

The background is a dark blue gradient with abstract, flowing, curved lines that create a sense of motion. On the right side, there is a bright, glowing blue shape that resembles a stylized 'S' or a curved arrow. The overall aesthetic is modern and technological.

Kardan University BCS Faculty Network Strategy

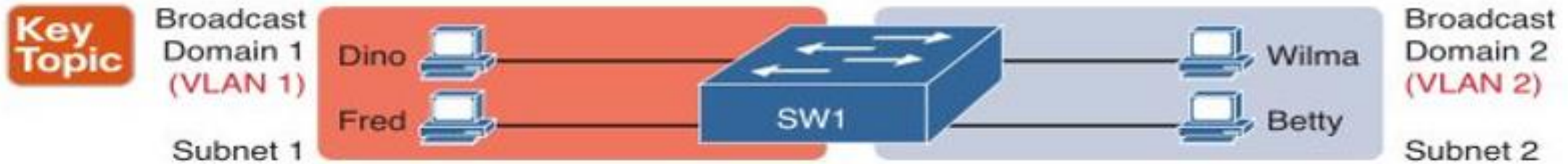
Outline

- VLAN concept
- VLAN configuration
- VTP
- VTP Modes
- Inter-VLAN Routing

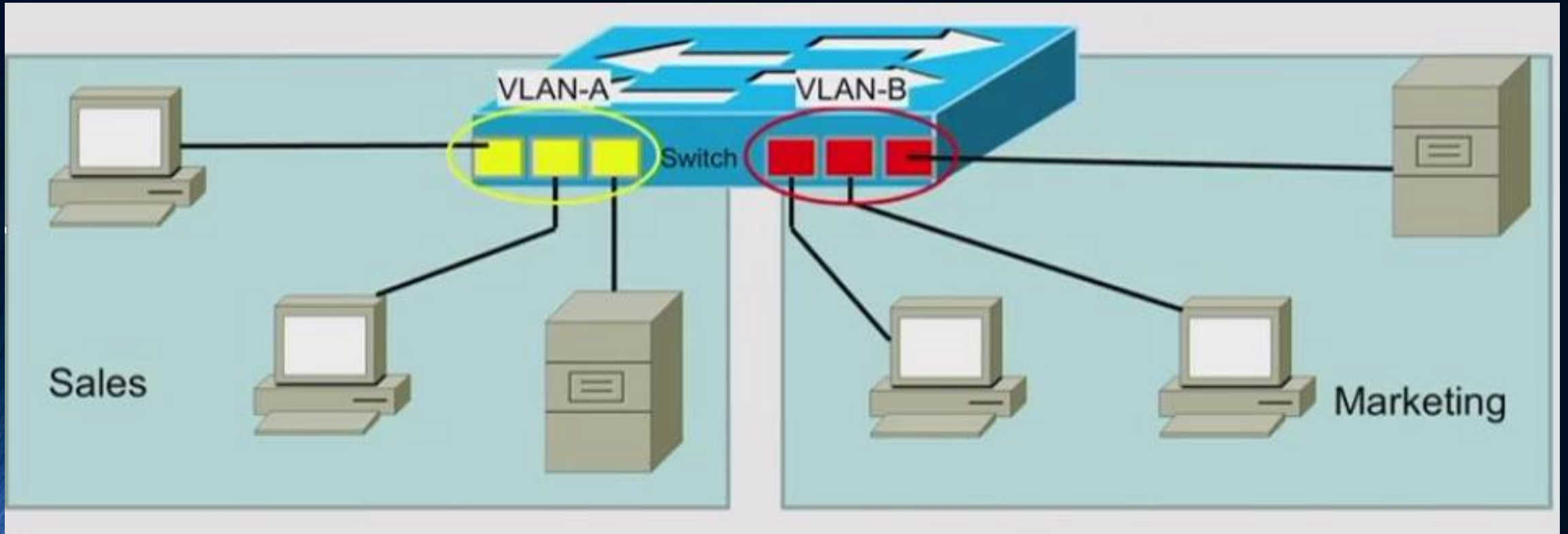
VLAN

- Virtual Local Area Network
- VLAN is used in a switched network to divide one large broadcast domain into many small ones logically.
- We can also divide a large broadcast domain into many small ones physically but that is not recommended
- VLAN reduces the broadcast and multicast traffic
- Provides better management and security
-

VLAN



VLAN



VLAN

- The VLANs ranges from 1 to 4094, 12 bits number.
- 1 to 1005 are normal range VLANs
- VLANs 1, 1002, 1003, 1004 and 1005 are built-in
- VLAN 1002 to 1005 are reserved
- 1006 to 4094 are extended range VLANs
- By default, all ports are part of VLAN 1.
- VLAN 1 is also called native VLAN and Management VLAN.

VLAN

- Once VLANs are created, then ports must be assigned into VLANs
- A port can be the member of only one VLAN.
- VLANs are known by its VLAN-ID and are stored in the Flash Memory as vlan.dat file.
- Creating VLANs:
 - R(config)#vlan 10
 - R(config-vlan)#name HR
 - R(config)#vlan 20
 - R(config-vlan)#name IT

Trunk & Access Ports

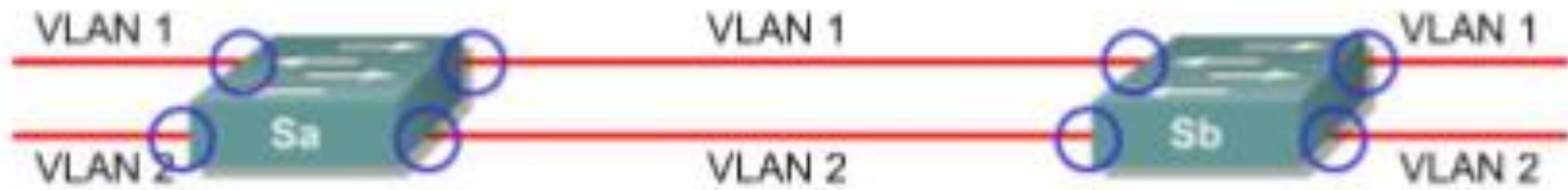
- Access Port:

- Are used to connected switch to PCs
- Allow the data of only one VLAN to be transferred through access port
- R(config)# interface Ethernet 0/0
- R(config-if)#switchport mode access
- R(config-if)#switchport access vlan 10

- Trunk Port:

- Connects switches together
- Allows the data of multiple VLANs

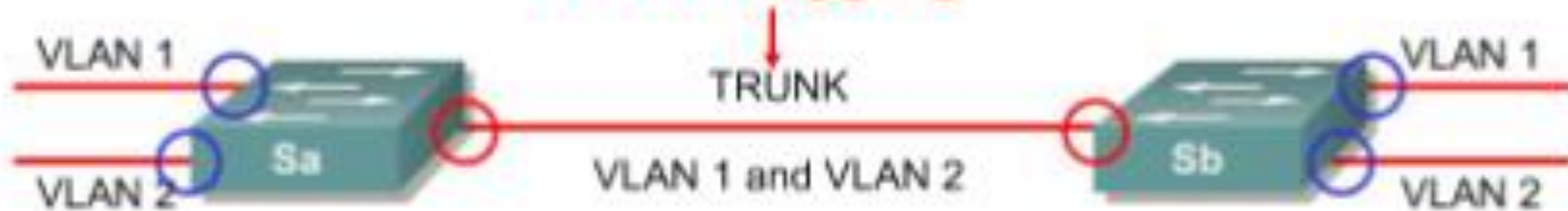
Trunk & Access Ports



Switch(config-if) switchport mode access ○

Switch(config-if) switchport mode trunk ○

VLAN Tagging



Frame Tagging

- When we configure a trunk port, it allows VLAN 1-1005.
- When SW1 sends frames related to a specific VLAN through a trunk port, SW1 will tag the frame and add the VLAN ID so that SW2 understands which VLAN the frame belongs to.
- Frame tagging protocols:
 - ISL (Inter-Switch Link) cisco proprietary
 - 30 bytes header
 - 802.1Q IEEE standard: (recommended, default)
 - 4 bytes header

Trunk Encapsulation Configuration

- R(config)# int eth 0/0
- R(config-if)# switchport trunk encapsulation dot1q
- R(config-if)#switchport mode trunk

R(config-if)#switchport trunk allowed vlan [all, none, vlan-id]

- Verification Commands:
 - R#show vlan brief
 - R#show vlan
 - R#show int eth 0/0 switchport
 - R#show interface trunk

Frame Tagging

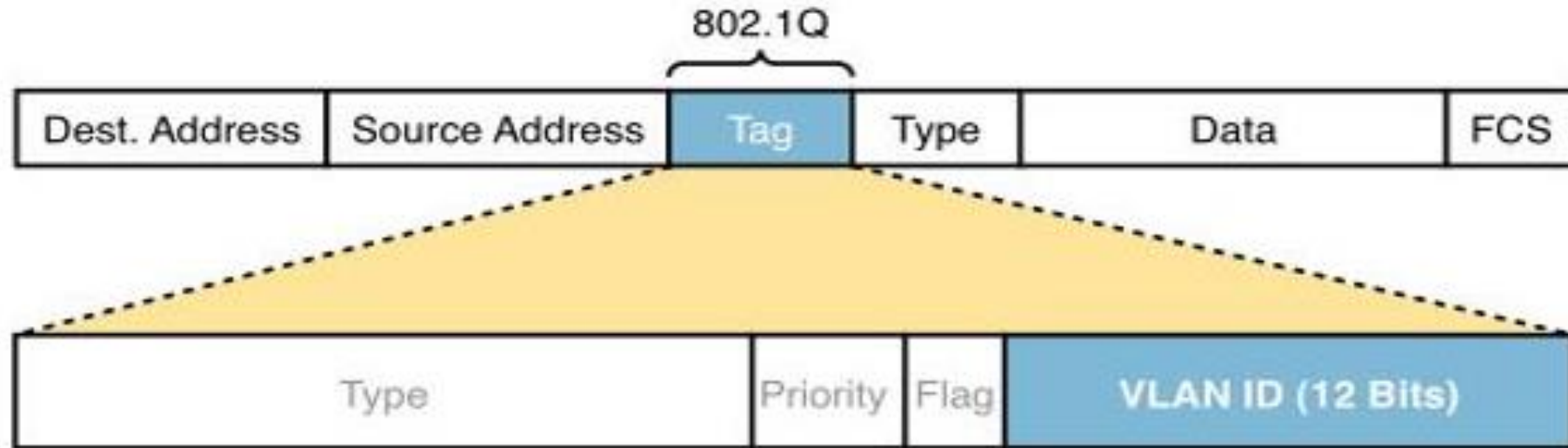


Figure 9-6 802.1Q Trunking

VTP (VLAN Trunking Protocol)

- Cisco Proprietary
- Used to propagate VLAN configuration from one switch to others through a trunk port [therefore, we will not need to create the same VLANs on all switches]
- Uses configuration revision number to identify the latest update
- Higher revision number means latest updates, default value is 0
- The revision number is incremented by 1 each time an update information is send or received
- R(config)#vtp domain test.com [enabled VTP]

VTP Modes

- VTP Server:
 - Can create, delete, modify and propagate VLAN configuration.
 - Default mode for all switches
 - Stores VLAN configuration in VLAN.dat file in flash memory
- VTP Client:
 - Can not create, delete or modify VLAN
 - Receives and advertised VLAN configuration
 - Stores VLAN configuration in vlan.dat file
- VTP Transparent:

VTP Modes

- VTP Transparent:
 - Can create, delete and modify VLANs
 - Can not receive or propagate VLANs
 - Allow the VLAN configuration to bypass the transparent switch and go to other switches.
- NOTE:
 - Changing the VTP mode to transparent reset the configuration revision number.

VTP Configuration

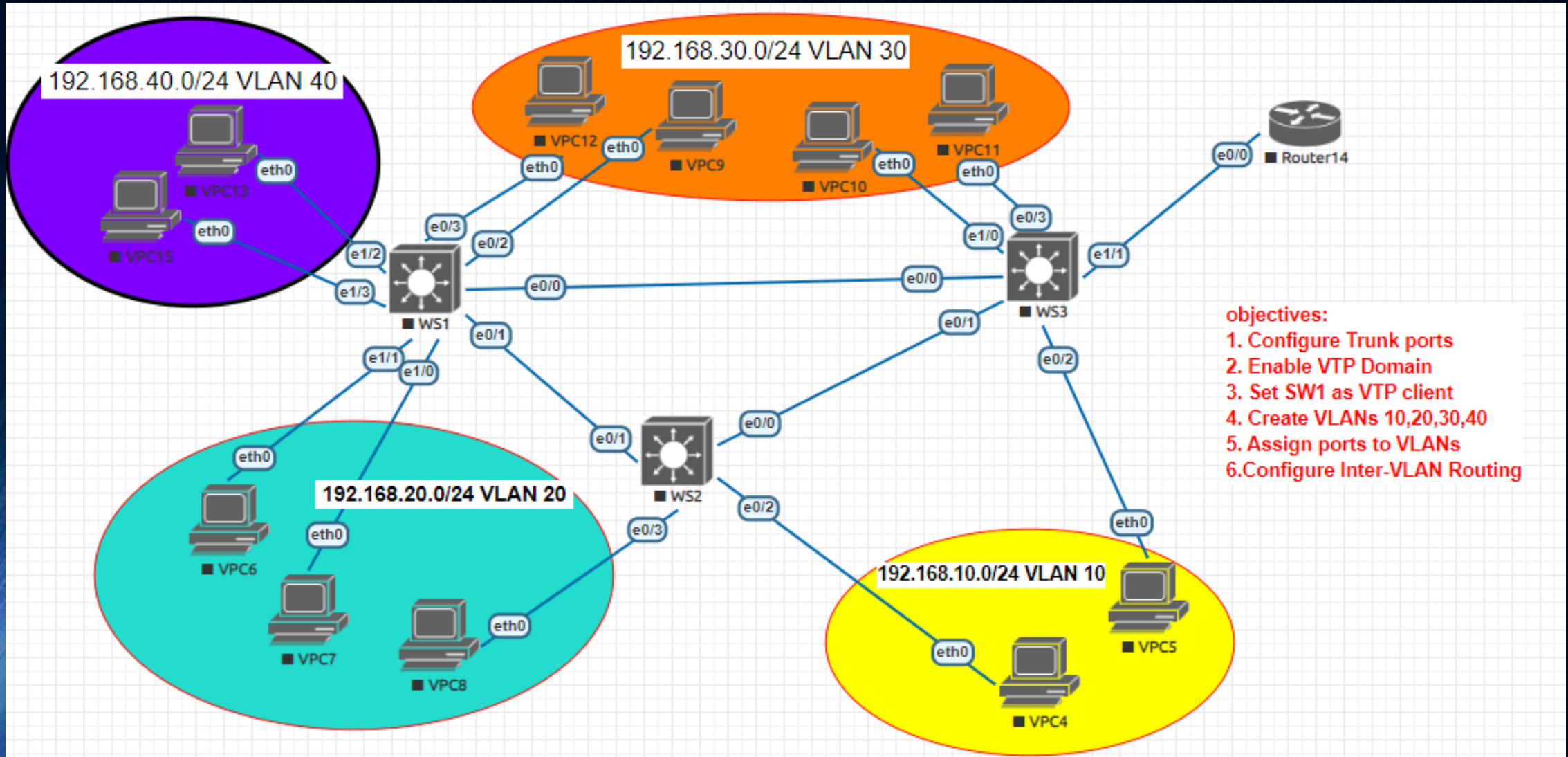
- R(config)#vtp mode server | client | transparent
- R(config)#vtp domain test.com
- R(config)#vtp version 1 | 2

- R#show vtp status

Inter-VLAN Routing

- PCs in one VLAN can not directly communicate with PCs in another VLAN.
- We need to configure inter-VLAN routing for inter-VLAN communication
- We can configure inter-VLAN routing by two methods:
 - Router on Stick
 - Multiple Links

Lab Scenario



REFERENCES

THANK YOU