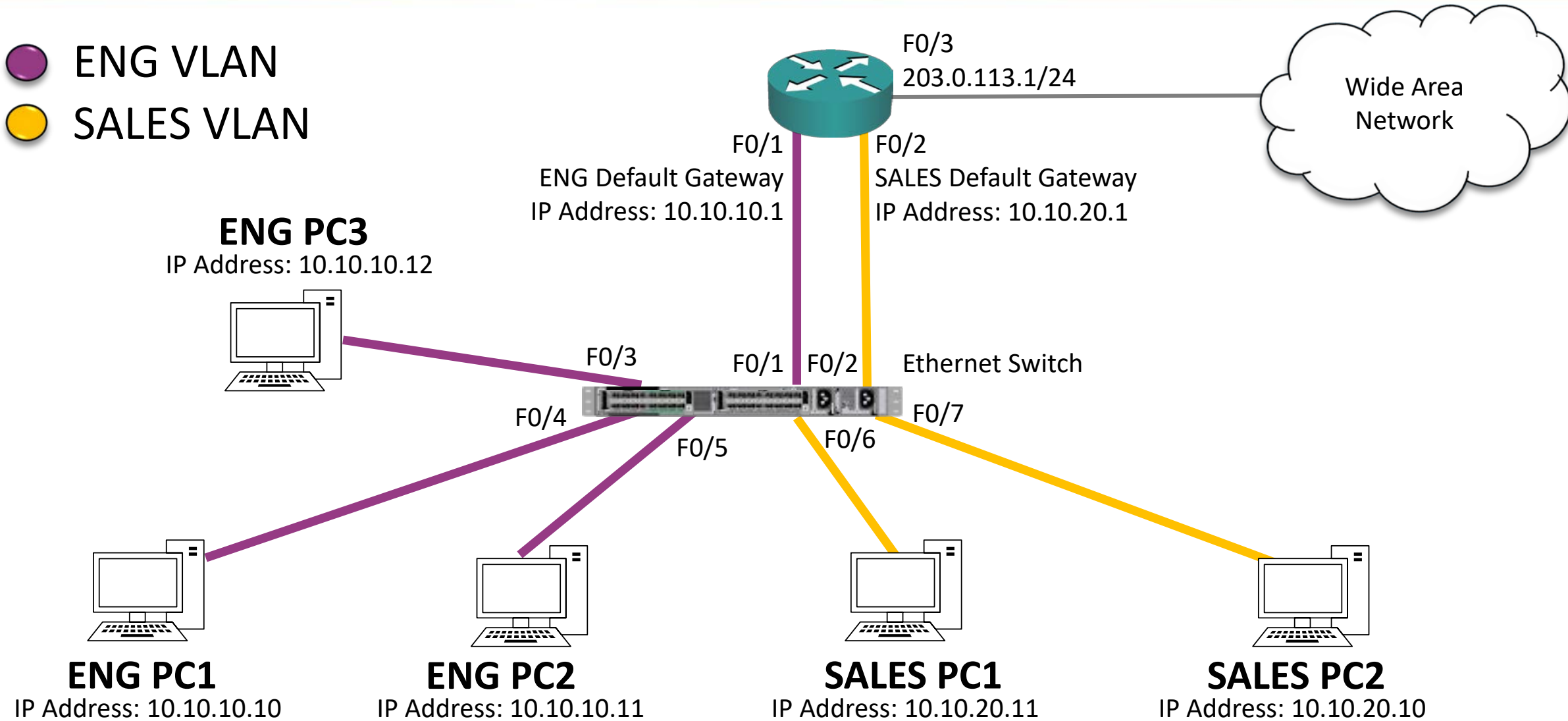# VLANs and IP subnets in the LAN

- There is typically a one-to-one relationship between an IP subnet and a VLAN in the LAN campus

- For example Engineering hosts are in IP subnet 10.10.10.0/24 and VLAN 10, and Sales hosts are in IP subnet 10.10.20.0/24 and VLAN 20

- Hosts are segregated at Layer 3 by being in different IP subnets, and at Layer 2 by being in different VLANs

- Hosts in different IP subnets need to send traffic via a router to communicate with each other

Option 1: Router with separate interfaces

- ⬤ ENG VLAN
- ⬤ SALES VLAN

F0/3
203.0.113.1/24

Wide Area Network

F0/1
ENG Default Gateway
IP Address: 10.10.10.1

F0/2
SALES Default Gateway
IP Address: 10.10.20.1

ENG PC3
IP Address: 10.10.10.12

F0/3   F0/1 F0/2   Ethernet Switch

F0/4   F0/7

F0/5   F0/6

ENG PC1
IP Address: 10.10.10.10

ENG PC2
IP Address: 10.10.10.11

SALES PC1
IP Address: 10.10.20.11

SALES PC2
IP Address: 10.10.20.10

Option 1 Configuration

```
R1(config)#interface FastEthernet 0/1
R1(config-interface)#ip address 10.10.10.1 255.255.255.0
R1(config)#interface FastEthernet 0/2
R1(config-interface)#ip address 10.10.20.1 255.255.255.0
R1(config)#ip route 0.0.0.0 0.0.0.0 203.0.113.2

SW1(config)#interface FastEthernet 0/1
SW1(config-if)#switchport mode access
SW1(config-if)#switchport access vlan 10
SW1(config)#interface FastEthernet 0/2
SW1(config-if)#switchport mode access
SW1(config-if)#switchport access vlan 20
```

Router with separate interfaces - Disadvantages

- You need a separate physical interface for every VLAN– you are liable to run out of interfaces
- Traffic being routed within the campus has to go up and down physical Ethernet cables to the router

Inter-VLAN Routing Lab

ENG GW: 10.10.10.1
SALES GW: 10.10.20.1

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