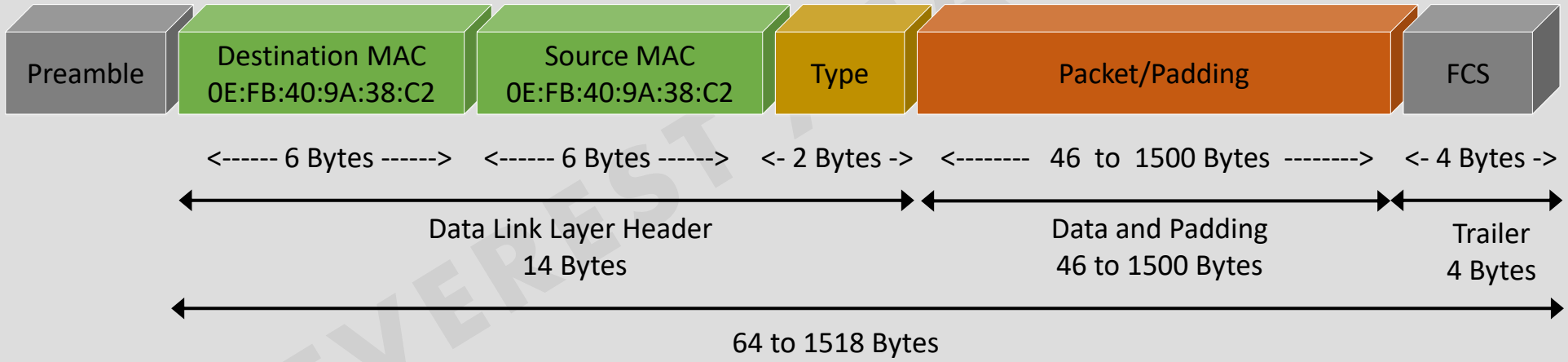
Switching Logic

- The LAN switch has one primary job is forwarding frames to the correct destination (MAC) address.

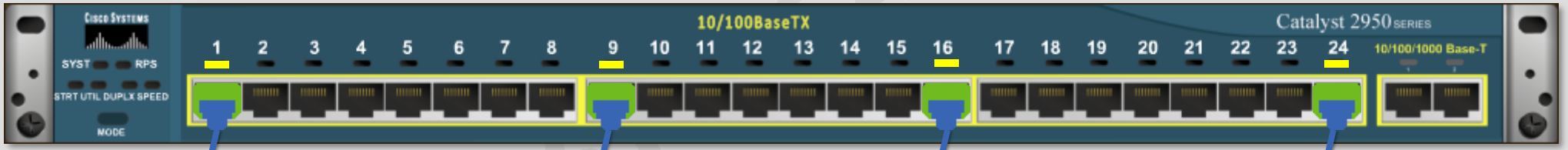
- All Ethernet frames have a destination and source MAC address. Both are 6-Bytes long.



Building a MAC Address Table

Mac Address Table

Vlan	Mac Address	Type	Ports (Outgoing Interface)
1	0001.6426.b880	*DYNAMIC*	Fa0/1
1	0050.0fd5.11de	*DYNAMIC*	Fa0/24
1	0090.2b08.5acd	*DYNAMIC*	Fa0/9
1	00e0.8fa1.969e	*DYNAMIC*	Fa0/16



PC1

IP : 192.168.1.1
MAC: 0001.6426.b880

PC2

IP : 192.168.1.2
MAC:0090.2b08.5acd

PC3

IP : 192.168.1.3
MAC:00e0.8fa1.969e

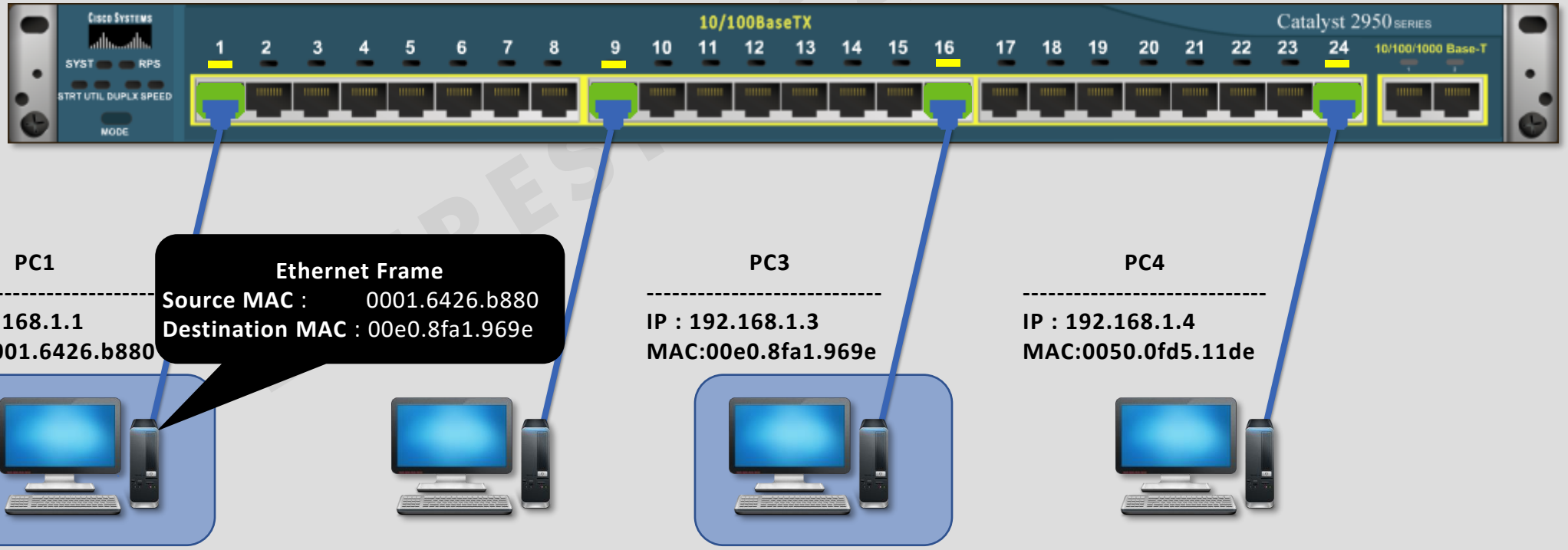
PC4

IP : 192.168.1.4
MAC:0050.0fd5.11de

Forwarding Known Unicast Frames

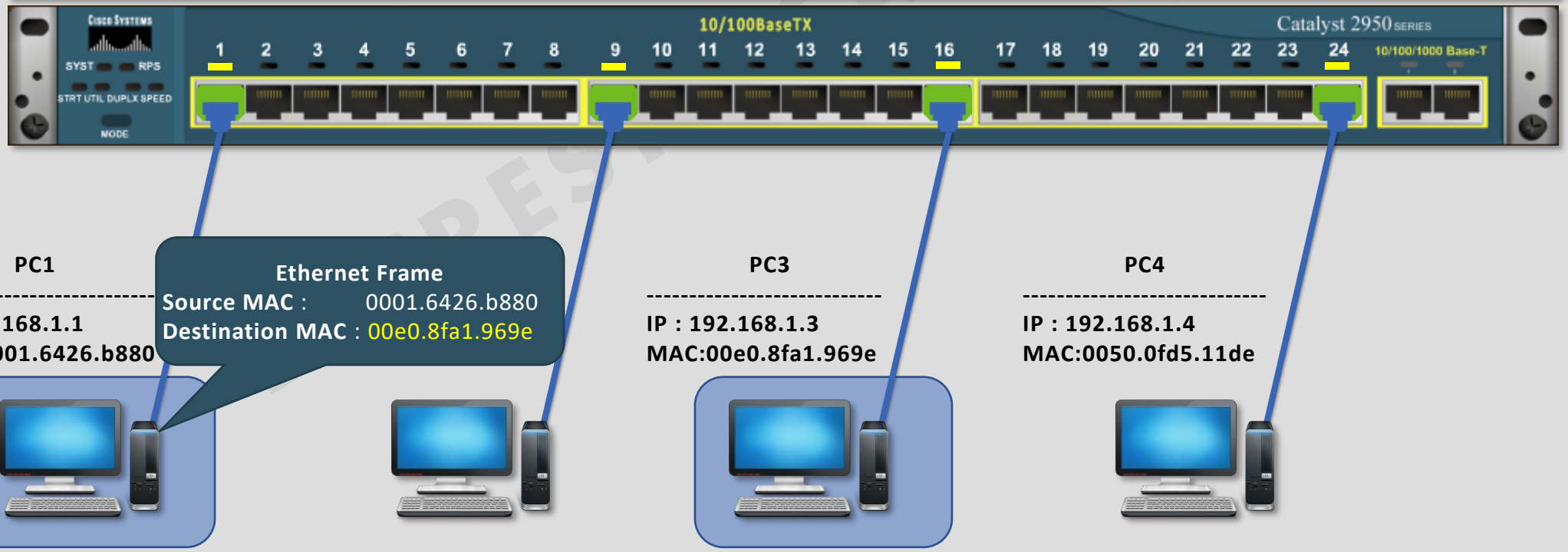
Mac Address Table

Vlan	Mac Address	Type	Ports (Outgoing Interface)
1	0001.6426.b880	*DYNAMIC*	Fa0/1
1	0050.0fd5.11de	*DYNAMIC*	Fa0/24
1	0090.2b08.5acd	*DYNAMIC*	Fa0/9
1	00e0.8fa1.969e	*DYNAMIC*	Fa0/16



Forwarding Known Unicast Frames

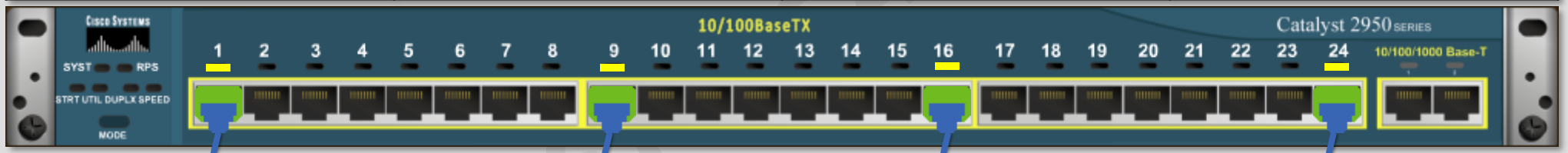
Mac Address Table			
Vlan	**Mac Address**	**Type**	**Ports** (Outgoing Interface)
1	0001.6426.b880	*DYNAMIC*	Fa0/1
1	0050.0fd5.11de	*DYNAMIC*	Fa0/24
1	0090.2b08.5acd	*DYNAMIC*	Fa0/9
1	00e0.8fa1.969e	*DYNAMIC*	Fa0/16



Flooding Unknown Unicast Frames

Mac Address Table

Vlan	Mac Address	Type	Ports (Outgoing Interface)
1	0001.6426.b880	*DYNAMIC*	Fa0/1
1	0050.0fd5.11de	*DYNAMIC*	Fa0/24
1	0090.2b08.5acd	*DYNAMIC*	Fa0/9
1	00e0.8fa1.969e	*DYNAMIC*	Fa0/16



PC1

IP : 192.168.1.1
MAC: 0001.6426.b880

Ethernet Frame
Source MAC : 0001.6426.b880
Destination MAC : 00e0.8fa1.969e

PC3

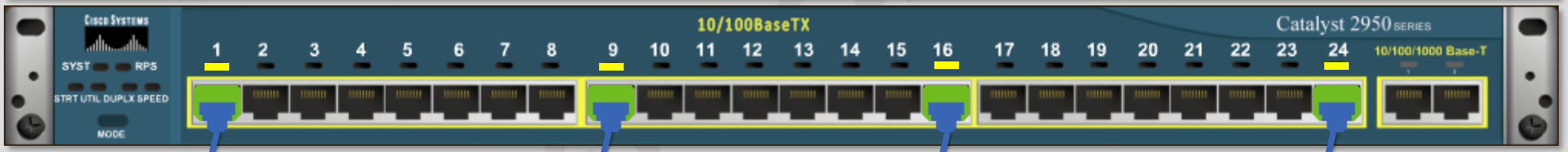
IP : 192.168.1.3
MAC:00e0.8fa1.969e

Ethernet Frame
Source MAC : 00e0.8fa1.969e
Destination MAC : 0001.6426.b880

Flooding Broadcast Frames

Mac Address Table

Vlan	Mac Address	Type	Ports (Outgoing Interface)
1	0001.6426.b880	*DYNAMIC*	Fa0/1
1	0050.0fd5.11de	*DYNAMIC*	Fa0/24
1	0090.2b08.5acd	*DYNAMIC*	Fa0/9
1	00e0.8fa1.969e	*DYNAMIC*	Fa0/16



PC1

IP : 192.168.1.1

MAC: 0001.6426.b880

ARP Frame
Source MAC : 0001.6426.b880
Destination MAC : FFFF.FFFF.FFFF

PC3

IP : 192.168.1.3

MAC:00e0.8fa1.969e

ARP Frame
Source MAC : 00e0.8fa1.969e
Destination MAC : 0001.6426.b880

Verification Commands

RouterA# *show mac address-table*

RouterA# *show mac address-table dynamic*

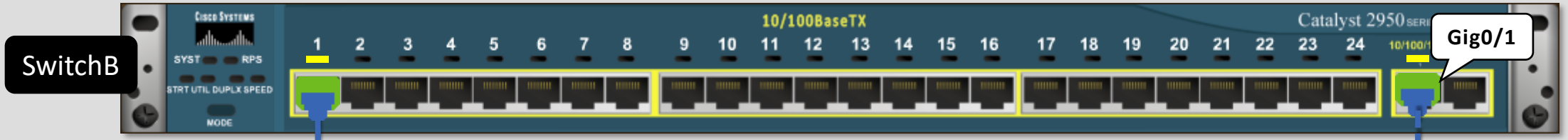
RouterA# *show mac address-table count*

RouterA# *show mac address-table aging-time*

RouterA# *clear mac address-table dynamic*

RouterA# *show interfaces status*

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



MAC: 000a.f37b.a4eb

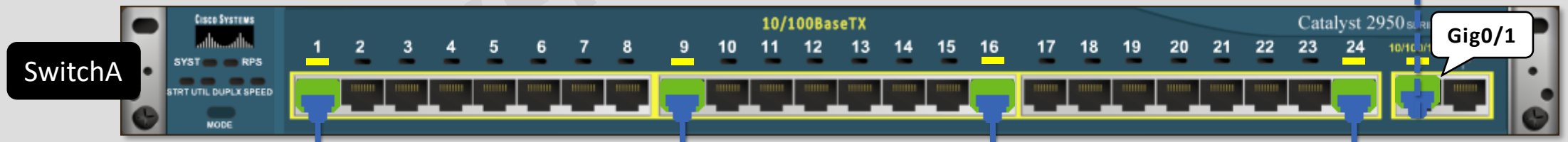
PC5

IP : 192.168.1.5
MAC: 0090.0c40.3de2

Mac Address Table (SwitchA)

Vlan	Mac Address	Type	Ports (Outgoing Interface)
1	0001.6426.b880	*DYNAMIC*	Fa0/1
1	0090.2b08.5acd	*DYNAMIC*	Fa0/9
1	00e0.8fa1.969e	*DYNAMIC*	Fa0/16
1	0050.0fd5.11de	*DYNAMIC*	Fa0/24
1	000a.f37b.a4eb	*DYNAMIC*	Gig0/1
1	0090.0c40.3de2	*DYNAMIC*	Gig0/1

MAC: 0001.43d0.6b19



PC1

IP : 192.168.1.1
MAC: 0001.6426.b880

PC2

IP : 192.168.1.2
MAC:0090.2b08.5acd

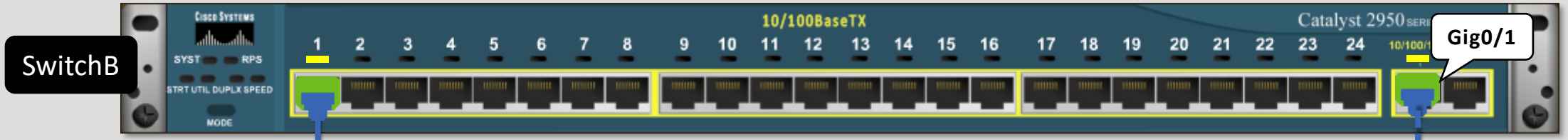
PC3

IP : 192.168.1.3
MAC:00e0.8fa1.969e

PC4

IP : 192.168.1.4
MAC:0050.0fd5.11de

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



PC5

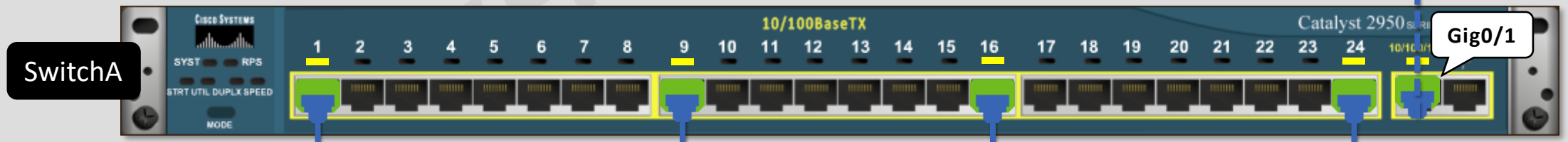
IP : 192.168.1.5
MAC: 0090.0c40.3de2

MAC: 000a.f37b.a4eb

Mac Address Table (SwitchB)

Vlan	Mac Address	Type	Ports (Outgoing Interface)
1	0090.0c40.3de2	*DYNAMIC*	Fa0/1
1	0001.6426.b880	*DYNAMIC*	Gig0/1
1	0090.2b08.5acd	*DYNAMIC*	Gig0/1
1	00e0.8fa1.969e	*DYNAMIC*	Gig0/1
1	0050.0fd5.11de	*DYNAMIC*	Gig0/1
1	0001.43d0.6b19	*DYNAMIC*	Gig0/1

MAC: 0001.43d0.6b19



PC1
IP : 192.168.1.1
MAC: 0001.6426.b880

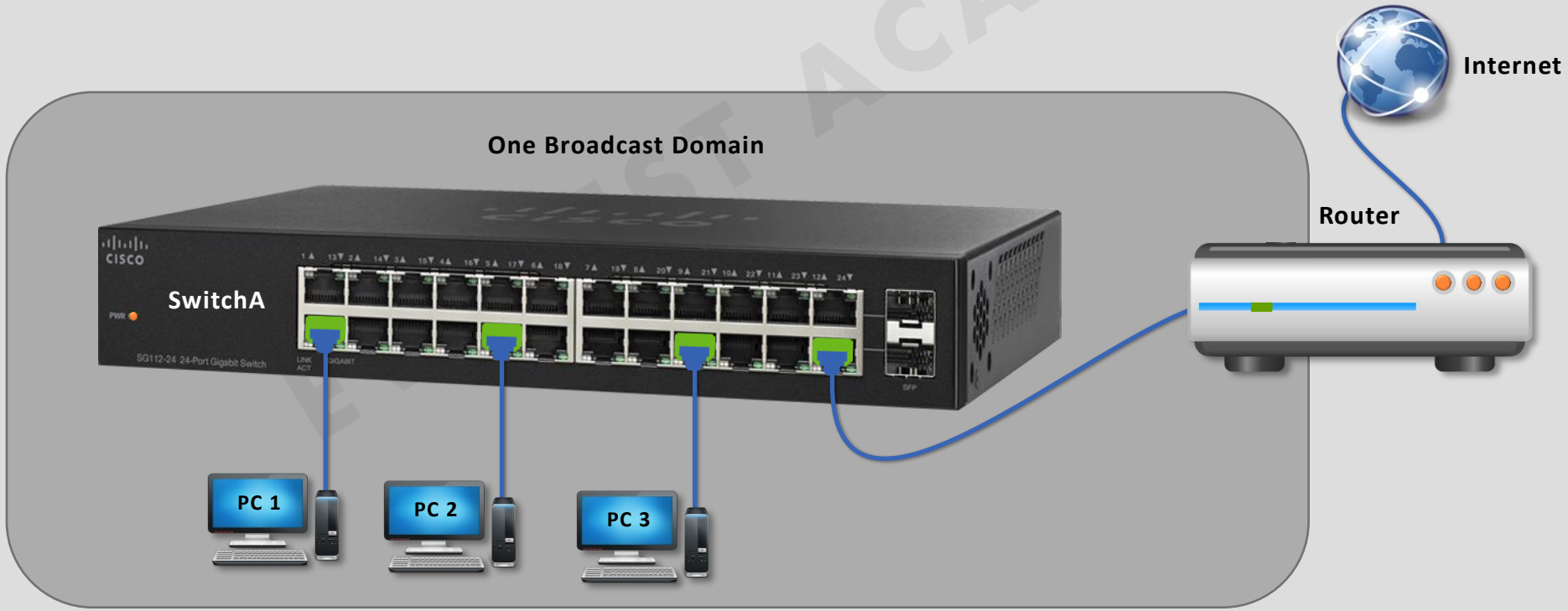
PC2
IP : 192.168.1.2
MAC:0090.2b08.5acd

PC3
IP : 192.168.1.3
MAC:00e0.8fa1.969e

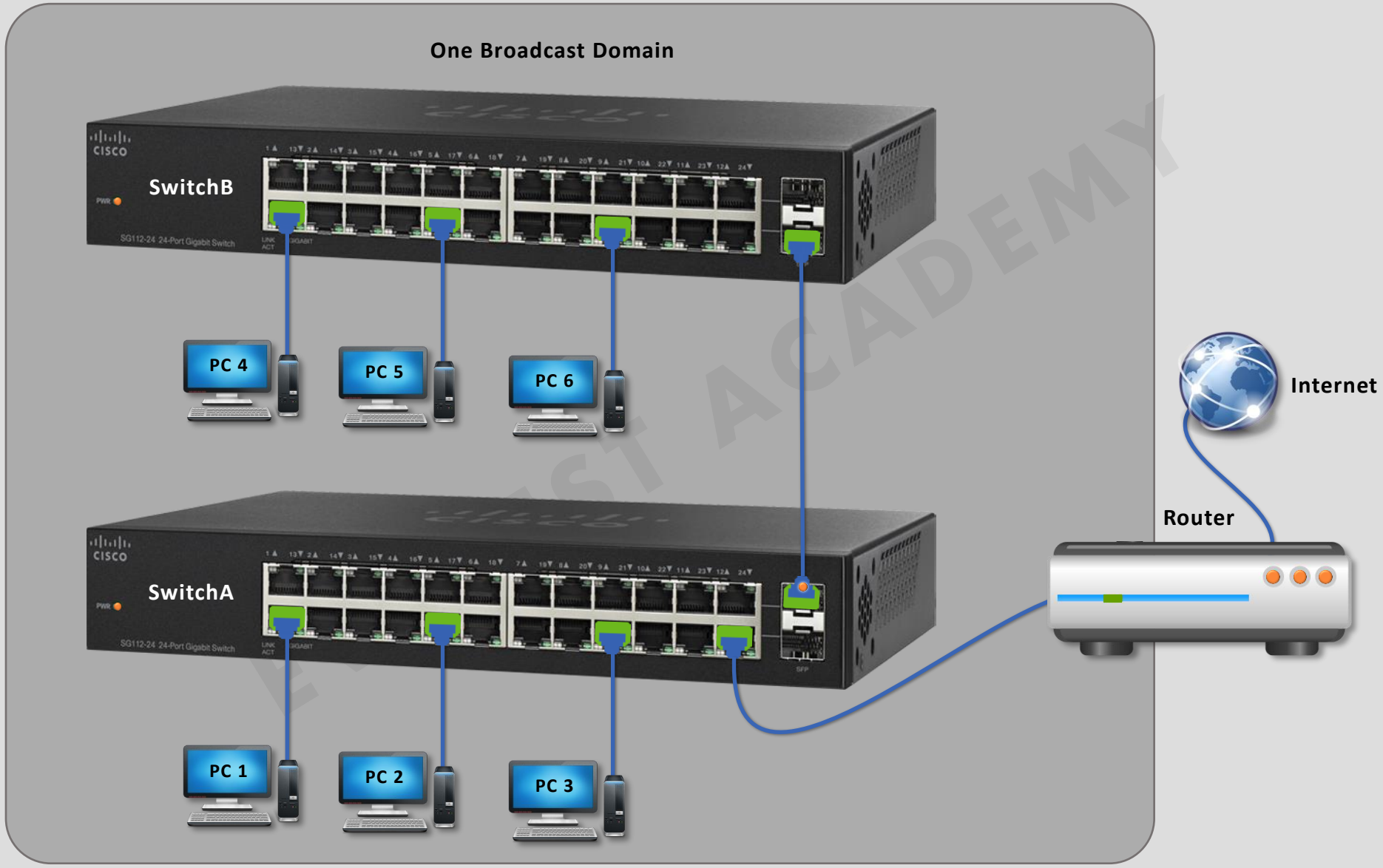
PC4
IP : 192.168.1.4
MAC:0050.0fd5.11de

Broadcast Domain

❖ **A broadcast domain** is a logical division of a computer network, in which all nodes can reach each other by broadcast at the data link layer.

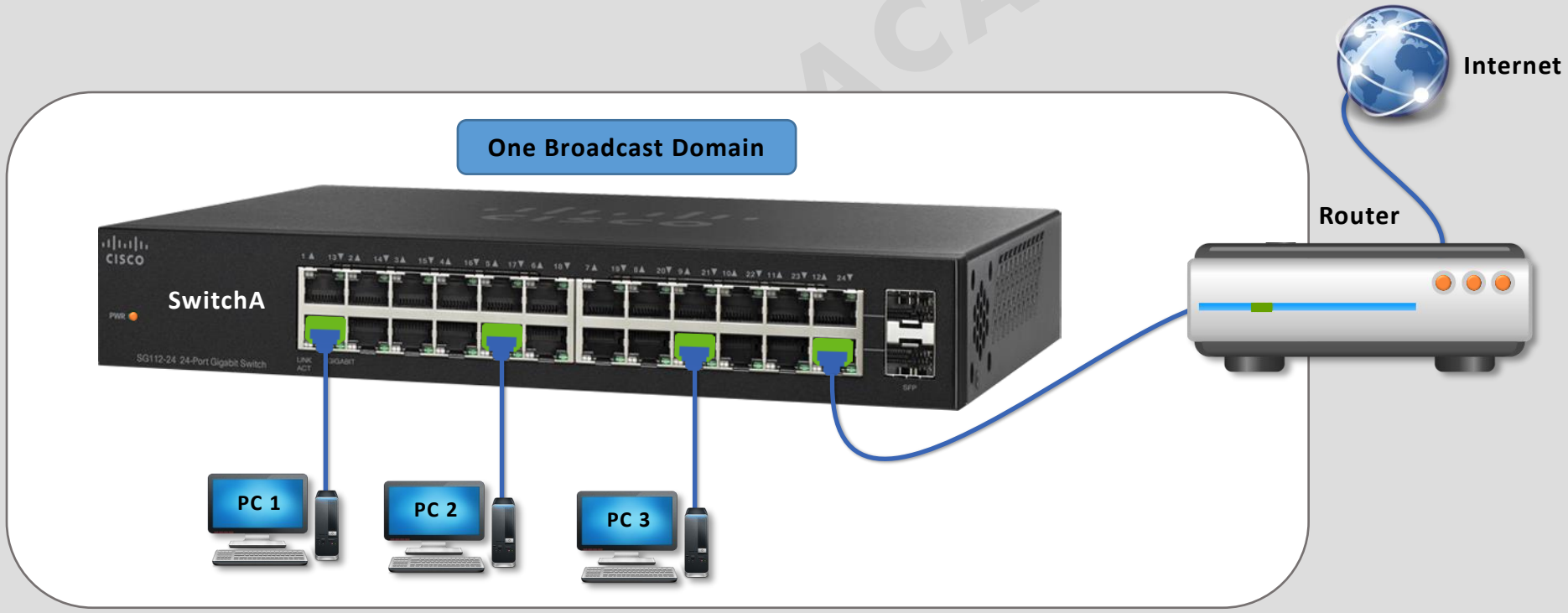


Broadcast Domain

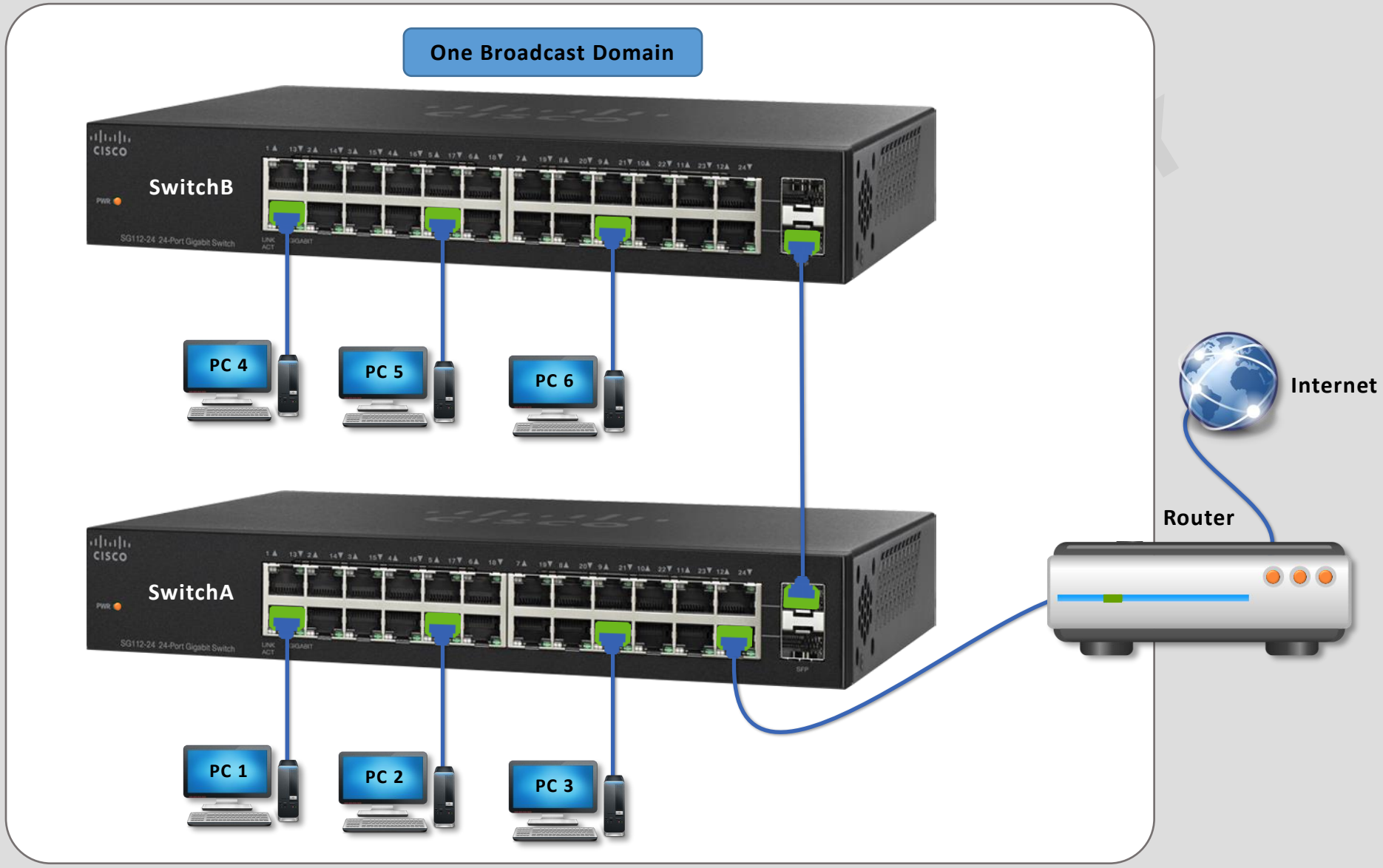


Broadcast Domain

Broadcast Domain



Broadcast Domain

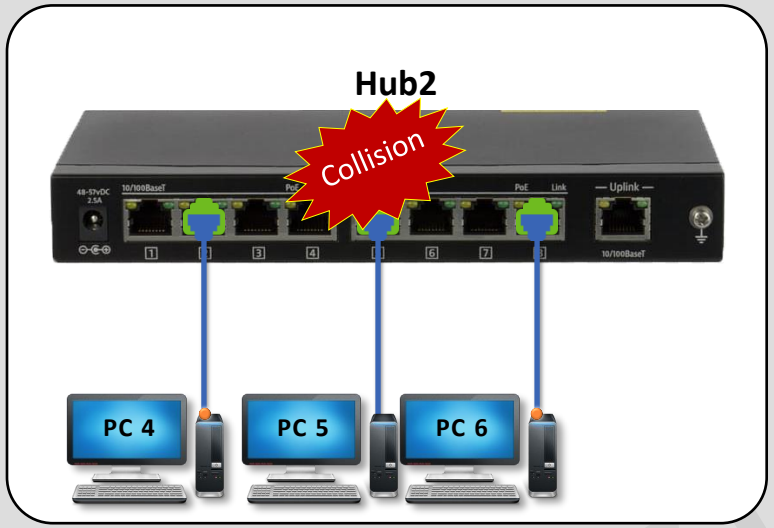


Collision Domain

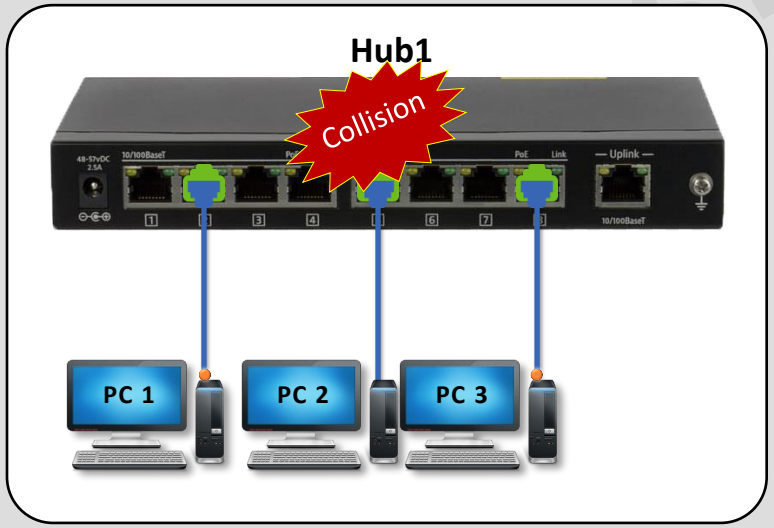
- **A collision domain** is a network segment connected by a shared medium or through **repeaters** and **hubs** where *simultaneous data transmissions* collide with one another.
- **A network collision** occurs when more than one device attempts to send a **frame** on a network segment at the same time.
- **Only one device** in the collision domain may transmit at any one time, and the other devices in the domain listen to the network and wait for transmitting.
- **Because only one device** may be transmitting at any one time, total network bandwidth is shared among all devices on the collision domain.
- **Collisions** decrease network efficiency on a collision domain as collisions require devices to abort transmission and retransmit at a later time.
- **collisions** are resolved using **carrier sense multiple access with collision detection (CSMA/CD)** in which the competing frame are discarded and re-sent one at a time.
- **A network switch** eliminate collisions. By connecting each device directly to a port on the switch and operates the port in *full duplex mode*, thus each port on a switch becomes its own collision domain

Collision Domain

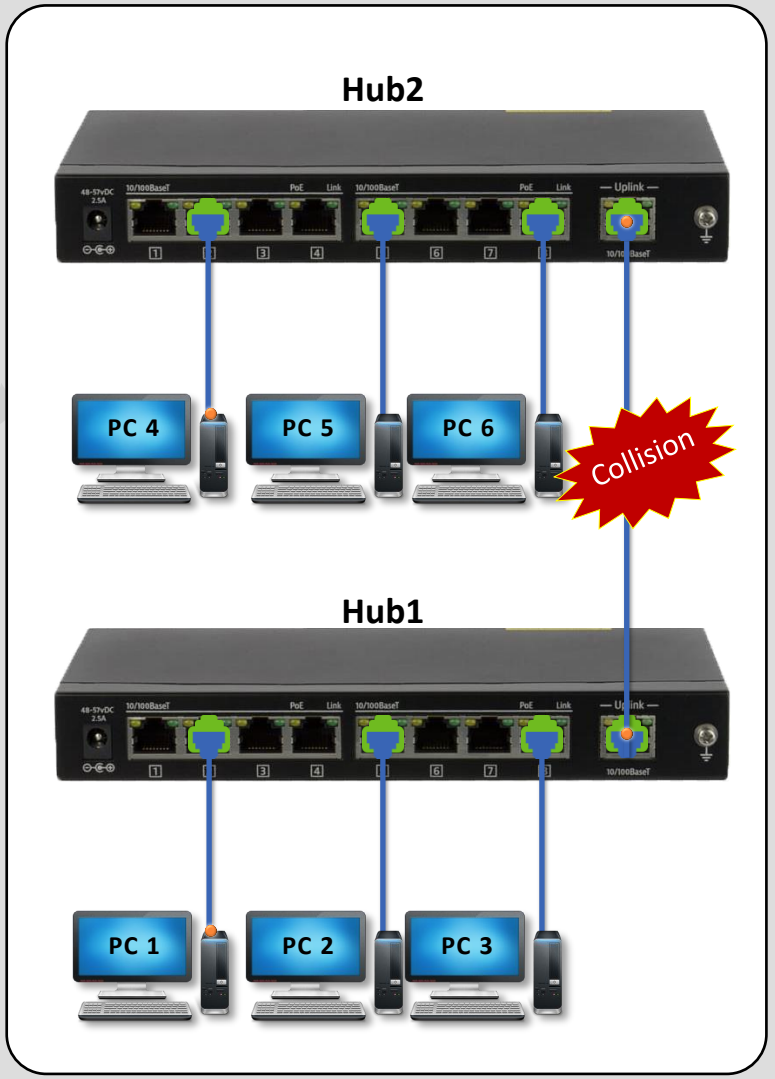
One Collision Domain



One Collision Domain

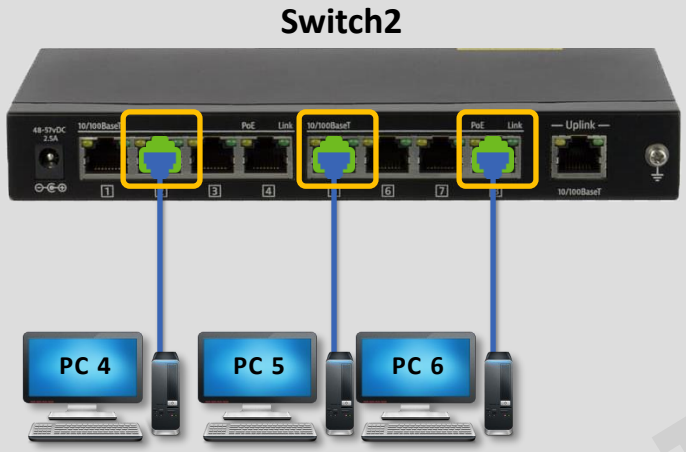


One Collision Domain

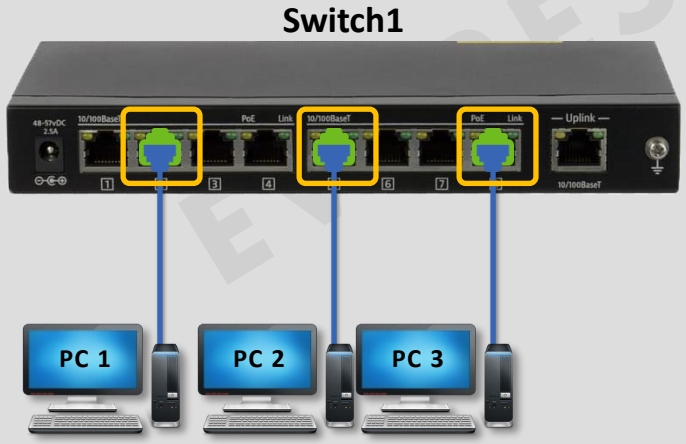


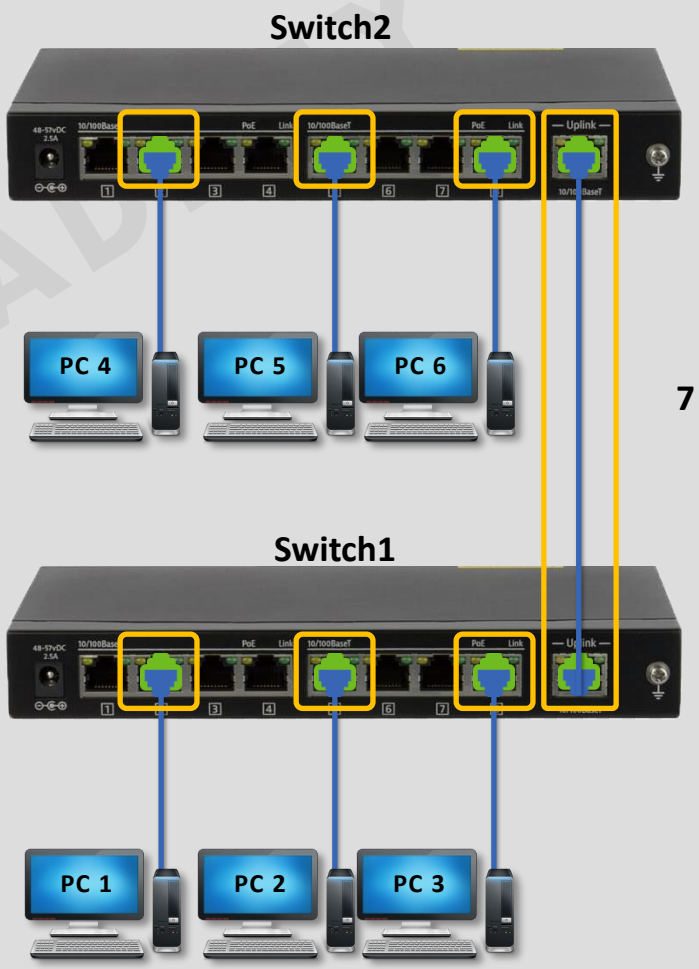
Collision Domain

3 Collision Domains



3 Collision Domains





7 Collision Domains

Collision Domain