

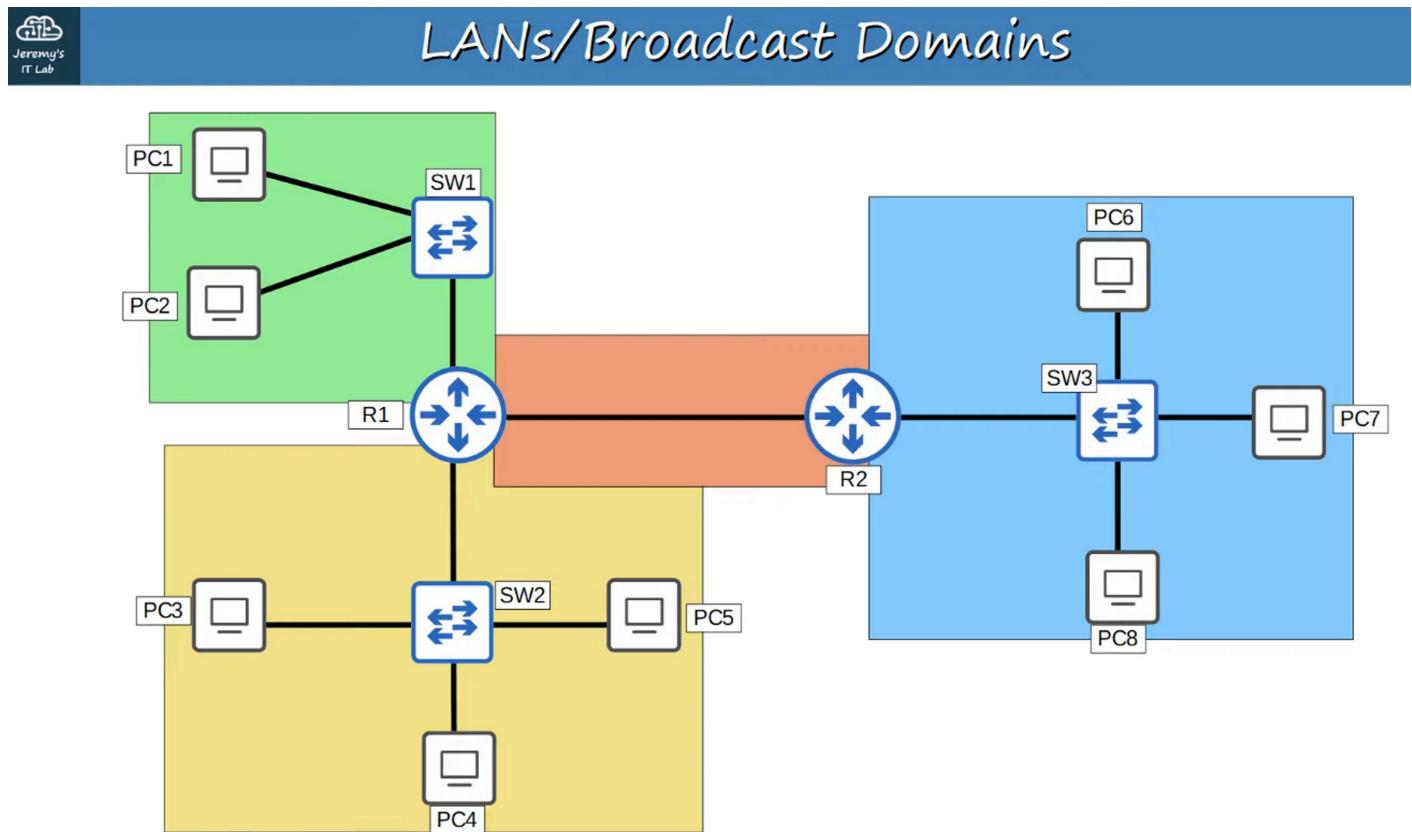
## VLANS : PART 1

### WHAT IS A LAN ?

- A LAN is a single BROADCAST DOMAIN, including all devices in that broadcast domain.
- BROADCAST DOMAINS

- A BROADCAST DOMAIN is the group of devices which will receive a BROADCAST FRAME (Destination MAC : FFFF.FFFF.FFFF) sent by any one of the members.

Image of LAN with FOUR BROADCAST DOMAINS (192.168.1.0 / 24)

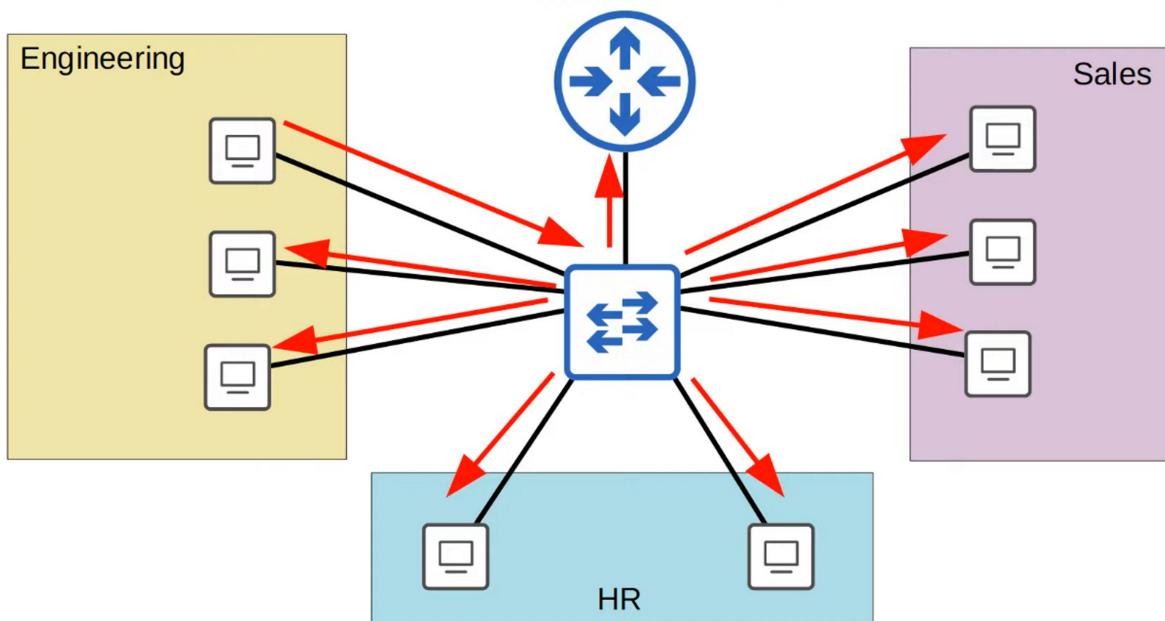


Performance :

Lots of unnecessary BROADCAST traffic can reduce network performance.

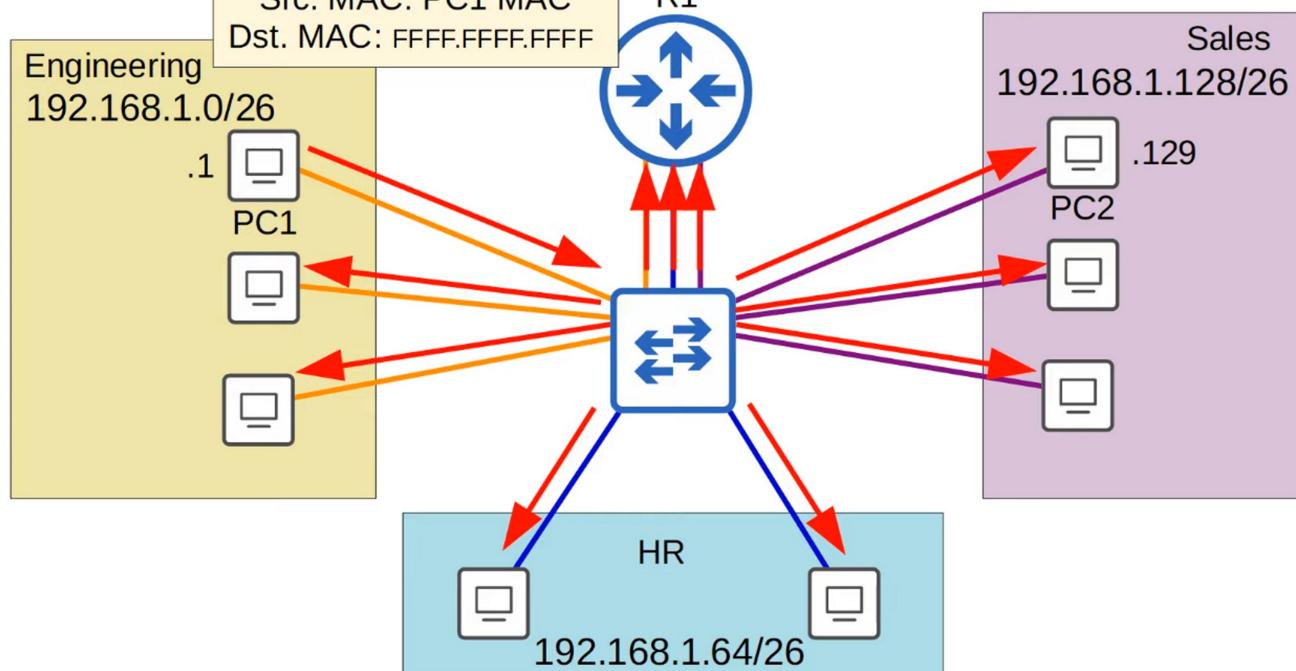
# What is a VLAN?

192.168.1.0/24



BROADCAST FRAME flooding all our subnets with unnecessary traffic.

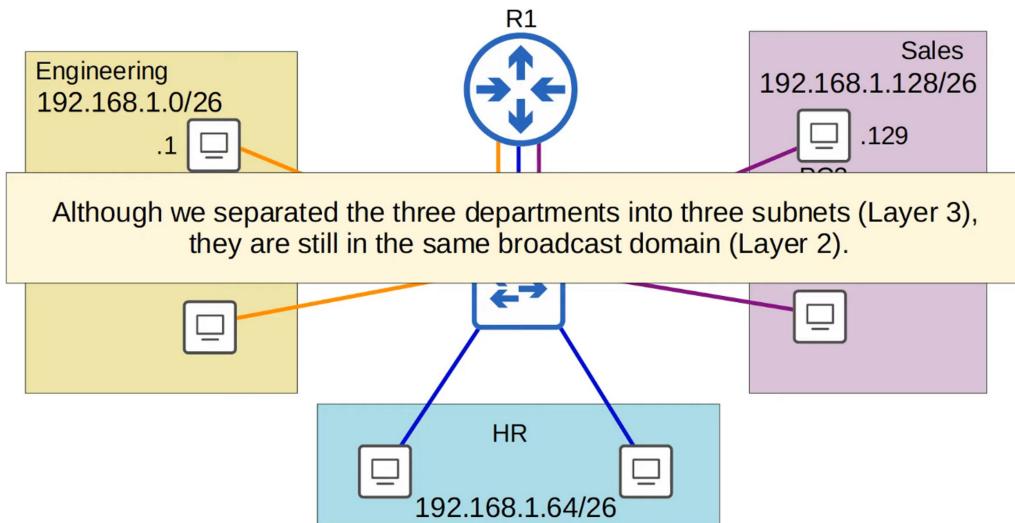
# What is a VLAN?



Security :

Even within the same office, you want to limit who has access to what. You can apply security policies on a ROUTER / FIREWALL. Because this is one LAN, PC's can reach each other directly, without traffic passing through the router. So, even if you configure security policies, they won't have any effect.

## What is a VLAN?



### WHAT IS A VLAN ?

#### VLANs:

- logically separate end-hosts at LAYER 2
- are configured on Layer 2 SWITCHES on a per-interface basis.
- any END HOST connected to that interface is part of that VLAN

#### PURPOSE OF VLANs:

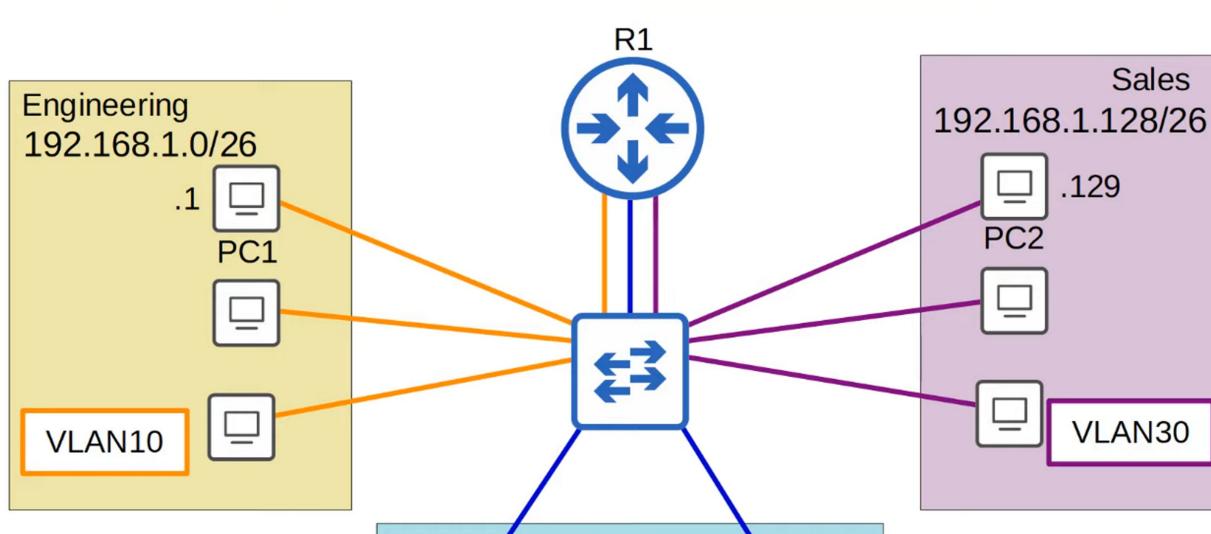
##### Network Performance :

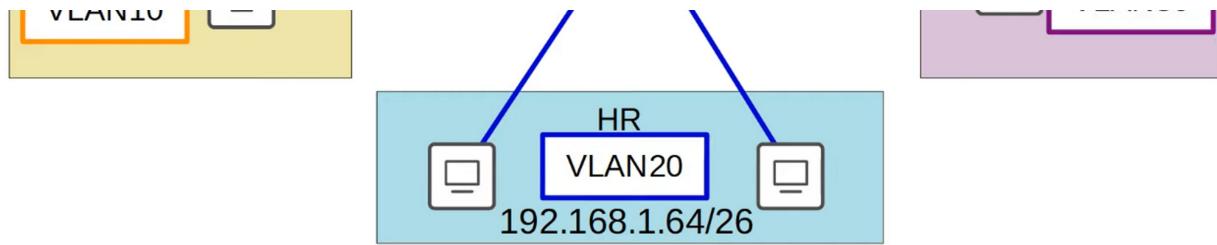
- Reduce unnecessary BROADCAST traffic, which helps prevent network congestion, and improve network performance

##### Network Security :

- Limiting BROADCAST and unknown UNICAST traffic, also improves network security, since messages won't be received by devices outside of the VLAN

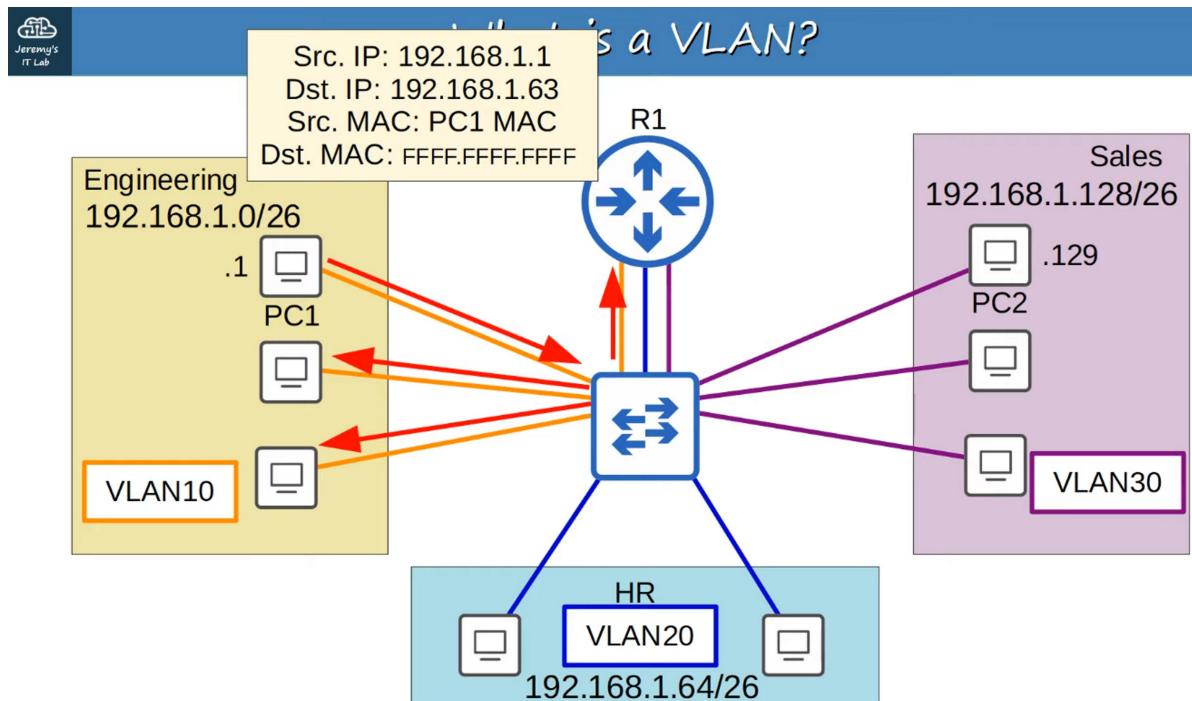
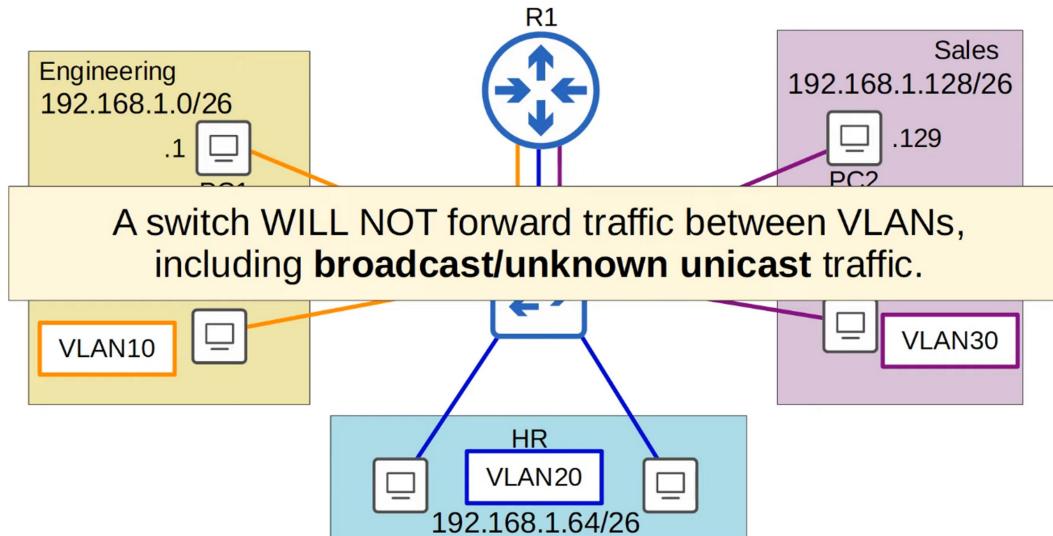
## What is a VLAN?



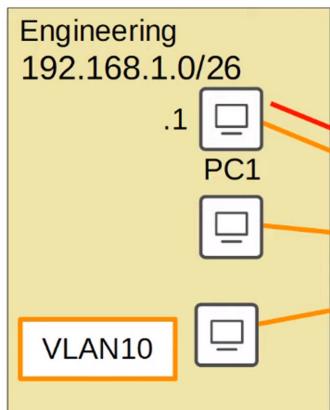


SWITCHES do not forward traffic directly between HOSTS in different VLANS

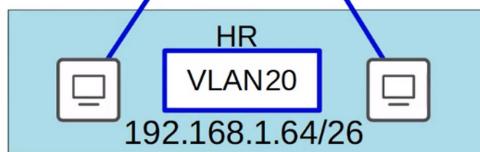
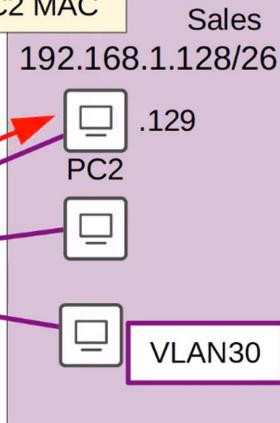
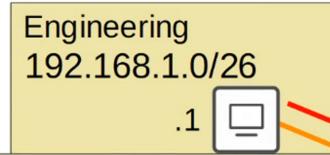
### What is a VLAN?



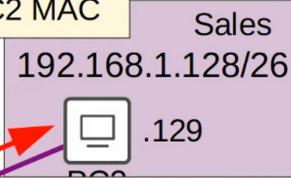
Sending Packets to another VLAN (Routed through R1)

*What is a VLAN?*

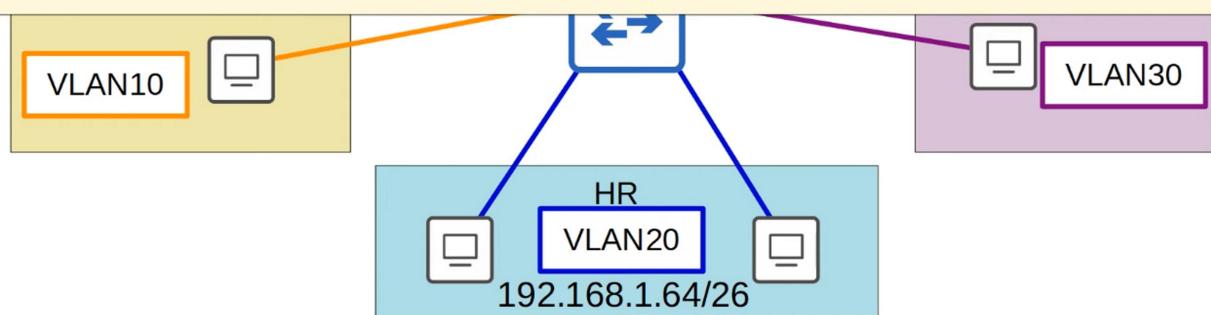
Src. IP: 192.168.1.1  
Dst. IP: 192.168.1.129  
Src. MAC: R1 MAC  
Dst. MAC: PC2 MAC

*What is a VLAN?*

Src. IP: 192.168.1.1  
Dst. IP: 192.168.1.129  
Src. MAC: R1 MAC  
Dst. MAC: PC2 MAC



The switch does not perform **inter-VLAN routing**.  
It must send the traffic through the router.

**HOW TO CONFIGURE VLANS ON CISCO SWITCHES**

```
#show vlan brief
```

# VLAN Configuration

```
SW1#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Gi0/0, Gi0/1, Gi0/2, Gi0/3 Gi1/0, Gi1/1, Gi1/2, Gi1/3 Gi2/0, Gi2/1, Gi2/2, Gi2/3 Gi3/0, Gi3/1, Gi3/2, Gi3/3
1002	fdci-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fdtnet-default	act/unsup	
1005	trnet-default	act/unsup	
	SW1#		

Shows which VLANS that exist on the SWITCH and what INTERFACES are in each VLAN

VLANs 1 (DEFAULT), 1002-1005 exist by default and cannot be deleted (5 VLANs)

## HOW TO ASSIGN INTERFACES TO A VLAN

# VLAN Configuration

```
SW1(config)#interface range g1/0 - 3
SW1(config-if-range)#switchport mode access
SW1(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
SW1(config-if-range)#interface range g2/0 - 2
SW1(config-if-range)#switchport mode access
SW1(config-if-range)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
SW1(config-if-range)#interface range g3/0 - 3
SW1(config-if-range)#switchport mode access
SW1(config-if-range)#switchport access vlan 30
% Access VLAN does not exist. Creating vlan 30
SW1(config-if-range)#[
```

1. Use the “interface range” command to select all the interfaces at once
2. Use the “switchport mode access” command to set the interface as an ACCESS PORT

## WHAT IS AN ACCESS PORT?

- An ACCESS PORT is a SWITCHPORT which belongs to a single VLAN, and usually connects to end hosts like PCs.

SWITCHPORTS which carry multiple VLANs are called “TRUNK PORTS” (more info on TRUNK in next chapter)

3. Use the “switchport access” command to assign a VLAN to a PORT



## VLAN Configuration

```
SW1(config)#do show vlan brief

VLAN Name                               Status    Ports
-----+-----+-----+
1     default                            active   Gi0/0, Gi0/1, Gi0/2, Gi0/3
                                              Gi2/3
10    VLAN0010                           active   Gi1/0, Gi1/1, Gi1/2, Gi1/3
20    VLAN0020                           active   Gi2/0, Gi2/1, Gi2/2
30    VLAN0030                           active   Gi3/0, Gi3/1, Gi3/2, Gi3/3
1002  fddi-default                      act/unsup
1003  token-ring-default                act/unsup
1004  fddinet-default                  act/unsup
1005  trnet-default                    act/unsup

SW1(config)#vlan 10
SW1(config-vlan)#name ENGINEERING
SW1(config-vlan)#vlan 20
SW1(config-vlan)#name HR
SW1(config-vlan)#vlan 30
SW1(config-vlan)#name SALES
```

Use "#vlan <#>" to enter Configuration Mode for a given VLAN (this can also create a VLAN)

Use "#name " to configure a NAME for your VLAN

To check your VLAN configuration, use "#show vlan brief"



## VLAN Configuration

```
SW1(config)#do show vlan brief

VLAN Name                               Status    Ports
-----+-----+-----+
1     default                            active   Gi0/0, Gi0/1, Gi0/2, Gi0/3
                                              Gi2/3
10    ENGINEERING                       active   Gi1/0, Gi1/1, Gi1/2, Gi1/3
20    HR                                active   Gi2/0, Gi2/1, Gi2/2
30    SALES                            active   Gi3/0, Gi3/1, Gi3/2, Gi3/3
1002  fddi-default                      act/unsup
1003  token-ring-default                act/unsup
1004  fddinet-default                  act/unsup
1005  trnet-default                    act/unsup

SW1(config)#
```

Testing VLAN 10

Pinging from PC1 using 255.255.255.255 (FFFF:FFFF:FFFF) floods broadcast packets to R1 and VLAN10 hosts only

## VLAN Configuration

