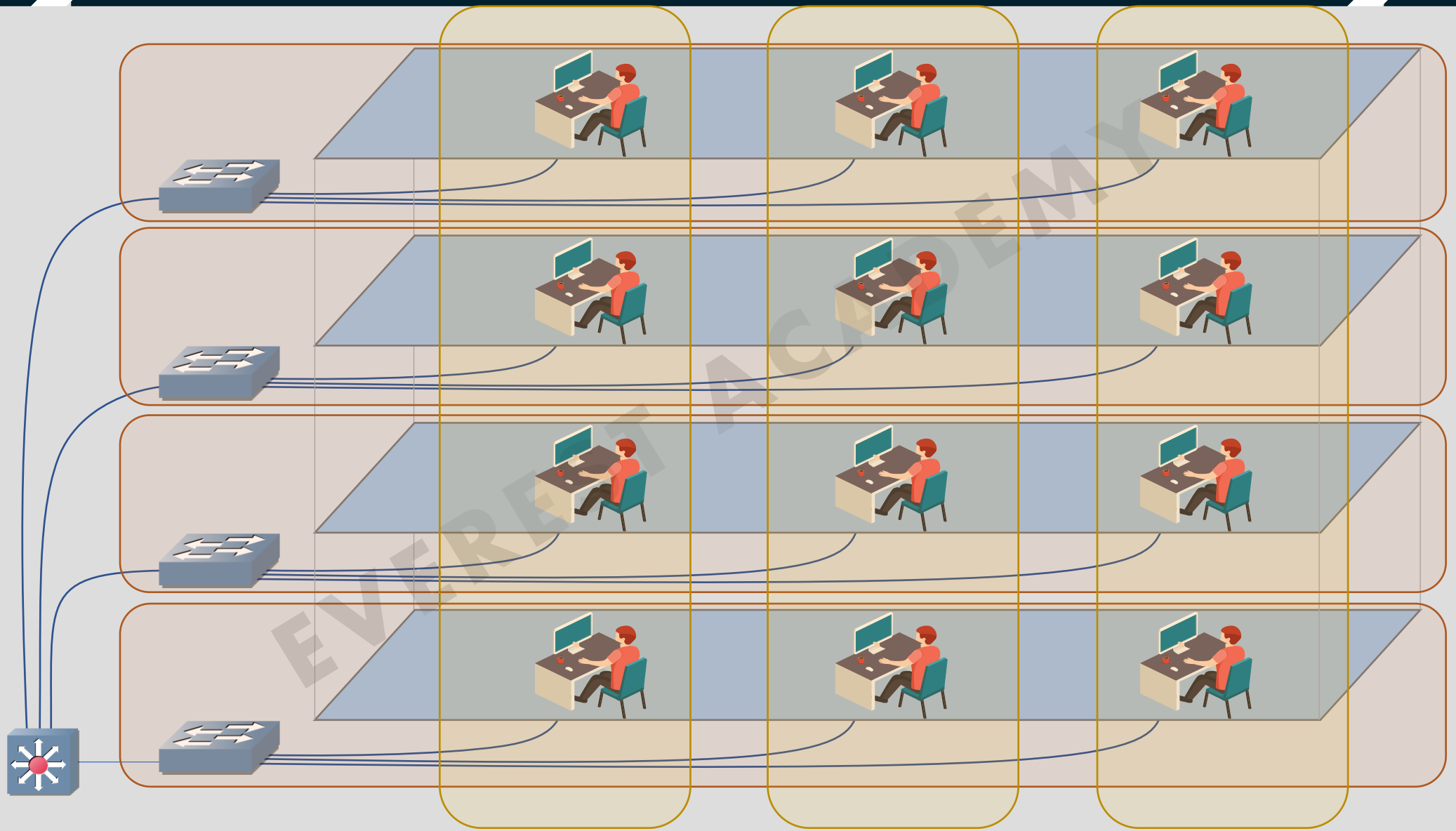
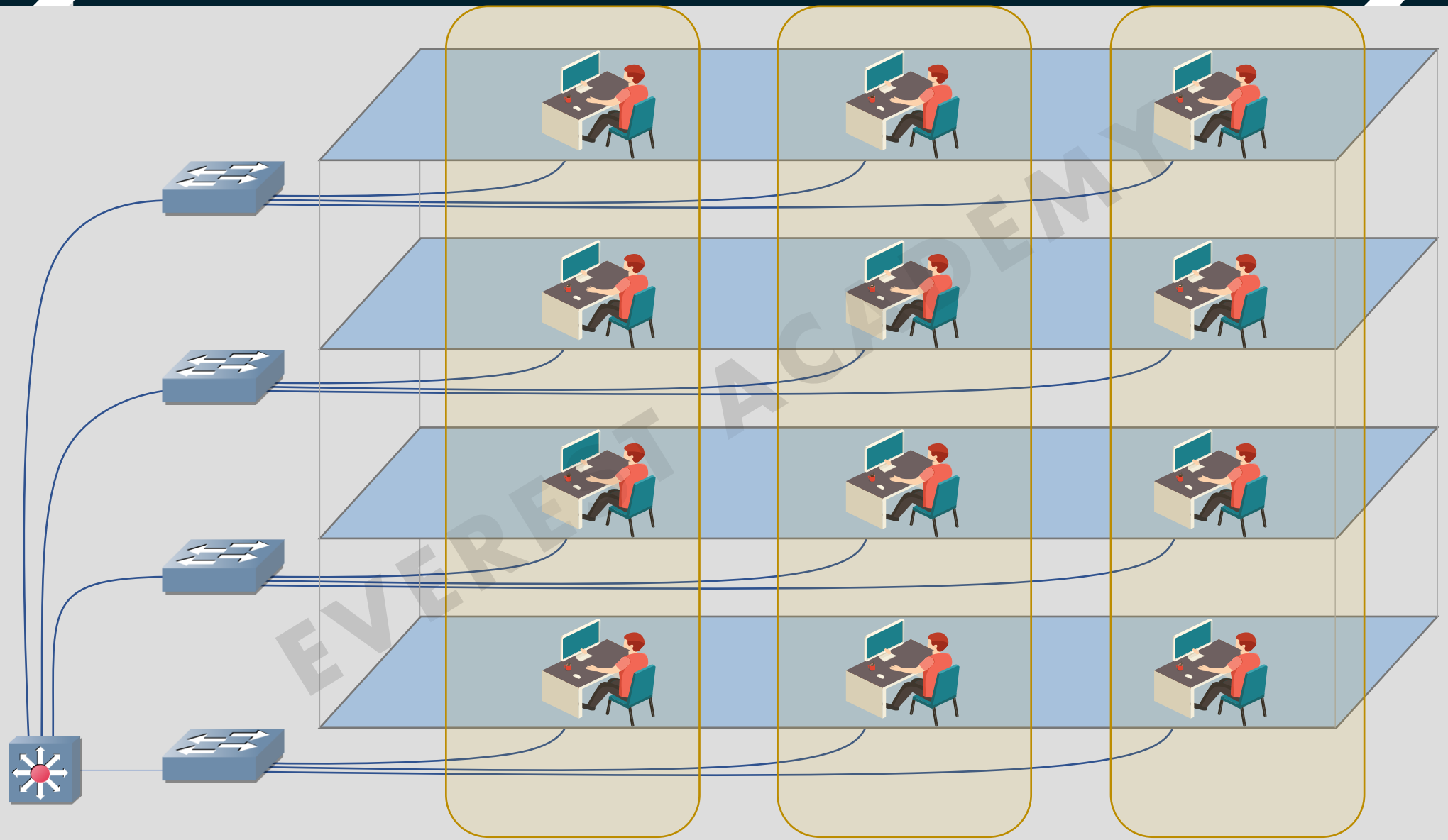
# VLAN Overview



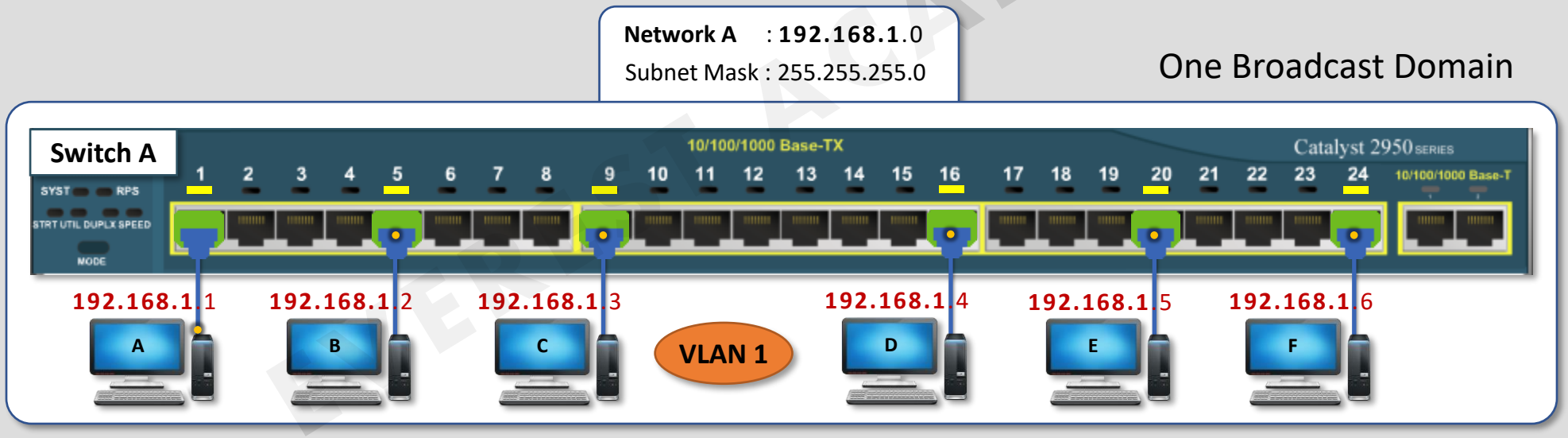
# VLAN Overview



# VLAN Overview

- **A Virtual Local Area Network or a Virtual LAN (VLAN)** is a logical group of computers and devices that belongs to a single broadcast domain

- **By default** all devices are assigned to VLAN 1, known as the default VLAN.

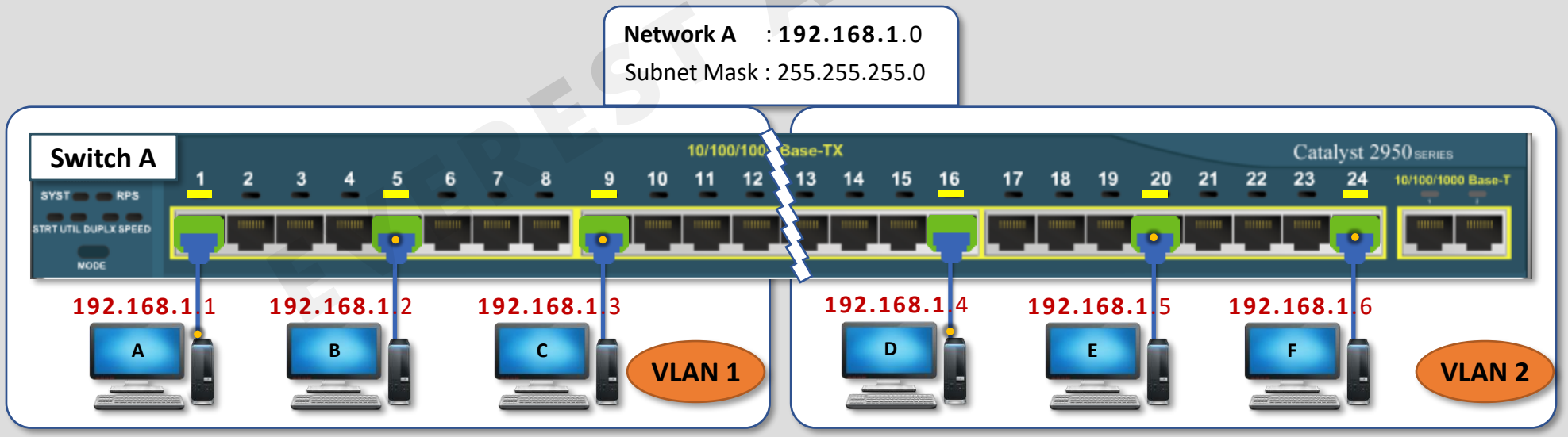


# VLAN Overview

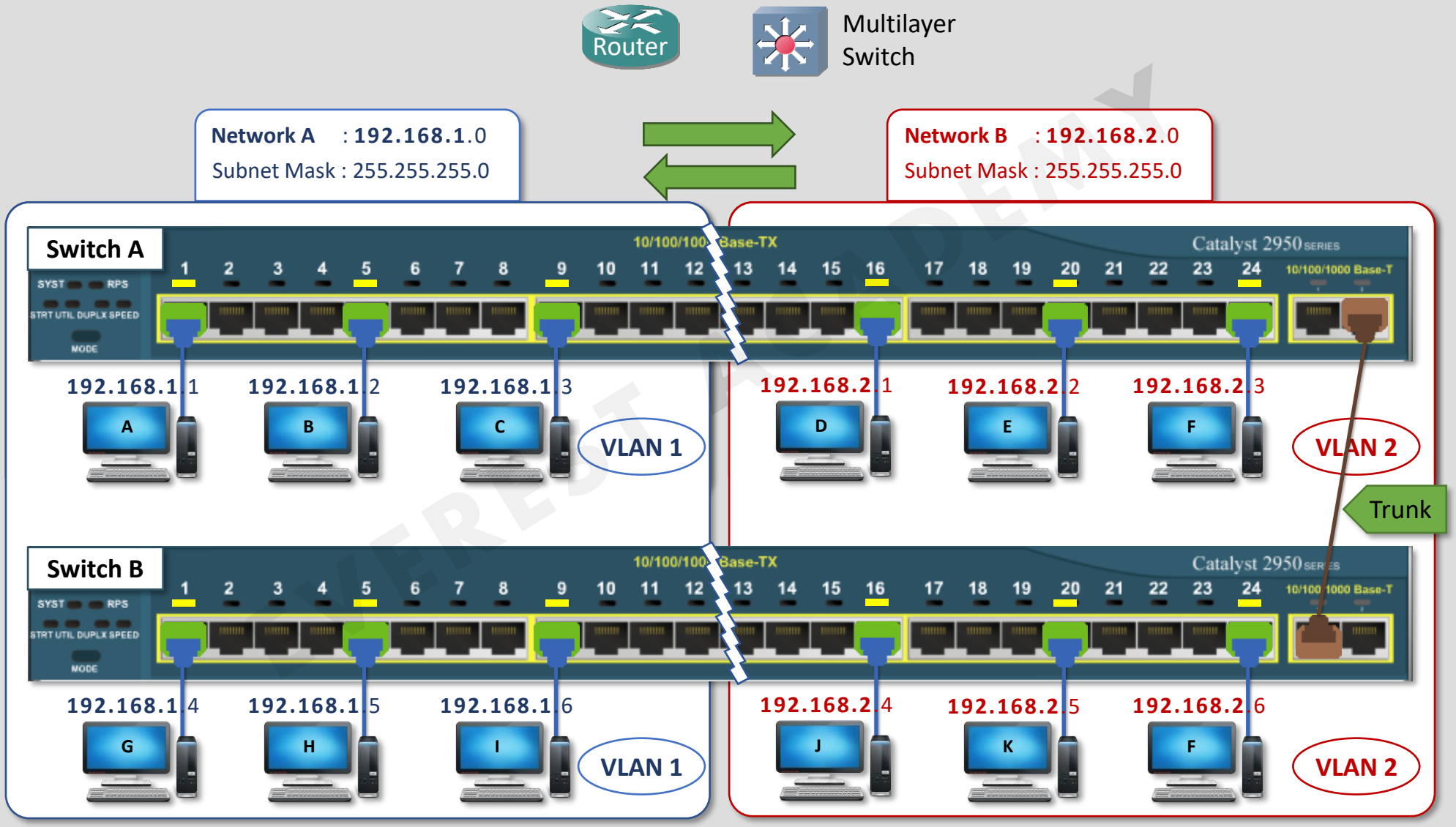
- **Implementing VLAN** reduces CPU overhead on each device and improves host performance, by reducing the number of devices that send broadcast frames.

- **Implementing VLAN** enhances network security. A malicious user can no longer just plug their workstation into any switch port and sniff the network traffic using a packet sniffer.

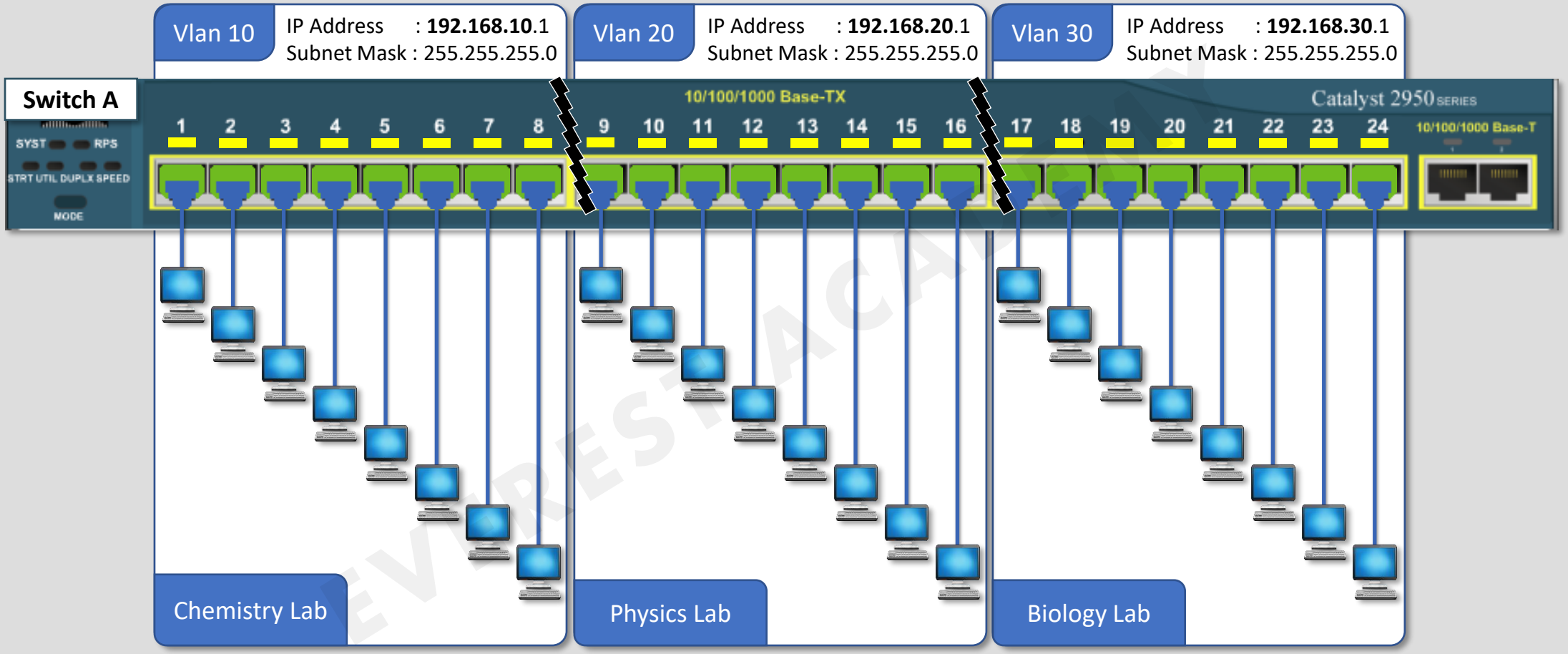
- **Implementing VLAN** creates more flexible designs that group users by department, or by groups that work together, instead of by physical location



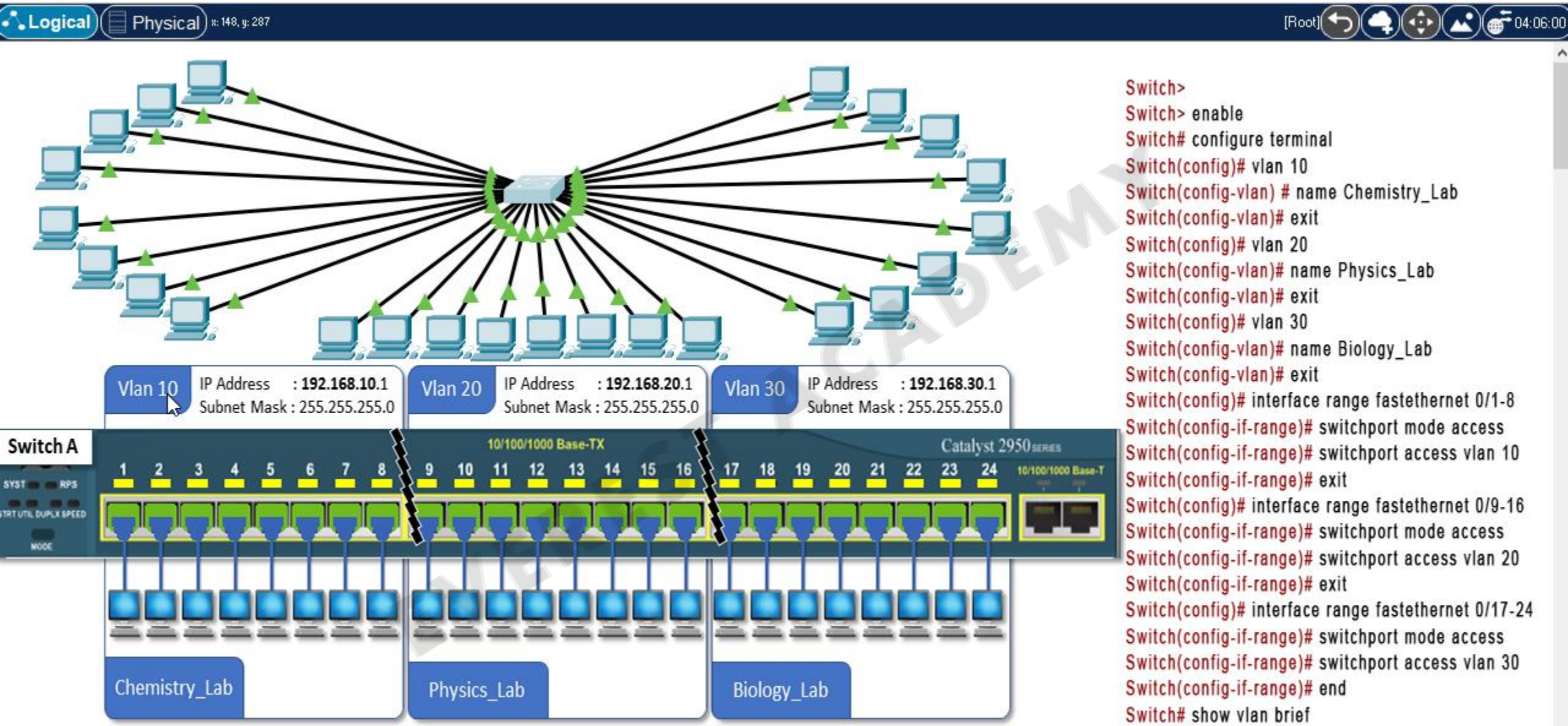
# VLAN Overview



# Basic VLAN Configuration

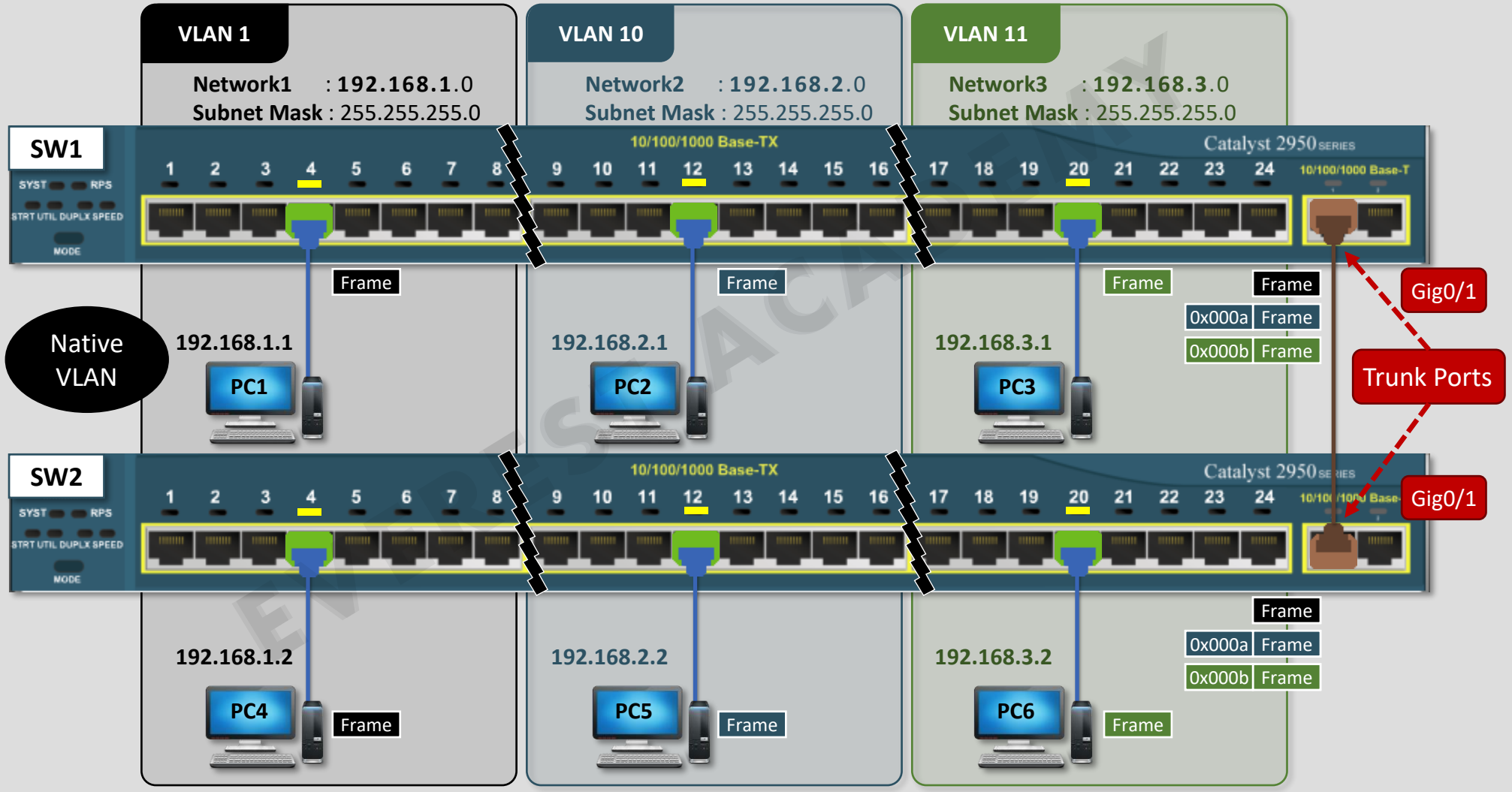


رابط دورة المدخل الى شبكات سيسكو CCNA 200-301 على موقع يودمي , هذه الدورة من إعداد المدرب عبد الرحمن العلوش




```
Switch>
Switch> enable
Switch# configure terminal
Switch(config)# vlan 10
Switch(config-vlan) # name Chemistry_Lab
Switch(config-vlan)# exit
Switch(config)# vlan 20
Switch(config-vlan)# name Physics_Lab
Switch(config-vlan)# exit
Switch(config)# vlan 30
Switch(config-vlan)# name Biology_Lab
Switch(config-vlan)# exit
Switch(config)# interface range fastethernet 0/1-8
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 10
Switch(config-if-range)# exit
Switch(config)# interface range fastethernet 0/9-16
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 20
Switch(config-if-range)# exit
Switch(config)# interface range fastethernet 0/17-24
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 30
Switch(config-if-range)# end
Switch# show vlan brief
```

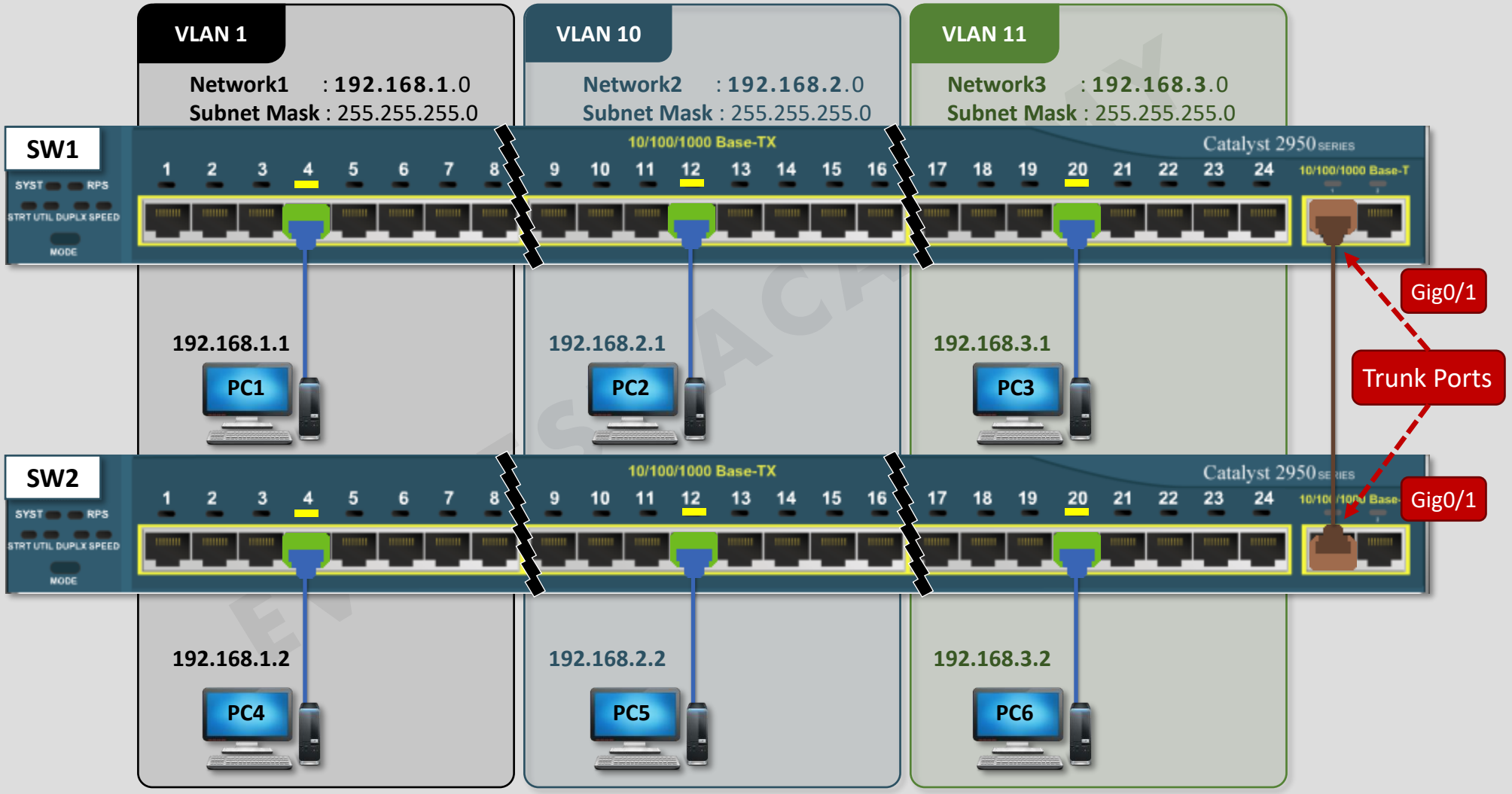
# VLAN Trunking



# VLAN Trunking


```
SW1> enable
SW1# configure terminal
SW1(config)# vlan 10
SW1(config-vlan)# exit
SW1(config)# vlan 11
SW1(config-vlan)# exit
SW1(config)# interface fa0/4
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 1
SW1(config-if)# exit
SW1(config)# interface fa0/12
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 10
SW1(config-if)# exit
SW1(config)# interface fa0/20
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 11
SW1(config-if)# exit
SW1(config)# interface gig 0/1
SW1(config-if)# switchport mode trunk
SW1(config-if)# end
```

# Trunk Encapsulation



# Trunk Encapsulation

❖ Cisco supports two Ethernet trunking methods:

**1**. Cisco's proprietary InterSwitch Link (ISL) protocol for Ethernet.

**2**. IEEE's 802.1Q, commonly referred to as dot1q for Ethernet.

```
SW2> enable
SW2# configure terminal
SW2(config)# interface fastEthernet 0/1
SW2(config-if)# switchport trunk encapsulation ?
dot1q       Interface uses only 802.1q trunking encapsulation when trunking
  isl       Interface uses only ISL trunking encapsulation when trunking
  negotiate Device will negotiate trunking encapsulation with peer on interface
```

# Cisco Dynamic Trunking Protocol (DTP)

- **The Dynamic Trunking Protocol (DTP)** is used on Cisco IOS switches for the purpose of negotiating **trunking** on a link between two switches, and for negotiating the type of **trunking encapsulation** (IEEE 802.1Q or Cisco ISL ) to be used.
- **By default DTP** is enabled on all modern Cisco switches.

# Cisco Dynamic Trunking Protocol (DTP)


```
SW1# show interface fa0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
Administrative Trunking Encapsulation: negotiate
Operational Trunking Encapsulation: isl
Negotiation of Trunking: On
```

```
SW1# configure terminal
SW1(config)# interface fa0/1
SW1(config-if)# switchport trunk encapsulation negotiate
SW1(config-if)# switchport mode dynamic desirable
SW1(config-if)# end
SW1#
```

```
SW2# configure terminal
SW2(config)# interface fa0/1
SW2(config-if)# switchport trunk encapsulation negotiate
SW2(config-if)# switchport mode dynamic desirable
SW2(config-if)# end
SW2#
```

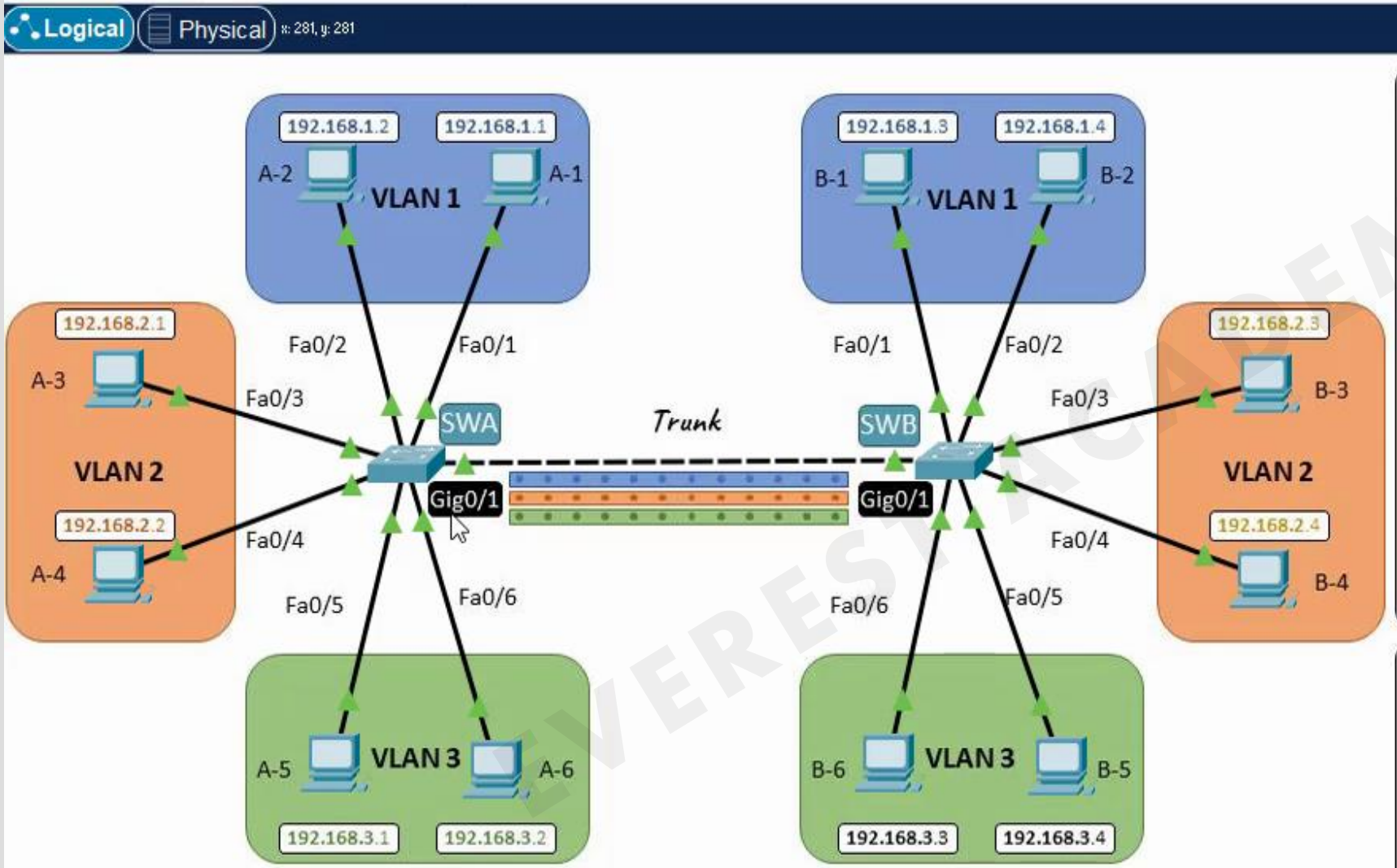
# Cisco Dynamic Trunking Protocol (DTP)


| | Access | Trunk | Desirable | Auto |
|---|---|---|---|---|
| Access | A | X | A | A |
| Trunk | X | T | T | T |
| Desirable | A | T | T | T |
| Auto | A | T | T | A |

# Native VLAN

- **The Dynamic Trunking Protocol (DTP)** is used on Cisco IOS switches for the purpose of negotiating **trunking** on a link between two switches, and for negotiating the type of **trunking encapsulation** (IEEE 802.1Q or Cisco ISL ) to be used.
- **By default DTP** is enabled on all modern Cisco switches.

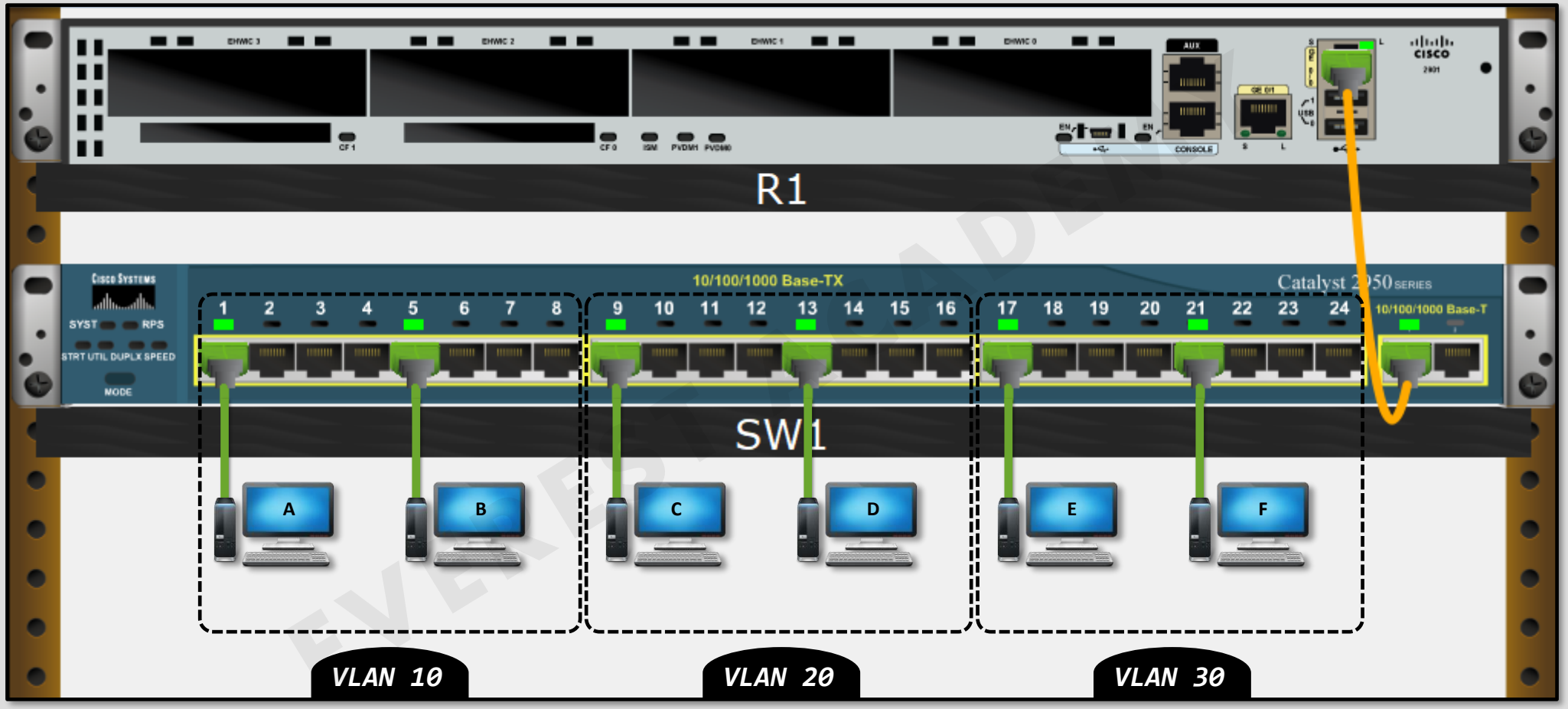
رابط دورة المدخل الى شبكات سيسكو CCNA 200-301 على موقع يودمي , هذه الدورة من إعداد المدرب عبد الرحمن العلوش



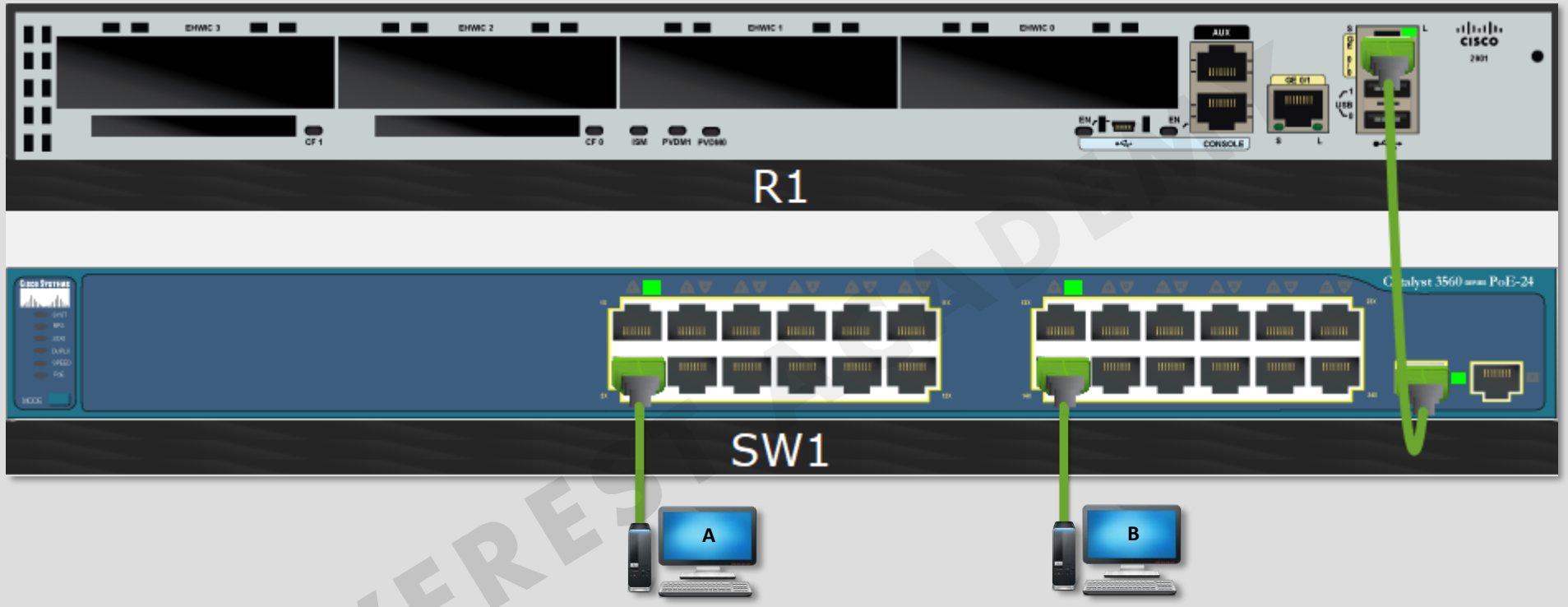

```
SWA> enable
SWA# configure terminal
SWA(config)# vlan 2
SWA(config-vlan)# exit
SWA(config)# vlan 3
SWA(config-vlan)# exit
SWA(config)# interface range fa0/3-4
SWA(config-if-range)# switchport mode access
SWA(config-if-range)# switchport access vlan 2
SWA(config-if-range)# exit
SWA(config)# interface range fa0/5-6
SWA(config-if-range)# switchport mode access
SWA(config-if-range)# switchport access vlan 3
SWA(config-if-range)# exit
SWA(config)# interface gig0/1
SWA(config-if)# switchport mode trunk
SWA(config-if)# end
```

```
SWB> enable
SWB# configure terminal
SWB(config)# vlan 2
SWB(config-vlan)# exit
SWB(config)# vlan 3
SWB(config-vlan)# exit
SWB(config)# interface range fa0/3-4
SWB(config-if-range)# switchport mode access
SWB(config-if-range)# switchport access vlan 2
SWB(config-if-range)# exit
SWB(config)# interface range fa0/5-6
```

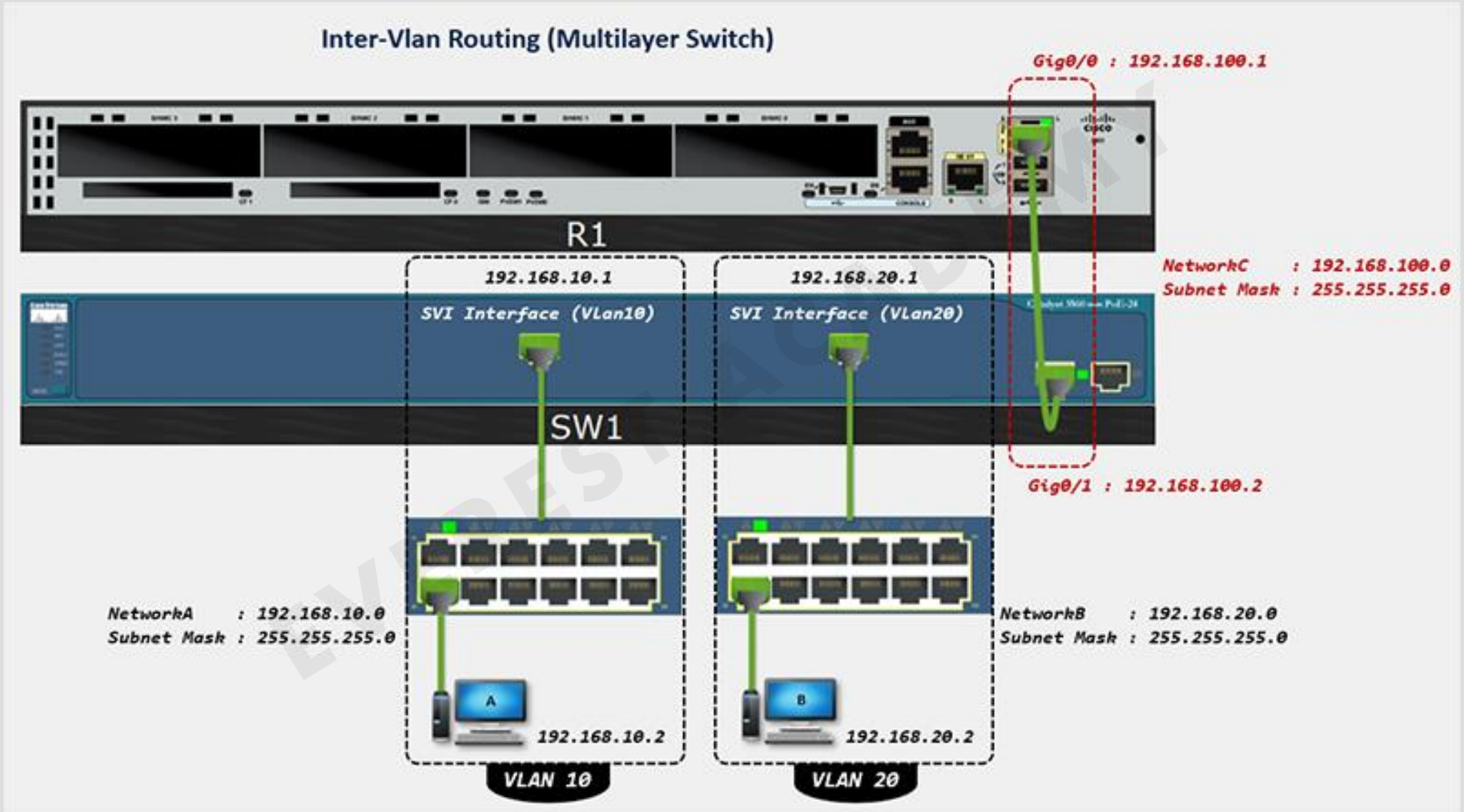
# InterVlan Routing (Router)



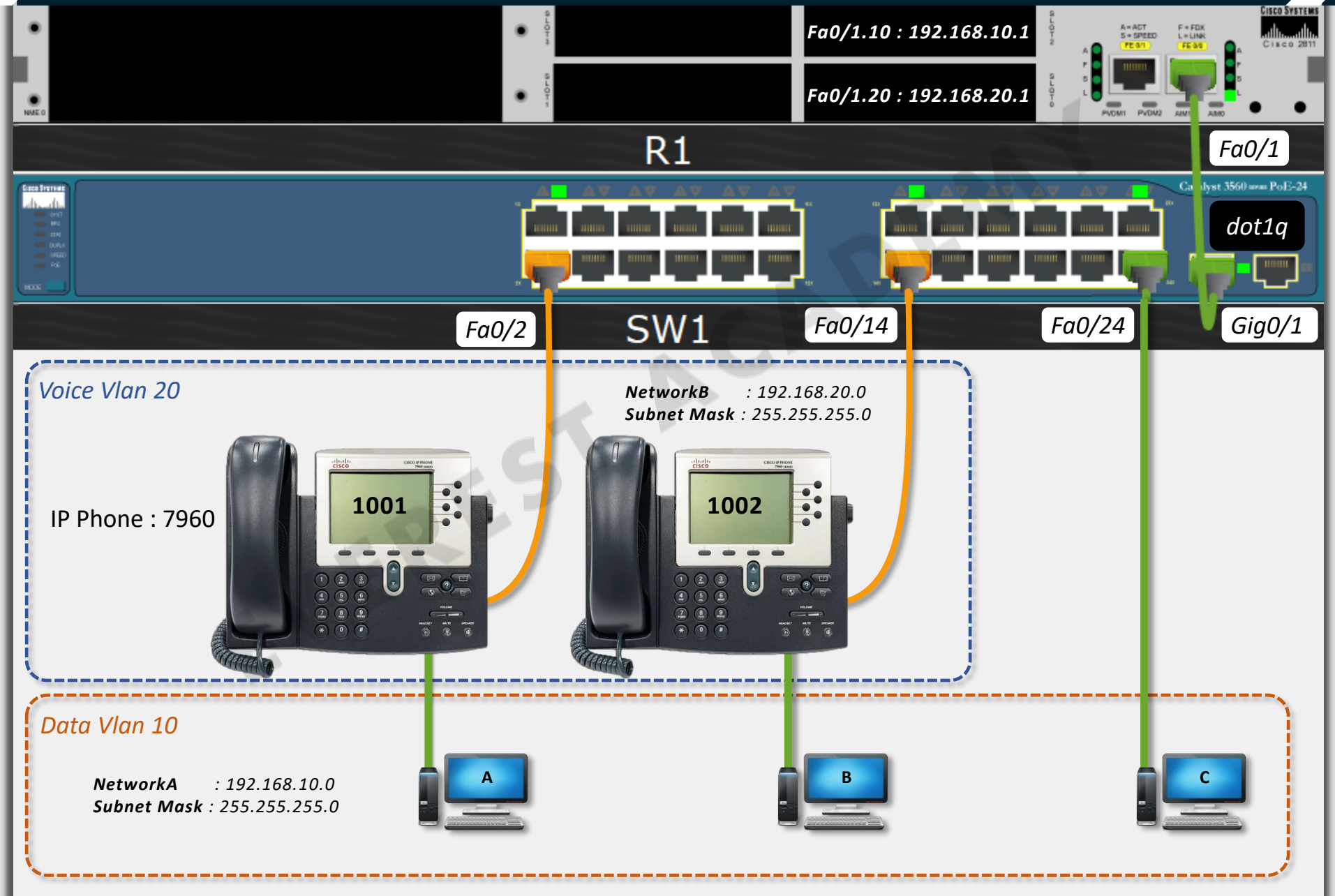
# Inter-Vlan Routing (Multilayer Switch)



# Inter-Vlan Routing (Multilayer Switch)



# Data and Voice VLAN



# VLAN Trunking Protocol (VTP)

❖ **VTP (VLAN Trunking Protocol)** is a Cisco proprietary protocol used by Cisco switches to exchange VLAN information.

❖ **VTP** is used by a switch to synchronize VLAN information (such as **VLAN ID or VLAN name**) with switches inside the same VTP domain.

❖ **A VTP domain** is a set of trunked switches with the matching VTP settings (the **domain name, password and VTP version**).

❖ **There are** three versions of VTP ( V1, V2, and V3).

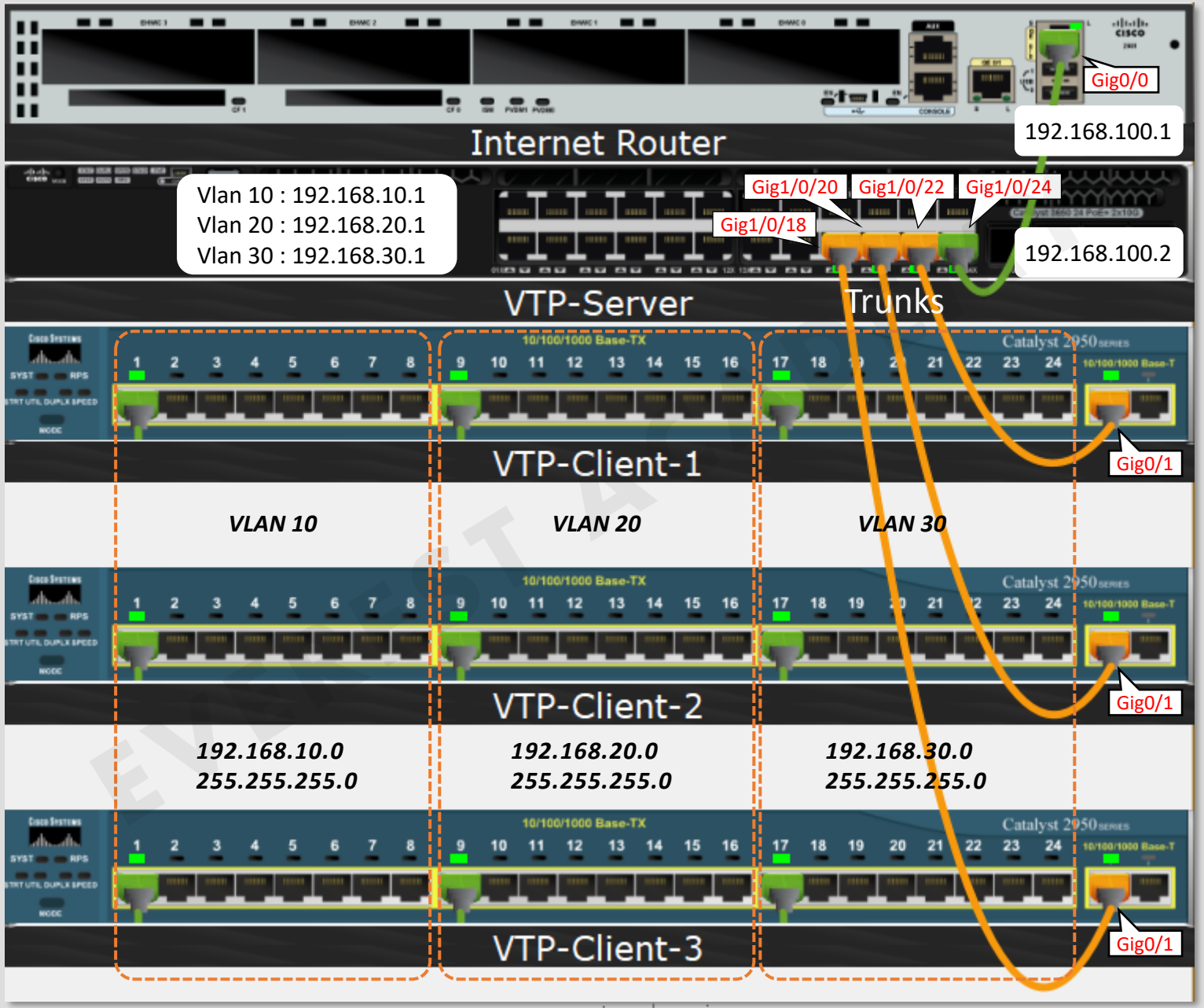
# VTP Modes

❖ **You can configure a switch to operate in any one of these VTP modes:**

**1. Server—**In VTP server mode, you can **create**, **modify**, and **delete** VLANs. VTP servers advertise their VLAN configuration to other switches in the same VTP domain and synchronize their VLAN configuration with other switches. VTP server is the **default mode**.

**2. Client—**VTP clients **cannot** create, change, or delete VLANs.

**3. Transparent—**In VTP transparent mode, you can **create**, **modify**, and **delete** VLANs. VTP transparent switches do not participate in VTP. A VTP transparent switch **does not advertise** its VLAN configuration and **does not synchronize** its VLAN configuration, transparent switches do forward VTP advertisements that they receive out their trunk ports in **VTP Version 2**.


Internet Router
Gig0/0
192.168.100.1
Vlan 10 : 192.168.10.1
Vlan 20 : 192.168.20.1
Vlan 30 : 192.168.30.1
Gig1/0/20
Gig1/0/22
Gig1/0/24
Gig1/0/18
192.168.100.2
VTP-Server
Trunks
VTP-Client-1
Gig0/1
VLAN 10
VLAN 20
VLAN 30
VTP-Client-2
Gig0/1
192.168.10.0
255.255.255.0
192.168.20.0
255.255.255.0
192.168.30.0
255.255.255.0
VTP-Client-3
Gig0/1