Introducing VLANs

Chapter 3

Faculty
172.17.40.21/24

PC1

Student
172.17.40.22/24

PC2

Guest
172.17.40.23/24

PC3

S1

F0/1   F0/3

F0/11   F0/1   F0/3   F0/11

F0/18   F0/18

S2   S3

F0/6   F0/6
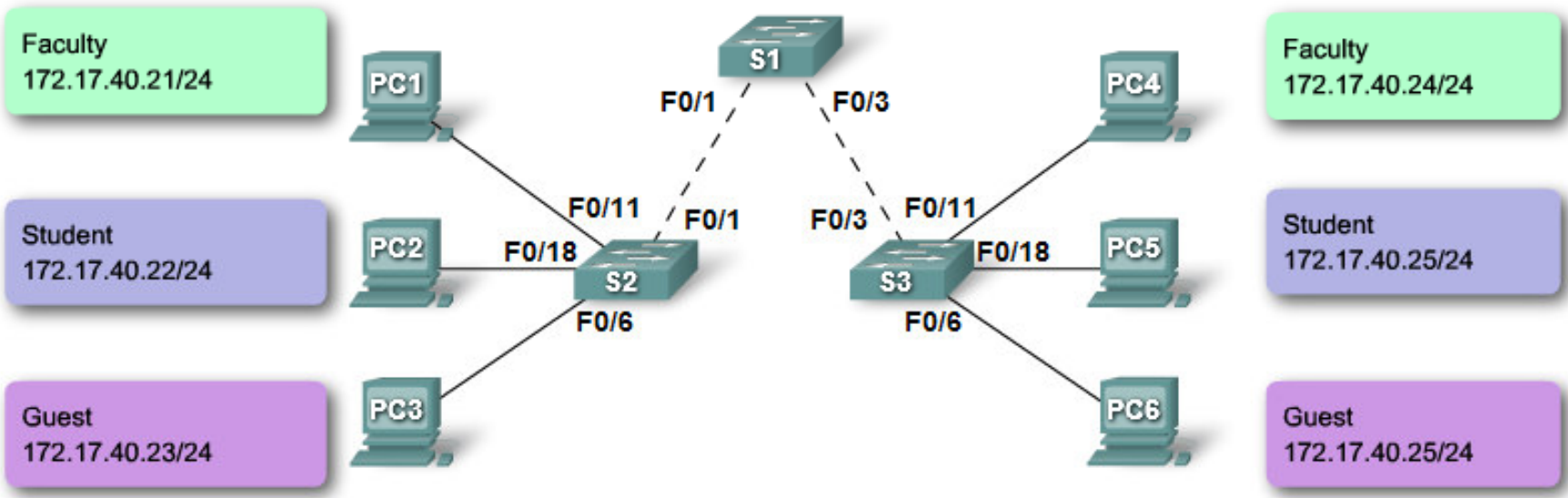
Faculty
172.17.40.24/24

PC4

Student
172.17.40.25/24

PC5

Guest
172.17.40.25/24

PC6
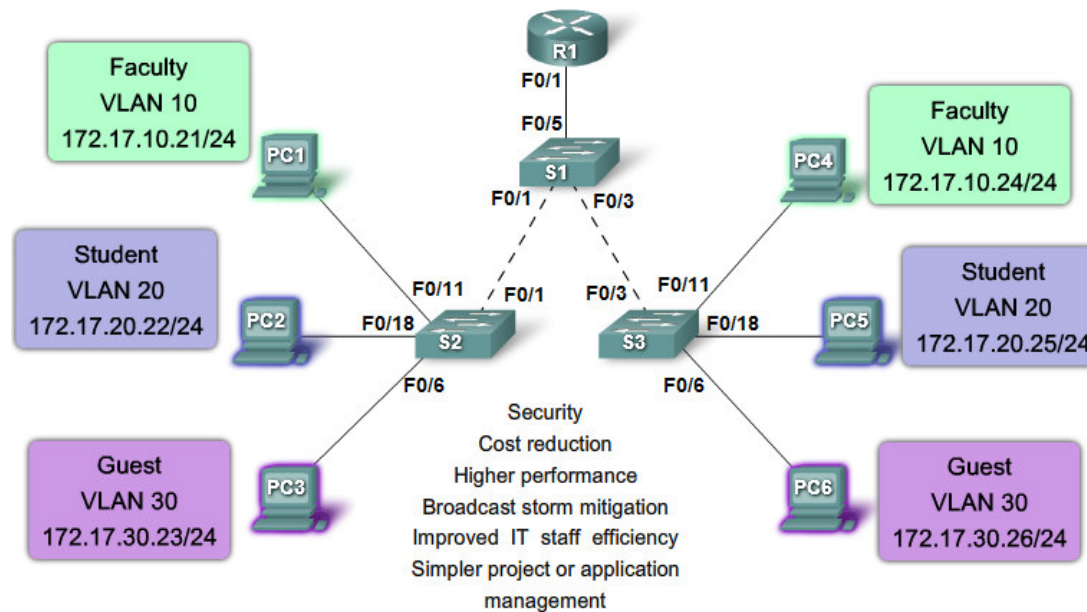
VLAN

- Virtual Local Area Network
- a network of computers that appear to be connected to the same network

- **Intra VLAN**
  - Communication within a VLAN

- **Inter VLAN**
  - Communication between VLANs
  - Requires a layer 3 device (Router or Layer 3 switch)

- Static vlan
  - Access port

- Dynamic vlan
  - VMPS
    - Vlan Management Policy server, Eg. FreeNac
    - Assigns vlan based on the who the hosts are

Configuration

- Create vlan

```
Switch(config)#vlan 7
Switch(config-vlan)#name Guest (Optional)
```
Or
```
Switch#vlan database
Switch (vlan)#vlan 7 name Guest
```
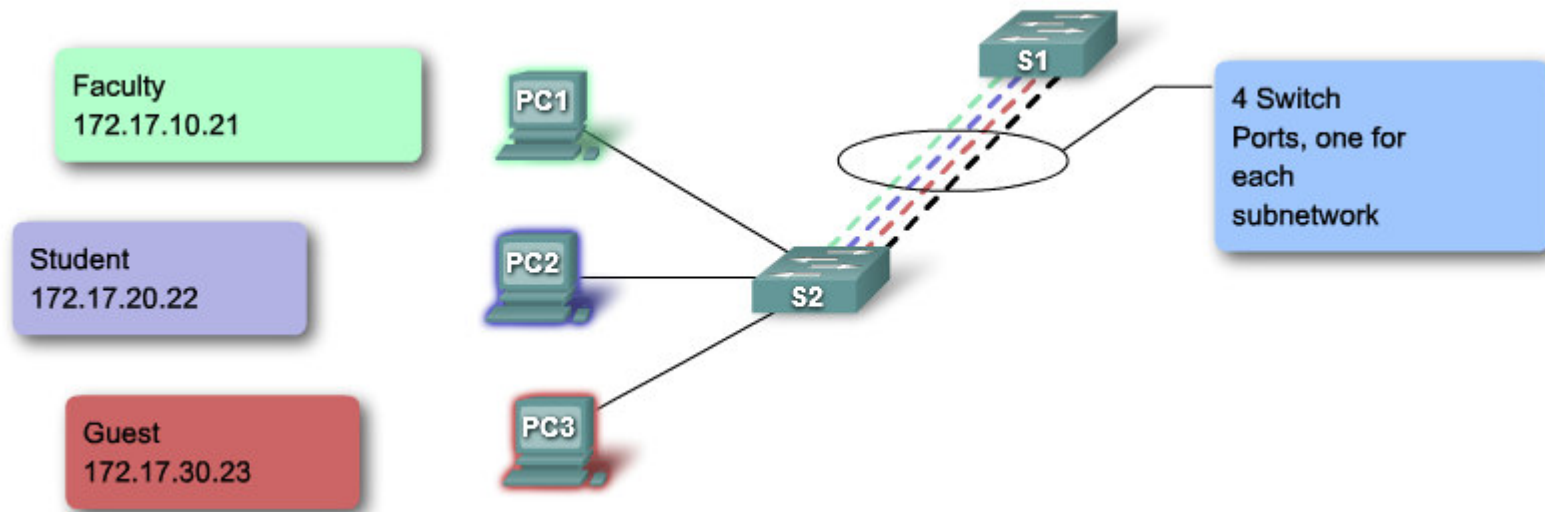
- Assign switchports

```
Switch(config)#interface Fastethernet0/1
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 7
```

Trunk

- A link that carries more than one VLAN
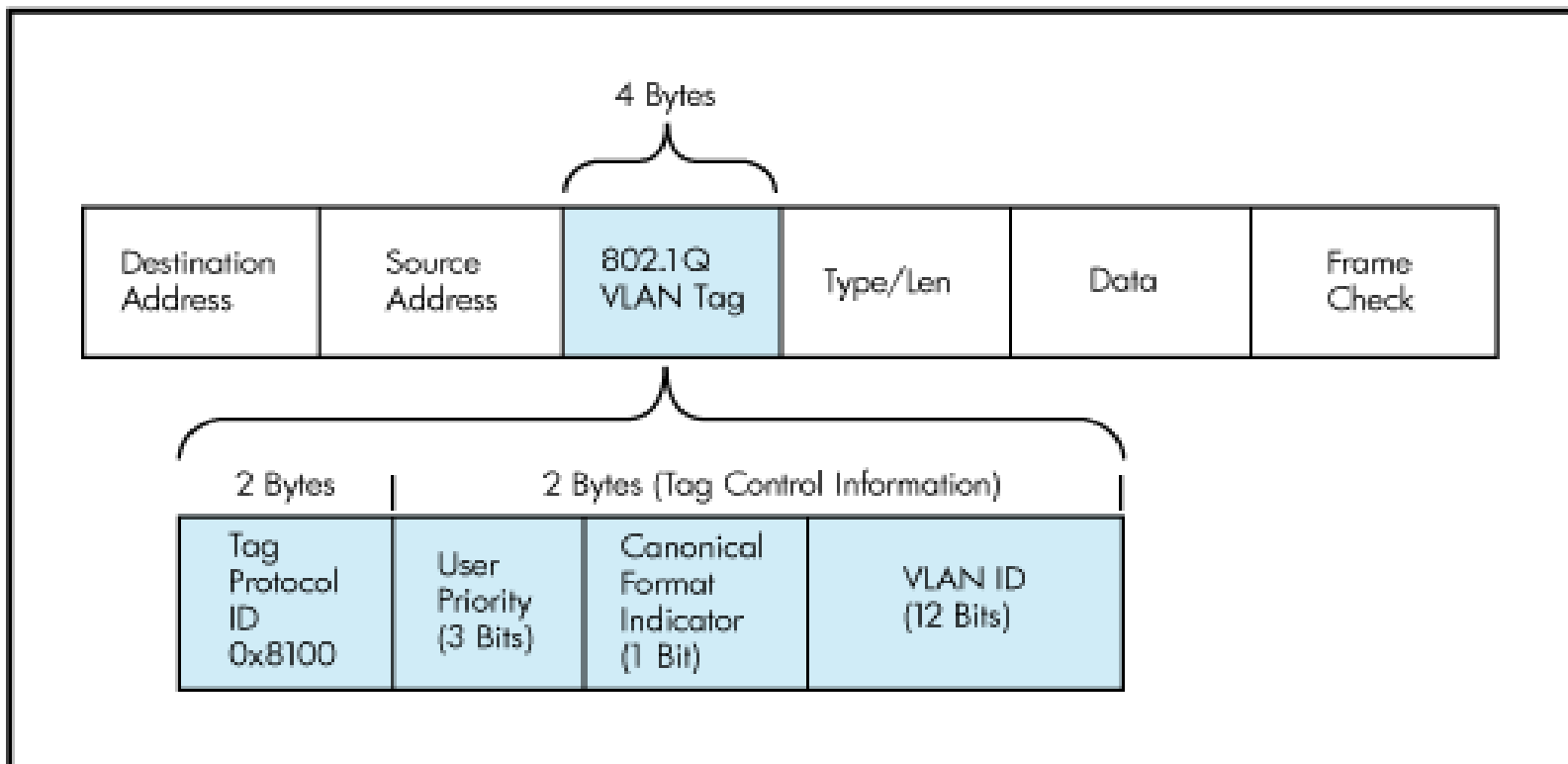- Alternative: One physical link pr. Vlan between switches.

- Management vlan
  - Administrative access to the switch

```
Switch(config)#interface vlan 10
Switch(config-if)#ip address 192.168.4.10
  255.255.255.0
```

802.1Q

- IEEE standard
- Inserts a 4 Byte vlan tag in the frame header

- VLAN ID
  - Normal-range IDs
    - 1 – 1005
    - 1002 -1005 reserved for Token Ring and FDDI VLANs
    - 1 and 1002 to 1005 are automatically created and cannot be removed
    - Stored in the vlan.dat file in flash memory
  - Extended-range IDs
    - 1006 – 4094
    - Designed for service providers
    - Have fewer options than normal range VLANs
    - Stored in the running configuration file

- Native vlan
  - Untagged traffic
  - Default: vlan 1
  - Used by CDP, DTP and others

DTP

- Dynamic Trunking Protocol
- Cisco proprietary
- Automatically configures the link as a trunk:
  - Dynamic auto
  - Dynamic desirable
  - On

	Dynamic Auto	Dynamic Desirable	Trunk	Access
Dynamic Auto	Access	Trunk	Trunk	Access
Dynamic Desirable	Trunk	Trunk	Trunk	Access
Trunk	Trunk	Trunk	Trunk	Not Recommended
Access	Access	Access	Not Recommended	Access

Note: Table assumes DTP is enabled at both ends.

* `show dtp interface` - to determine current settings

Configuration

```
Switch(config)#interface Fastethernet0/1
Switch(config-if)# switchport mode trunk

Switch(config-if)# switchport trunk native vlan 40
Switch(config-if)# switchport trunk allowed vlan 7,40
```

- You can remove a vlan with active ports
- You can assign an interface to non-existent vlans (some IOS's)
- Vlan.dat is not cleared when you erase startup configuration
- The native VLAN must be the same on both sides of the link