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Name of Experiment: **Creation of Virtual LAN (VLAN)**

Object

Creating VLAN (Virtual LAN) in a Switch

Introduction

- VLAN provides Layer 2 security
- Divides a single broadcast domain into multiple broadcast domains
- By default all ports of the switch are in VLAN1
- VLAN1 is known as administrative VLAN or management VLAN
- VLAN can be created from 2 to 1001

Types of VLAN

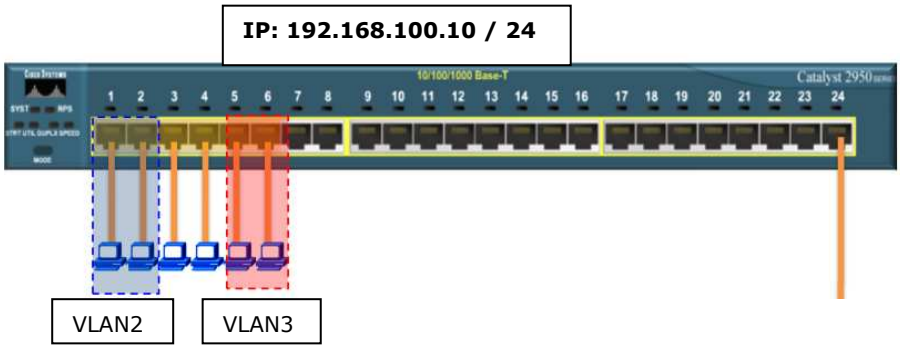
- Static VLAN
    - Static VLAN's are port based, hence they are called as port based VLAN's
    - Ports have to be manually assigned to a VLAN
    - A port can be a member of a single VLAN
- Dynamic VLAN
    - These are based on the MAC address of a device
    - Switch automatically assigns the port to a VLAN
    - Each port can be a member of a multiple VLAN's
    - For Dynamic VLAN configuration a software called VMPS (VLAN management policy server) is needed

Apparatus Required

1. *Desktop PCs with NIC card*
2. Patch card (straight cable, both ends terminated with RJ 45 connectors)
3. Switch (DAX)
4. Router (or) Layer3 Switch

Procedure

Create VLAN (Virtual LAN) in the given Switch



VLAN creation:

Step1:

Telnet to the switch and enter into privilege mode

Step2:

i. To verify the status of switch interfaces give the command
Switch#show interface status↵

ii. To verify MAC address table
Switch#show mac-address table↵

Step3:

To create VLAN enter into global configuration mode

Syntax:

Switch (config) # *vlan <vlan no.>*↵
Switch (config-vlan) *#name <name>*↵

Configuration:

Switch1(config) # vlan 2↵
Switch1(config-vlan) #name operating↵
Switch1(config-vlan) #exit↵

Switch1(config) # vlan 3↵
Switch1(config-vlan) #name engineering↵
Switch1(config-vlan) #exit↵

Implementation of VLAN:

Syntax:

Switch (config) # *interface <type> <no.>*↵
Switch (config-if) *#switchport mode access*↵
Switch (config-if) *#switchport access vlan <vlan no.>*↵
Switch (config-if) *#exit*↵

Configuration:

Switch1(config)*#interface fa0/1 -2*↵
Switch1(config-vlan) *# switchport mode access*↵
Switch1(config-vlan) *# switchport access vlan 2*↵
Switch1(config-if) *#exit*↵
Switch1(config)*#interface fa0/5 -6*↵
Switch1(config-vlan) *# switchport mode access*↵
Switch1(config-vlan) *# switchport access vlan 3*↵
Switch1(config-if) *#exit*↵

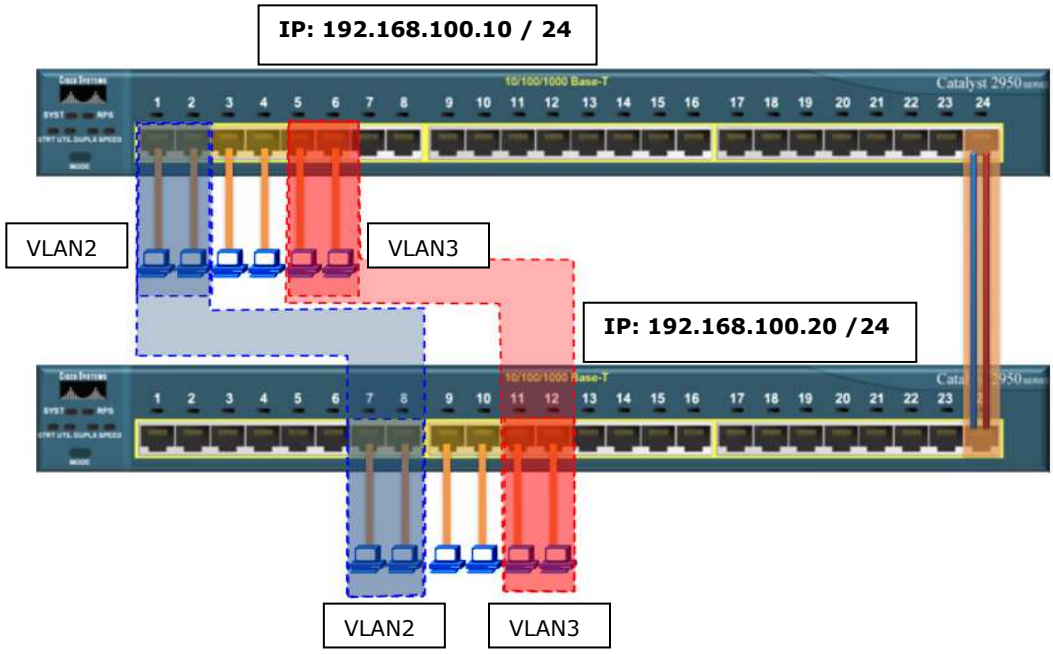
Verification:

Switch*# sh VLAN*

VLAN	Name	Type	Media	Ports	
1	default	Static	ENET	Ethernet0/0/3	Ethernet0/0/4
				Ethernet0/0/7	Ethernet0/0/8
				Ethernet0/0/9	Ethernet0/0/10
				Ethernet0/0/11	Ethernet0/0/12
				Ethernet0/0/13	Ethernet0/0/14
				Ethernet0/0/15	Ethernet0/0/16
				Ethernet0/0/17	Ethernet0/0/18
				Ethernet0/0/19	Ethernet0/0/20
				Ethernet0/0/21	Ethernet0/0/22
				Ethernet0/0/23	Ethernet0/0/24
				Ethernet0/0/25	Ethernet0/0/26
				Ethernet0/0/27	Ethernet0/0/28
2	operating	Static	ENET	**Ethernet0/0/1**	**Ethernet0/0/2**
3	engineering	Static	ENET	**Ethernet0/0/5**	**Ethernet0/0/6**

VLAN Trunking:

To configure a trunk link on interface



VLAN trunk creation:

Syntax:

Switch (config) # interface <type> <no.>↵
Switch (config-if) #switchport trunk allowed vlan <all / no.>↵
Switch (config-if) #exit↵

Configuration:

On 192.168.100.10 Switch

Switch1(config)*#interface fa0/24*↵
Switch1(config-vlan) *# switchport trunk allowed clan all*↵
Switch1(config-if) *#exit*↵

On 192.168.100.20 Switch

Switch1(config)*#interface fa0/24*↵
Switch1(config-vlan) *# switchport trunk allowed clan all*↵
Switch1(config-if) *#exit*↵

Verification:

Switch*# sh interface trunk*

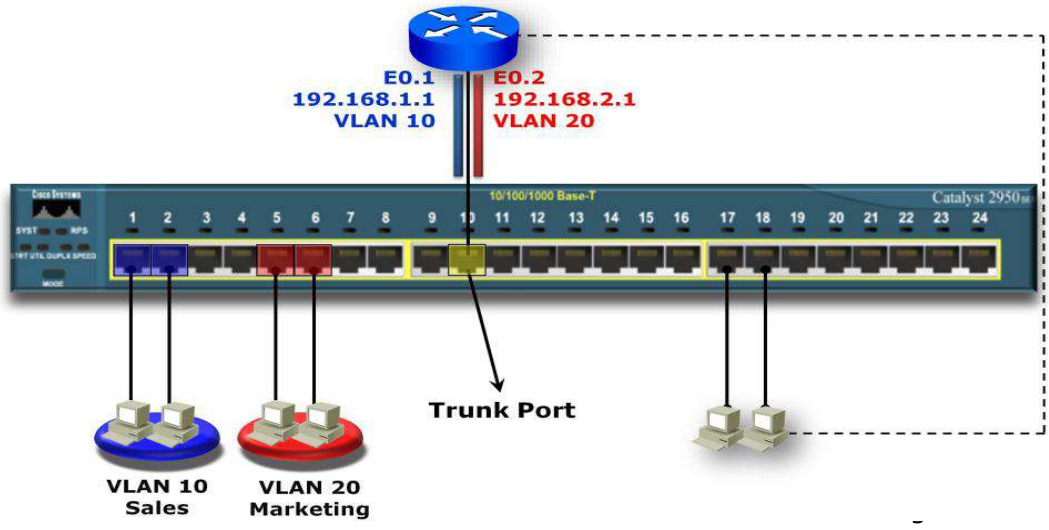
Port	*Mode*	*Encapsulation*	*Status*	*Native vlan*
Fa0/24	**on**	**802.1q**	**trunking**	**1**

Port	*Vlans allowed on trunk*
Fa0/24	**1-4094**

Port	*Vlans allowed and active in management domain*
Fa0/24	**1, 2, 3**

Inter-VLAN Routing:

To configure a trunk link on interface connected to router



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Configuration on Switch

```
Switch(config)#vlan 10↵
Switch(config-vlan)#name sales↵
Switch(config-vlan)#exit↵

Switch(config)#vlan 20↵
Switch(config-vlan)#name marketing↵
Switch(config-vlan)#exit↵

Switch(config)# interface range fa0/1-2↵
Switch(config-if)#switchport mode access↵
Switch(config-if)#switchport access vlan 10↵
Switch(config-if)#exit↵

Switch(config)# interface range fa0/5-6↵
Switch(config-if)#switchport mode access↵
Switch(config-if)#switchport access vlan 20↵
Switch(config-if)#exit↵

Switch(config)# interface fa0/10↵
Switch(config-if)#switchport mode trunk↵
Switch(config-if)#switchport trunk allowed
valn all↵
Switch(config-if)#exit↵
```

Configuration on Router

```
Router(config)# interface Ethernet 0↵
Router(config-if)#no ip address↵
Router(config-if)#no shutdown↵
Router(config-if)#exit↵

Router(config)# interface Ethernet 0.1↵
Router(config-if)#encapsulation dot1q 10↵
Router(config-if)#ip address 192.168.1.1
                        255.255.255.0↵
Router(config-if)#exit↵

Router(config)# interface Ethernet 0.2↵
Router(config-if)#encapsulation dot1q 20↵
Router(config-if)#ip address 192.168.2.1
                        255.255.255.0↵
Router(config-if)#exit↵

Router(config)# interface Ethernet 0.1↵
Router(config-if)#encapsulation dot1q 10↵
Router(config-if)#ip address 192.168.1.1
                      255.255.255.0↵
Router(config-if)#exit↵
Router(config)#ip routing↵
```

Verification:

Switch# *sh interface trunk*↵

Port	*Mode*	*Encapsulation*	*Status*	*Native vlan*
Fa0/10	**on**	**802.1q**	**trunking**	**1**

Router#sh ip route↵

Codes: 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

Gateway of last resort is not set

C 192.168.1.0/24 is directly connected, Ethernet0/0.1
C 192.168.2.0/24 is directly connected, Ethernet0/0.2

Exercise:

1. What are the advantages of creating VLAN?

2. What are the advantages of VLAN trunking?

3. What are the ad vantages of Inter VLAN routing?

4. What are the advantages of Dynamic VLAN over Static VLAN?