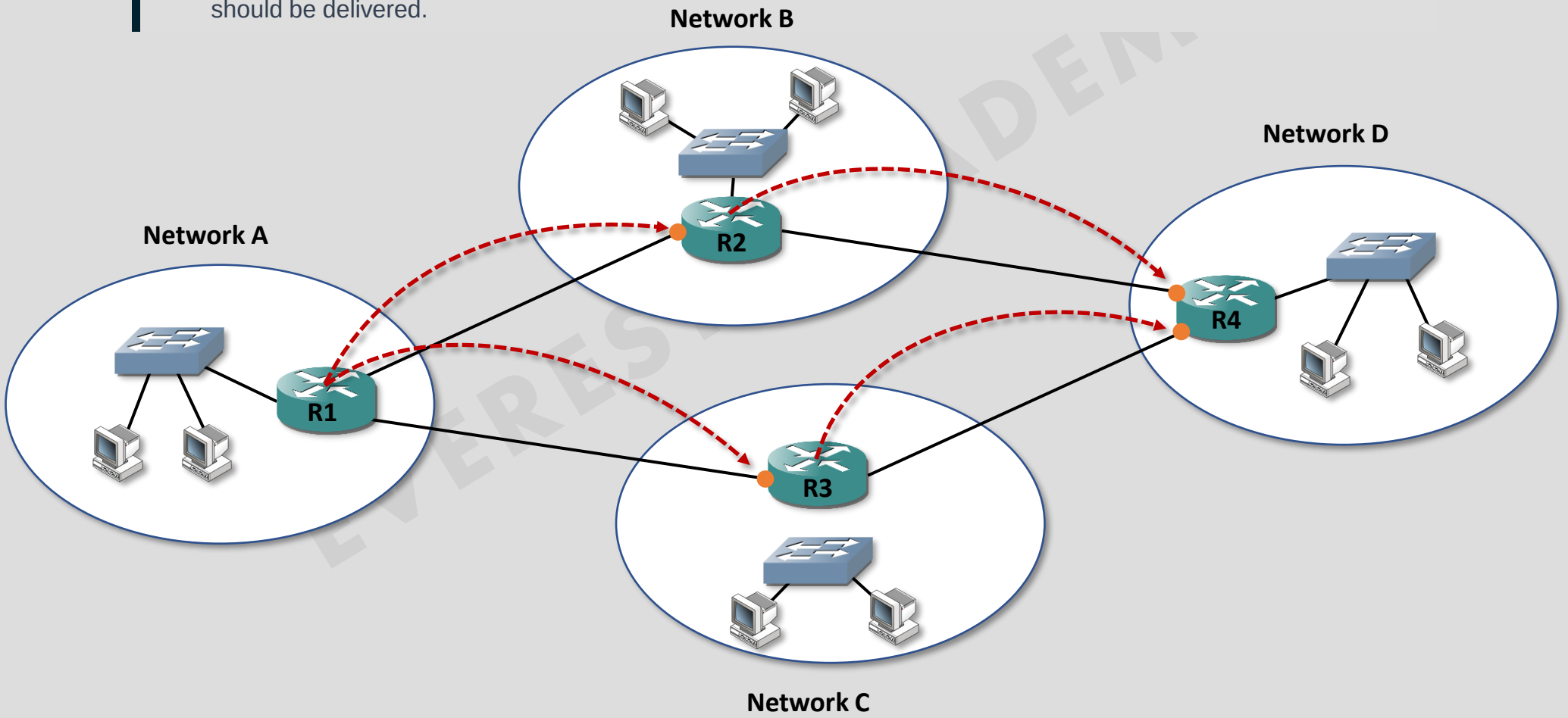
❖ **Routing** is the process of selecting a path for traffic in a network or between or across multiple networks.



EVEREST ACADEMY

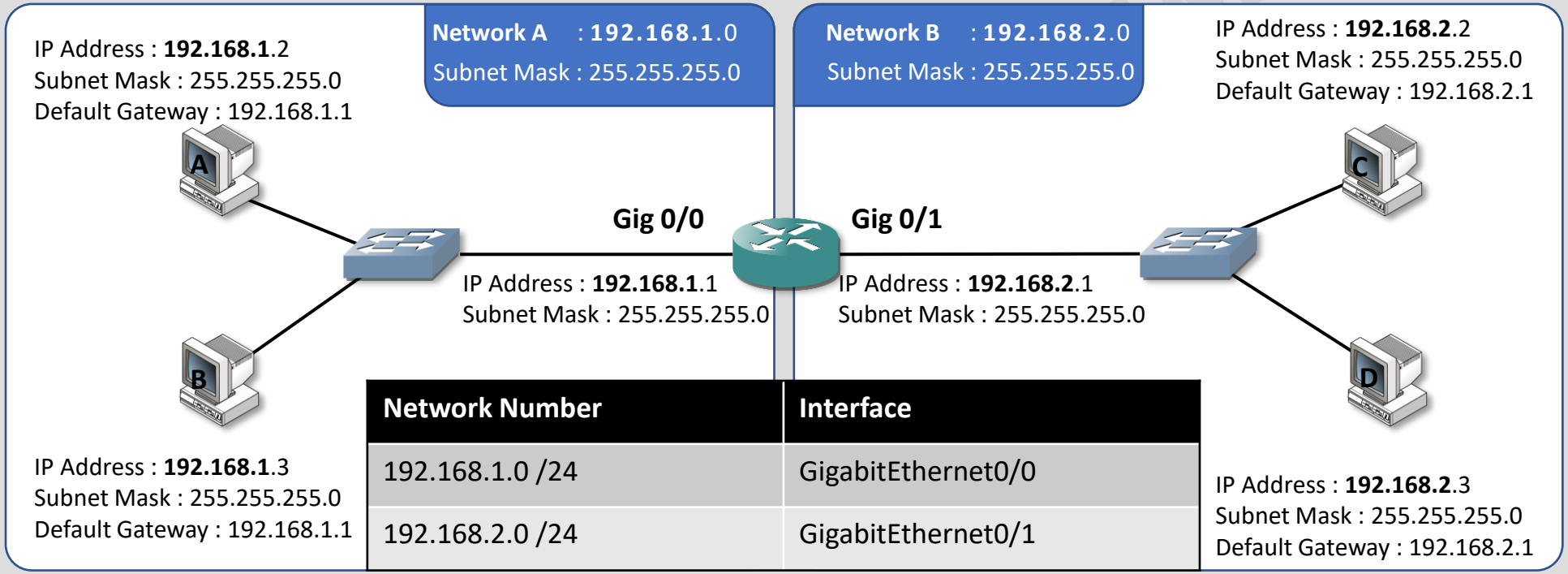
IP Routing

❖ **IP Routing** is the process of sending packets from a host on one network to another host on a different remote network using routers. **Routers** use **IP routing tables** to determine the **next-hop address** to which the packet should be delivered.



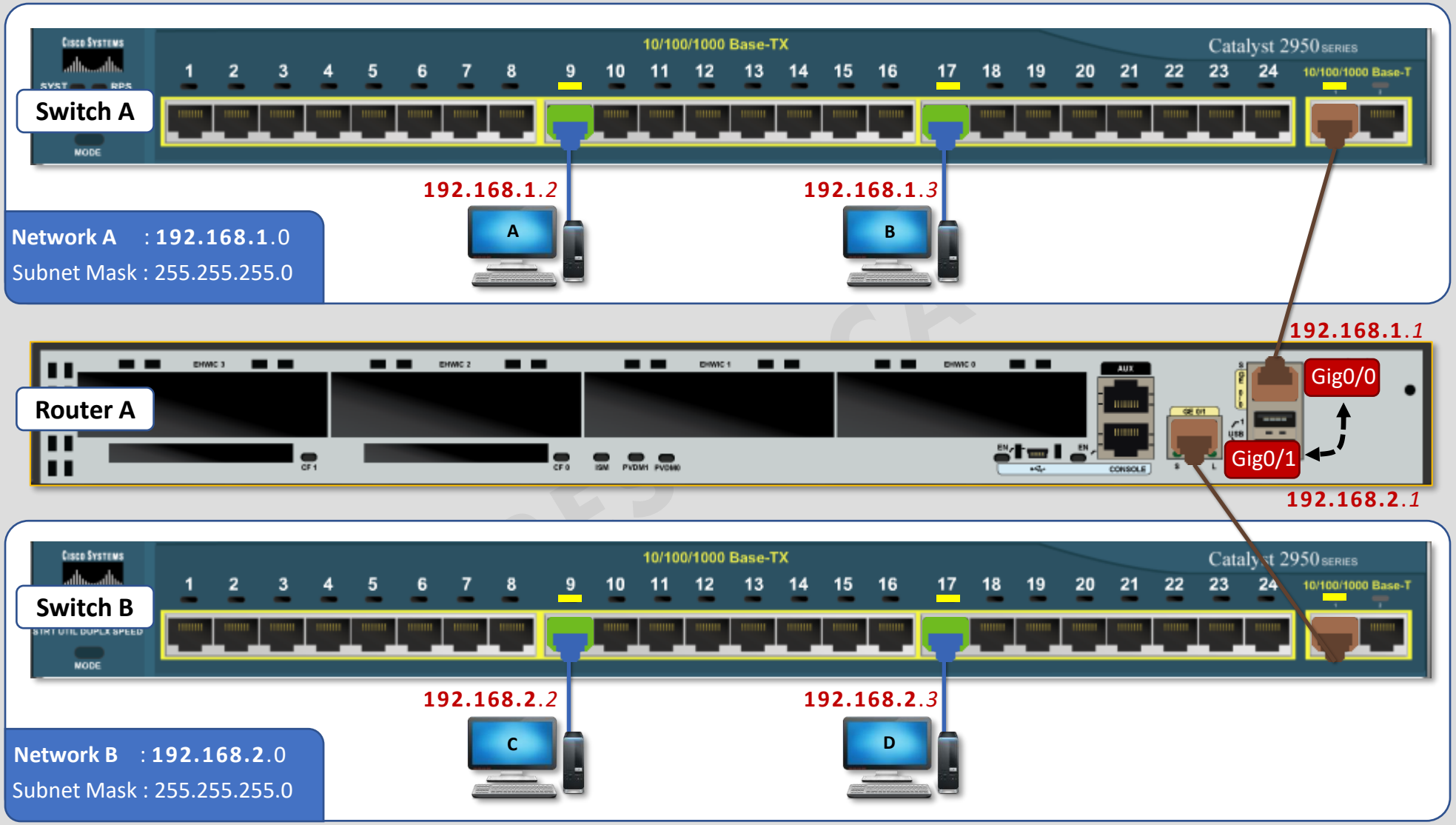
IP Routing Table

❖ **IP Routing Table, or Routing Information Base (RIB),** is a data table stored in a router that lists the routes to particular network destinations.

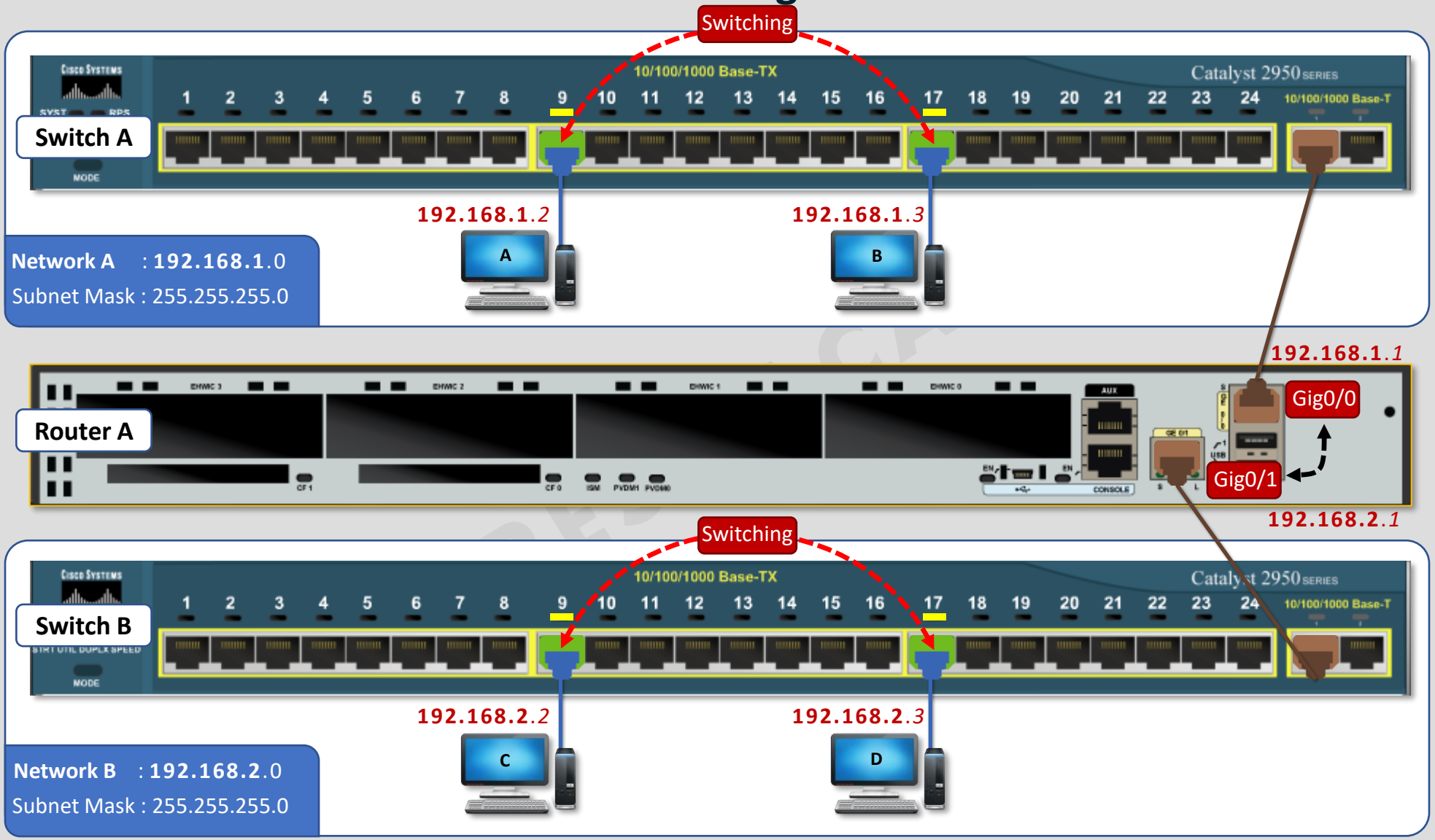


Network Number	Interface
192.168.1.0 /24	GigabitEthernet0/0
192.168.2.0 /24	GigabitEthernet0/1

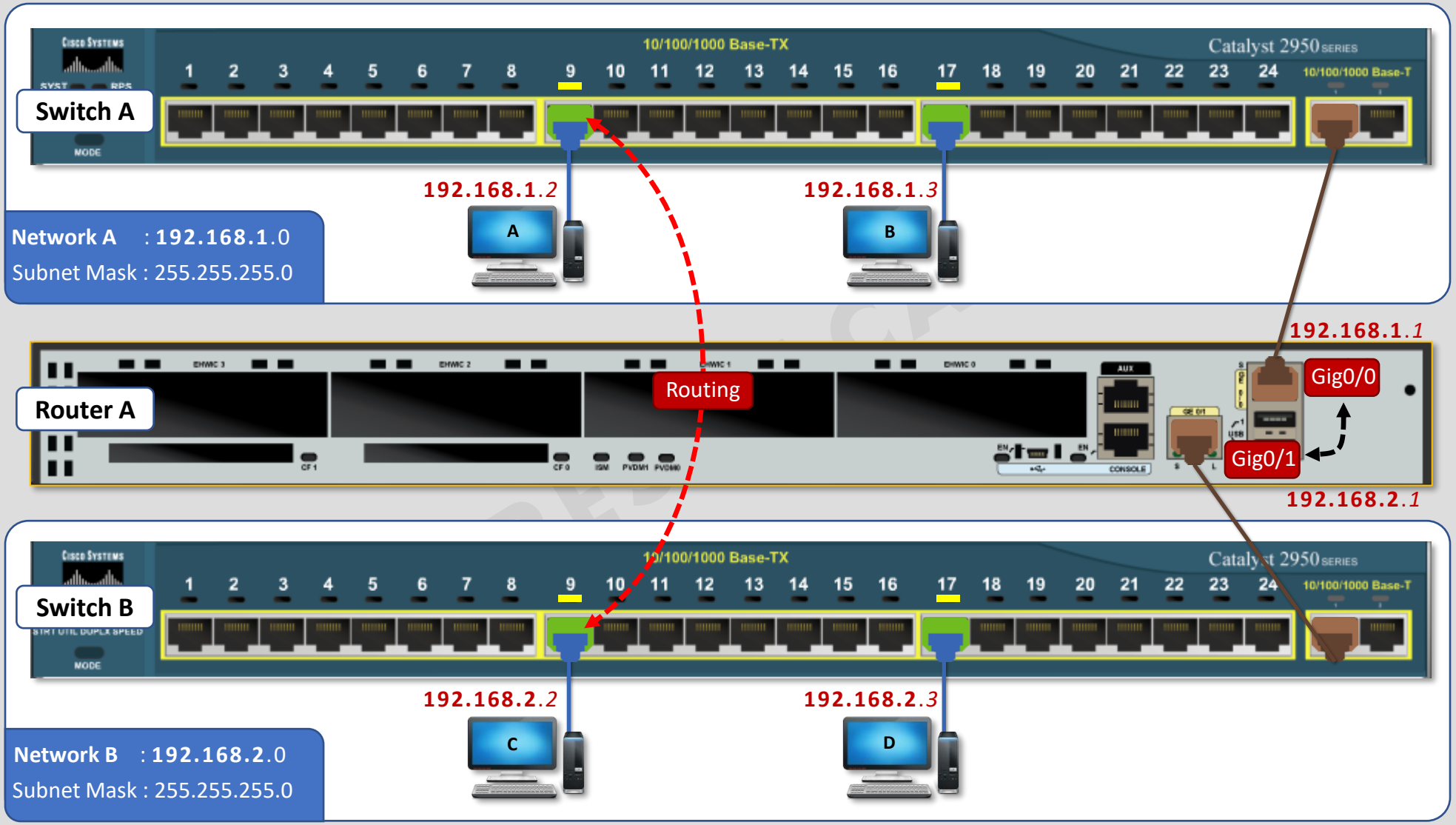
IP Routing

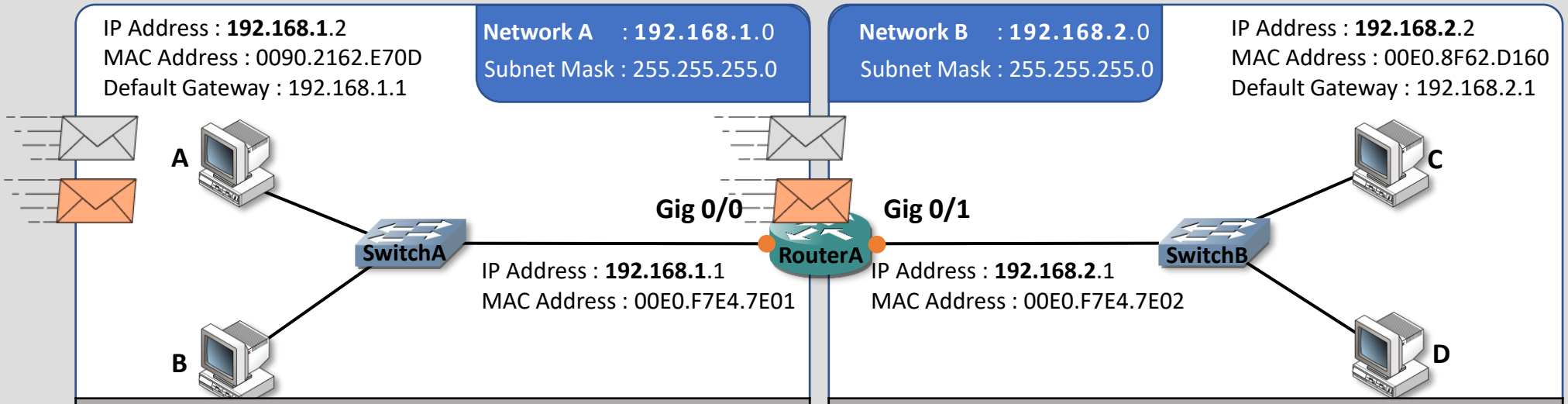

Switch A
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.1.2
192.168.1.3
A
B
Network A : 192.168.1.0
Subnet Mask : 255.255.255.0
192.168.1.1
Router A
Gig0/0
Gig0/1
192.168.2.1
Switch B
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.2.2
192.168.2.3
C
D
Network B : 192.168.2.0
Subnet Mask : 255.255.255.0

IP Routing


Switching
Switch A
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.1.2
192.168.1.3
A
B
Network A : 192.168.1.0
Subnet Mask : 255.255.255.0
192.168.1.1
Router A
Gig0/0
Gig0/1
192.168.2.1
Switching
Switch B
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.2.2
192.168.2.3
C
D
Network B : 192.168.2.0
Subnet Mask : 255.255.255.0

IP Routing


Switch A
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.1.2
192.168.1.3
A
B
Network A : 192.168.1.0
Subnet Mask : 255.255.255.0
192.168.1.1
Router A
Routing
Gig0/0
Gig0/1
192.168.2.1
Switch B
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.2.2
192.168.2.3
C
D
Network B : 192.168.2.0
Subnet Mask : 255.255.255.0



ICMP Packet => ping -n 2 192.168.2.2	
Packet (IP)	S = **192.168.1**.2 , D = **192.168.2**.2
Frame (MAC)	S = 0090.2162.E70D , D = ???

ICMP Packet (1st Packet)	
Packet (IP)	S = **192.168.1**.2 , D = **192.168.2**.2
Frame (MAC)	S = 00E0.F7E4.7E02 , D = ???

ARP Request (from A)	
Frame (MAC)	S = 0090.2162.E70D , D = FFFF.FFFF.FFFF

ARP Request (from RouterA)	
Frame (MAC)	S = 00E0.F7E4.7E02 , D = FFFF.FFFF.FFFF

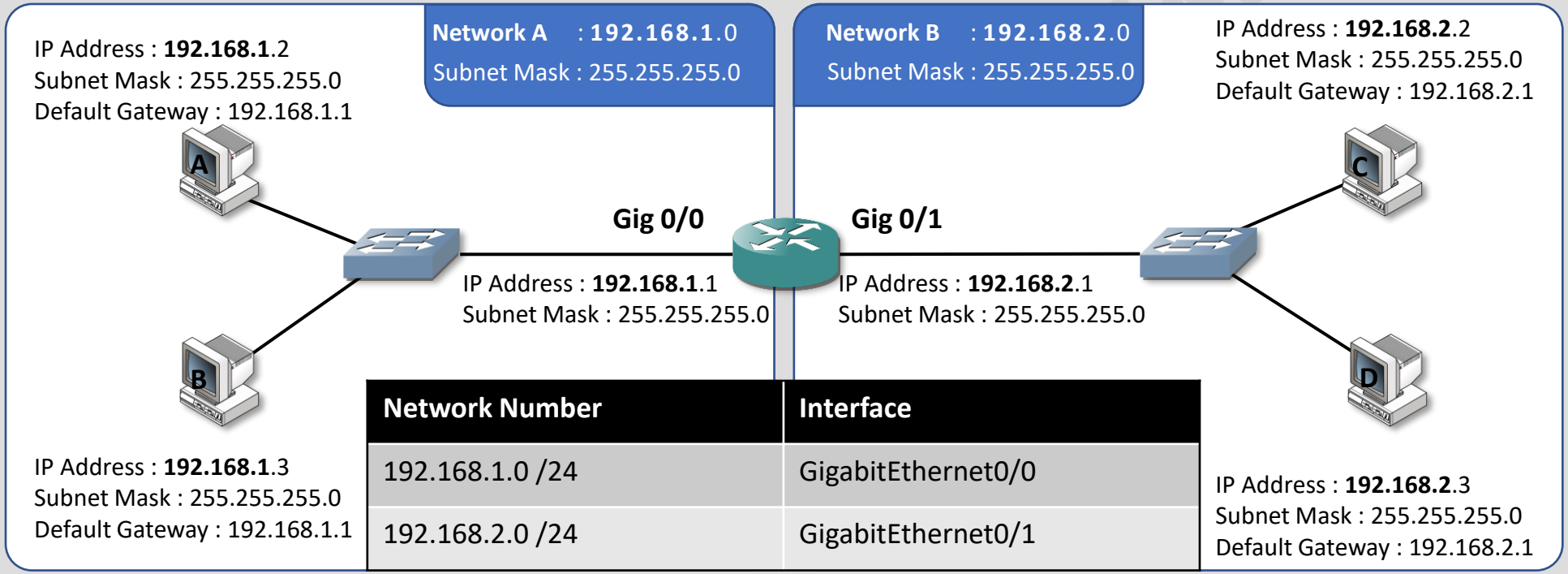
ARP Reply (from RouterA))	
Frame (MAC)	S = 00E0.F7E4.7E01 , D = 0090.2162.E70D

ARP Reply (from C)	
Frame (MAC)	S = 00E0.8F62.D160 , D = 00E0.F7E4.7E02

ICMP Packet (1st Packet)	
Packet (IP)	S = **192.168.1**.2 , D = **192.168.2**.2
Frame (MAC)	S = 0090.2162.E70D , D = 00E0.F7E4.7E01

ICMP Packet (2nd Packet)	
Packet (IP)	S = **192.168.1**.2 , D = **192.168.2**.2
Frame (MAC)	S = 00E0.F7E4.7E02 , D = 00E0.8F62.D160

Static Routing

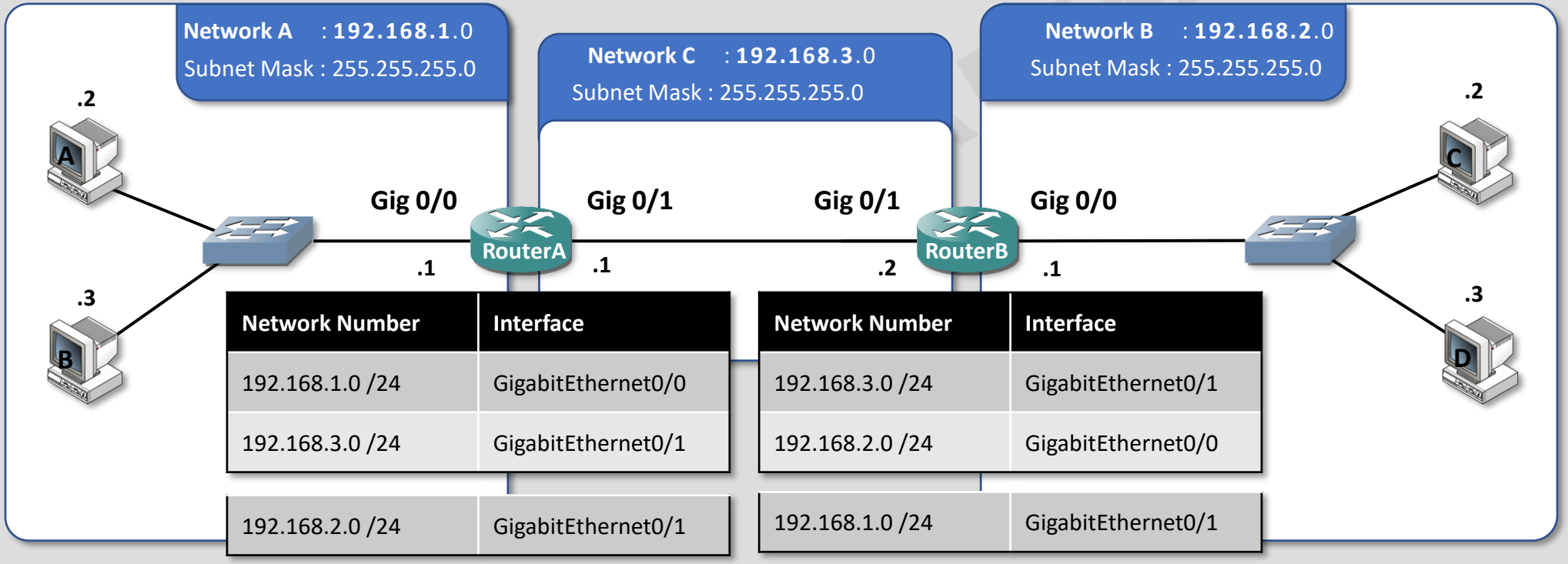


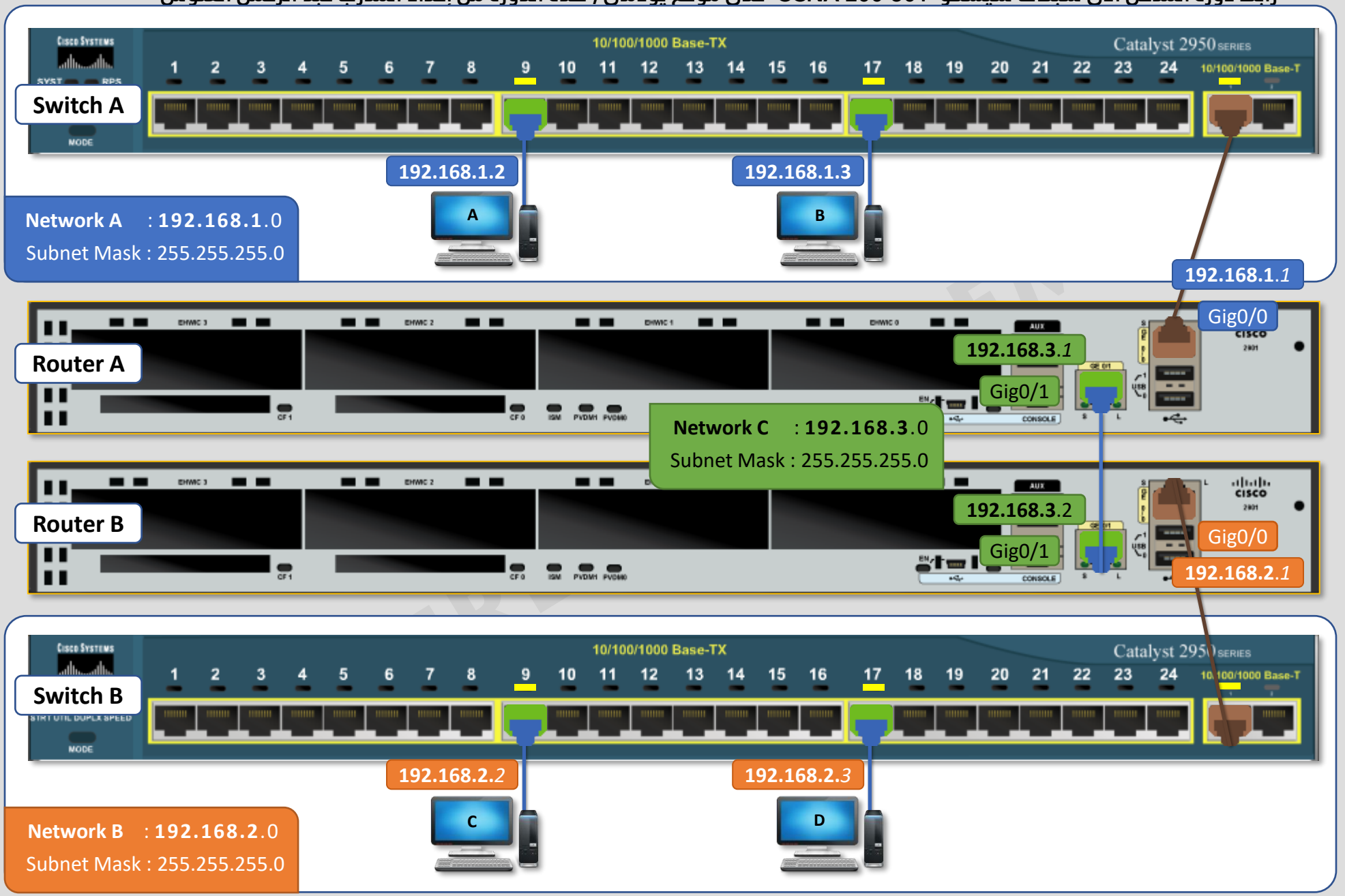
Network Number	Interface
192.168.1.0 /24	GigabitEthernet0/0
192.168.2.0 /24	GigabitEthernet0/1

Static Routing

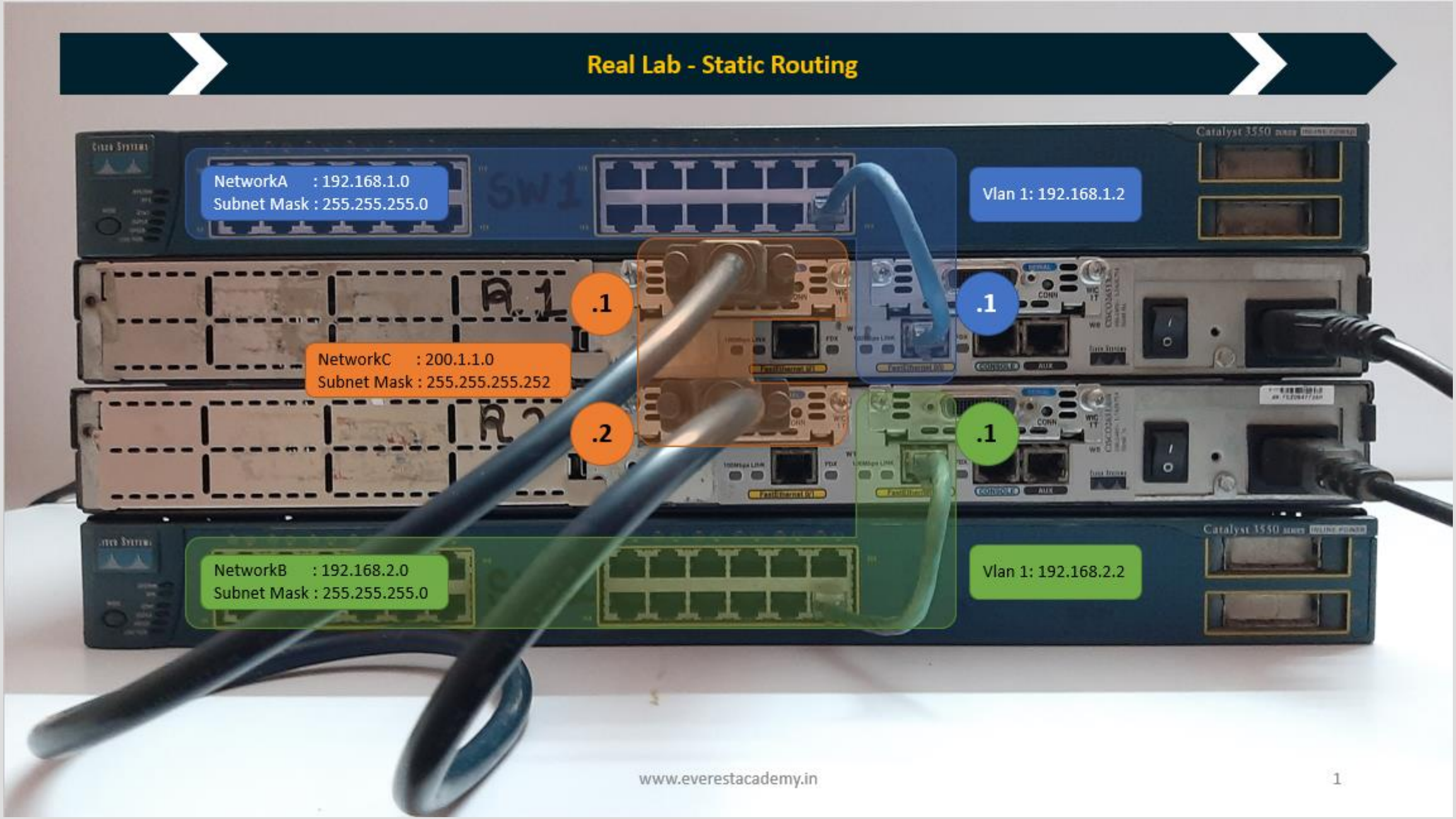
❖ **Static routing is** a type of routing that occurs when a router uses a manually-configured routing entry.

❖ **Static routes** are manually configured by a network administrator by adding in entries into a routing table.



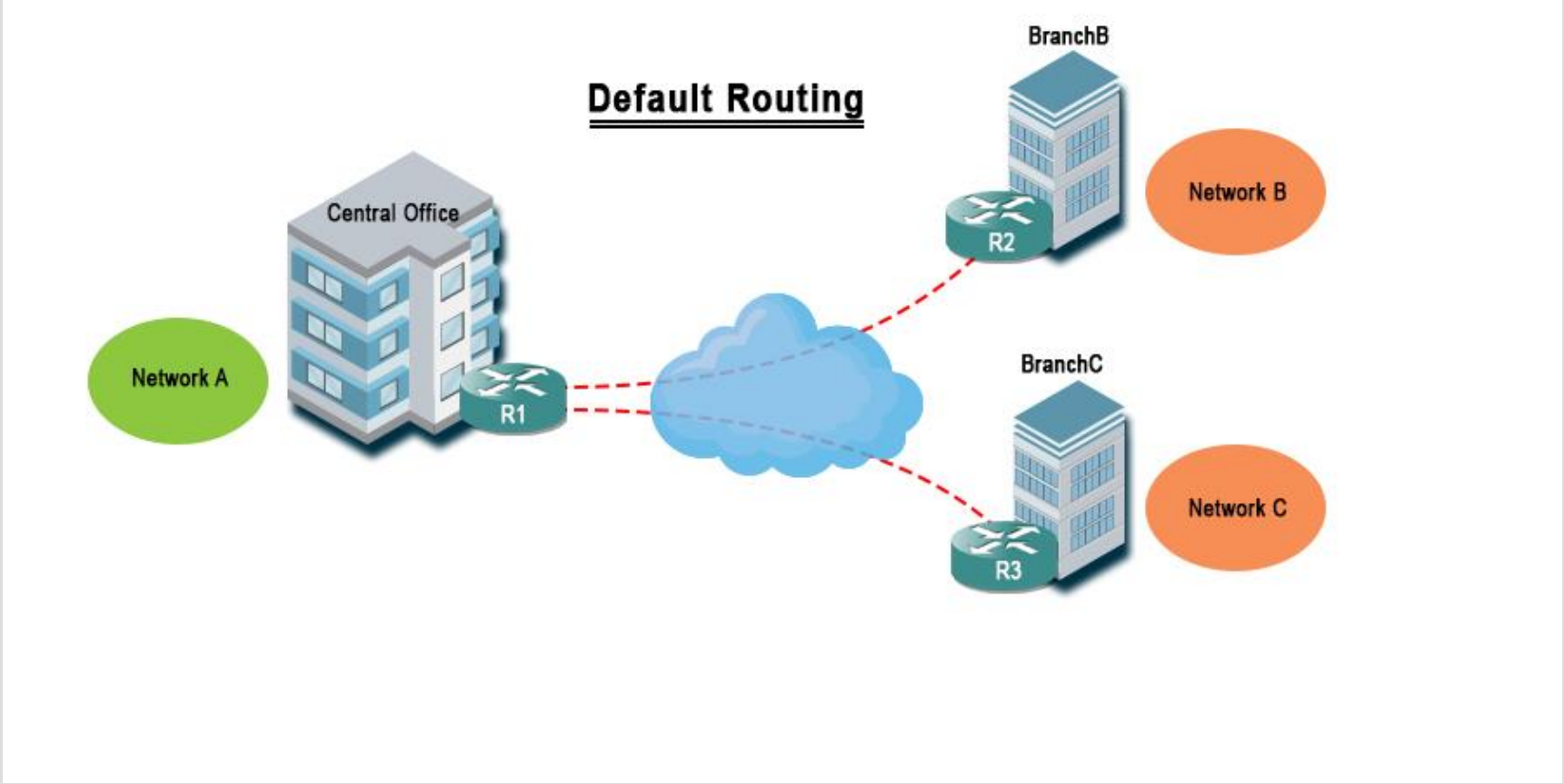

Switch A
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.1.2
192.168.1.3
A
B
Network A : 192.168.1.0
Subnet Mask : 255.255.255.0
192.168.1.1
Gig0/0
Router A
192.168.3.1
Gig0/1
Network C : 192.168.3.0
Subnet Mask : 255.255.255.0
Router B
192.168.3.2
Gig0/1
Gig0/0
192.168.2.1
Switch B
10/100/1000 Base-TX
Catalyst 2950 SERIES
192.168.2.2
192.168.2.3
C
D
Network B : 192.168.2.0
Subnet Mask : 255.255.255.0

رابط دورة المدخل الى شبكات سيسكو CCNA 200-301 على موقع يودمي , هذه الدورة من إعداد المدرب عبد الرحمن العلوش

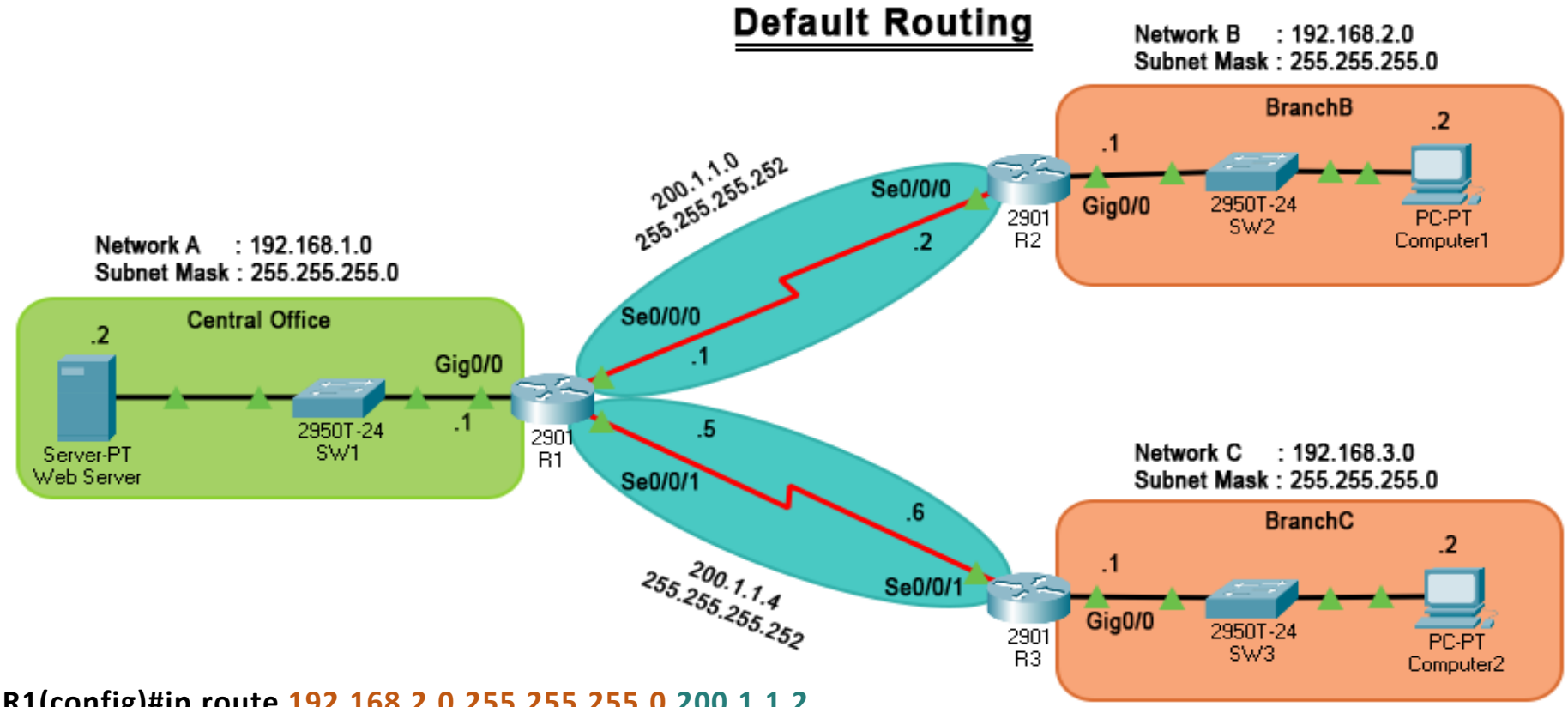


Default Routing

Router(config)#ip route 0.0.0.0 0.0.0.0 Next_Hop_IP_Address



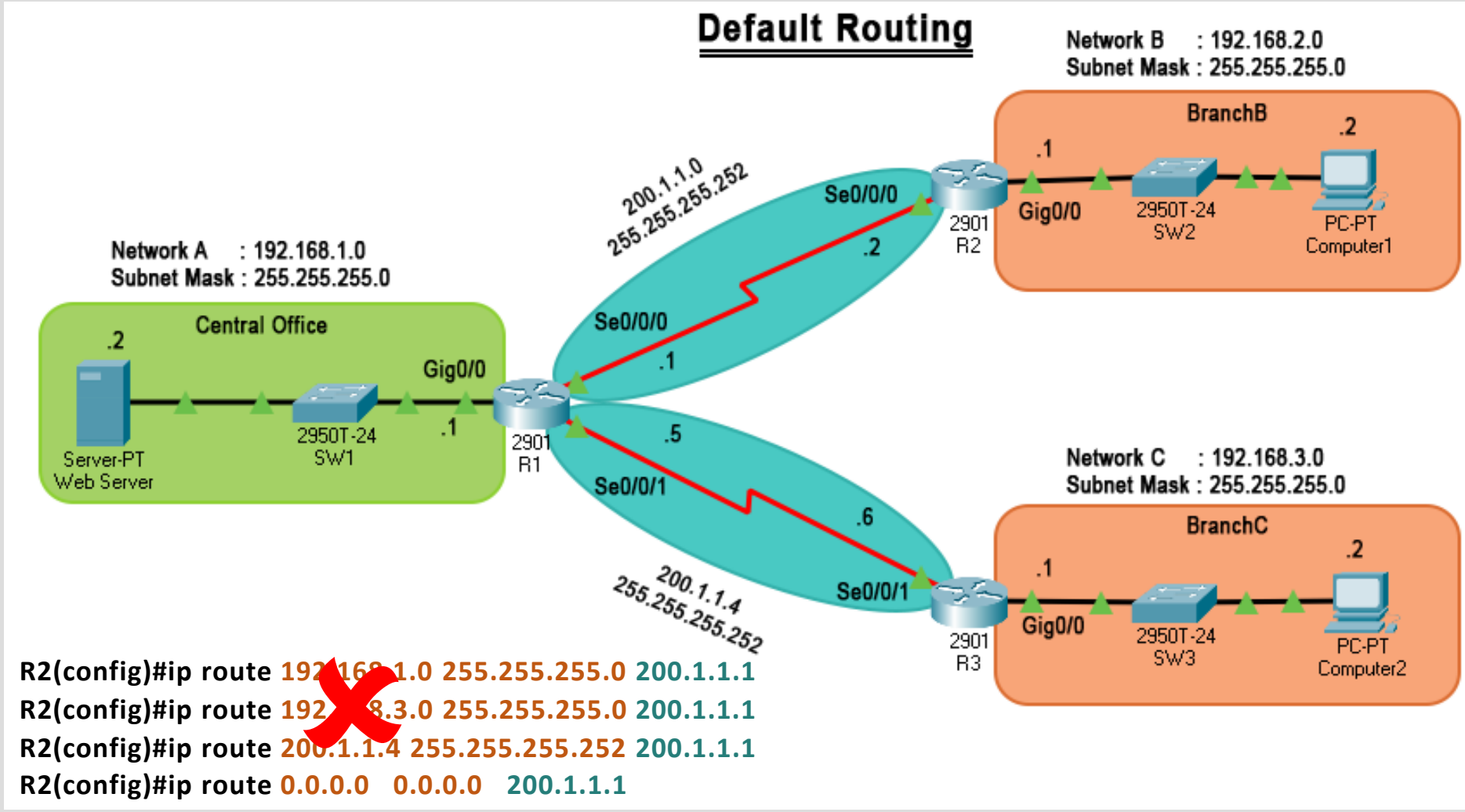
Default Routing



R1(config)#ip route 192.168.2.0 255.255.255.0 200.1.1.2

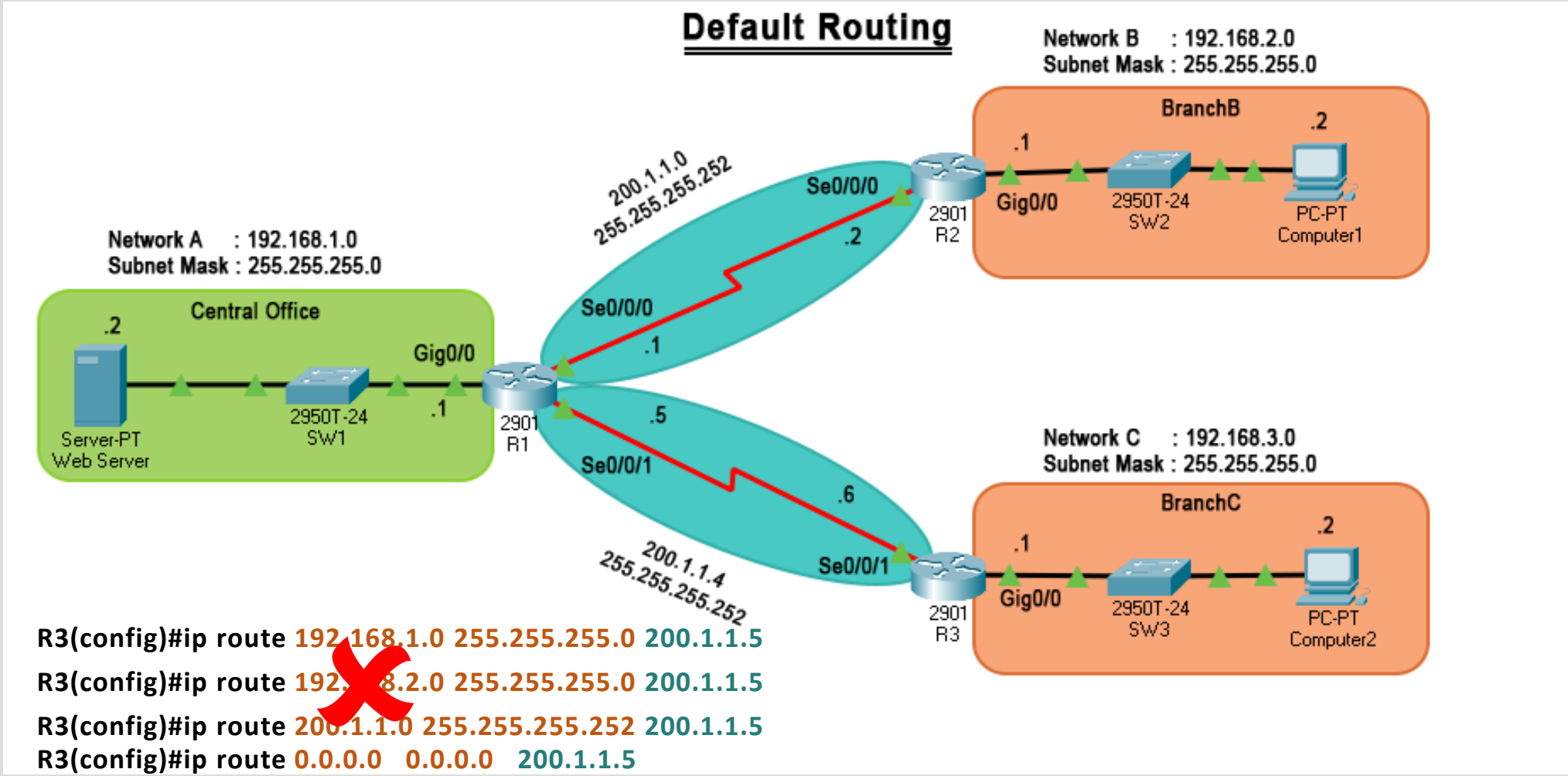
R1(config)#ip route 192.168.3.0 255.255.255.0 200.1.1.6

Default Routing




```
R2(config)#ip route 192.168.1.0 255.255.255.0 200.1.1.1
R2(config)#ip route 192.168.3.0 255.255.255.0 200.1.1.1
R2(config)#ip route 200.1.1.4 255.255.255.252 200.1.1.1
R2(config)#ip route 0.0.0.0   0.0.0.0   200.1.1.1
```

Default Routing

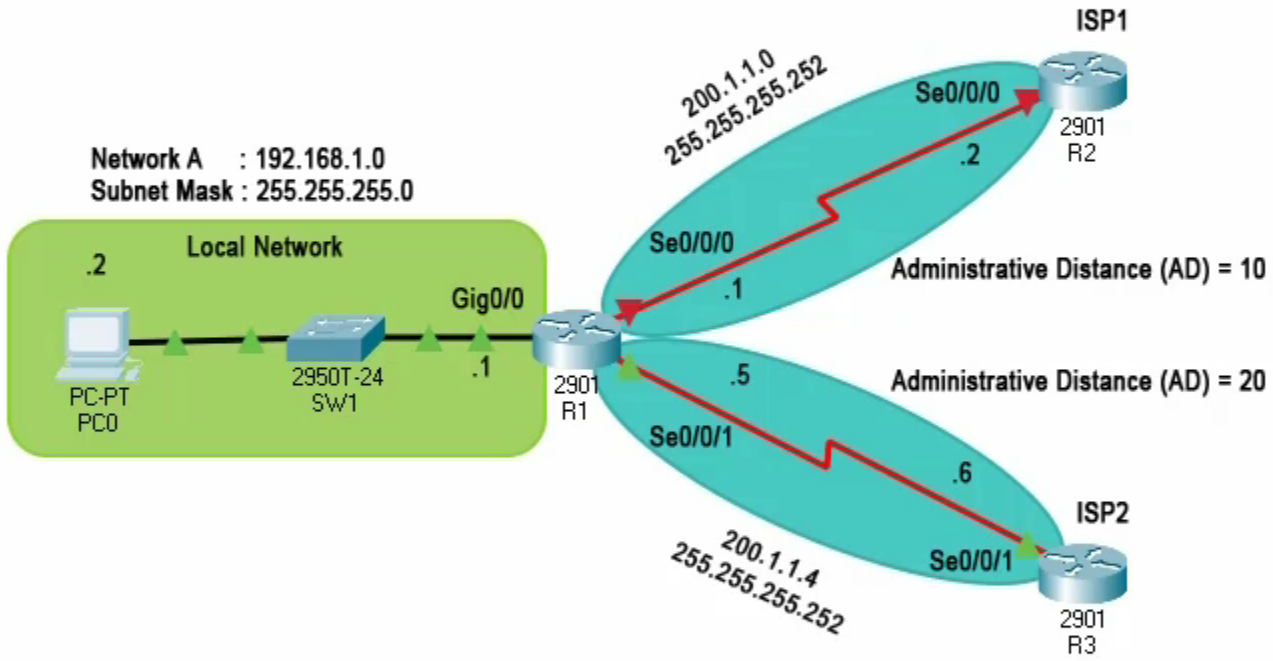



```
R3(config)#ip route 192.168.1.0 255.255.255.0 200.1.1.5
R3(config)#ip route 192.168.2.0 255.255.255.0 200.1.1.5
R3(config)#ip route 200.1.1.0 255.255.255.252 200.1.1.5
R3(config)#ip route 0.0.0.0   0.0.0.0   200.1.1.5
```

File Edit Options View Tools Extensions Window Help

Logical Physical x: 727, y: 119 [Root] 06:09:00

Floating Static Route



Time: 00:11:57 Realtime Simulation

4331 4321 1941 2901 2911 819IOX 819HGW 829 1240 PT-Router PT-Empty 184

819HG-4G-IOX

Scenario 0

New Delete

Toggle PDU List Window

Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic