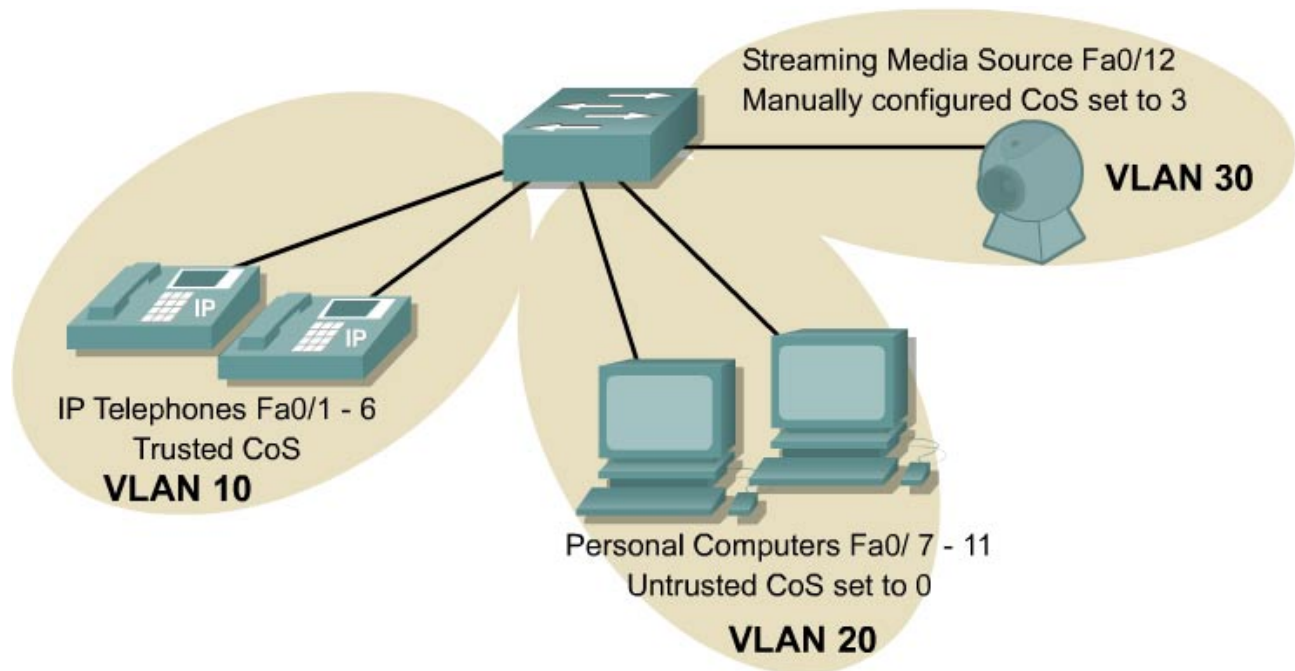


Lab 8.9.1 Classifying Traffic using Class of Service at the Access Layer



Objective

For effective quality of service (QoS) it is important to classify traffic as soon as possible. This allows routing and switching processes that can differentiate traffic and provide the required service levels. This lab introduces the use of the Layer 2 class of service (CoS) field as a means of classifying traffic entering the network at the access-layer switch. The following key concepts are covered:

- Trust of an existing CoS, such as provided by an IP phone
- Manual configuration of CoS for devices incapable of setting it for themselves
- Manual configuration and overriding the CoS for devices that cannot be trusted

This lab can be performed using the Catalyst 2950 or 3550 switches.

Scenario

A company marketing department is expanding and has just obtained some additional floor space for five new staff members. Each staff member has a personal computer and an IP phone. In addition, the marketing department has purchased a video camera so that marketing presentations can be streamed to customers and employees. Configure the access-layer switch for the new workgroup and pay particular attention to their quality of service requirements.

Step 1

If a Catalyst 3550 is being used for this lab, activate the QoS features of the switch from the global configuration mode.

```
Switch(config)#mls qos
```

If a Catalyst 2950 is being used for this lab, ignore this step as the QoS features of the 2950 are always available.

Step 2

Configure a Virtual Terminal Protocol (VTP) domain corp and assign VLANs to the interfaces as shown in the topology above.

```
Switch(config)#vtp domain corp
Switch(config)#vtp mode server
Switch(config)#interface range fastethernet 0/1 - 6
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#interface range fastethernet 0/7 - 11
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#interface fastethernet 0/12
Switch(config-if)#switchport access vlan 30
```

Step 3

The IP phones have been purchased and have automatically set the Ethernet class of service field to 5. This is an appropriate value. This allows the access-layer switch to pass these Ethernet frames, leaving the CoS intact. In other words, the CoS coming in on the IP phone interfaces switch is trusted.

Configure interfaces 1 through 6 to trust the incoming CoS.

```
Switch(config)#interface range fastethernet 0/1 - 6
Switch(config-if-range)#mls qos trust cos
```

Step 4

The personal computers used in the marketing department do not have any special QoS requirements. By classifying Ethernet frames originating from them with a CoS of 0. A best effort delivery priority is represented.

Configure interfaces 7 through 11 with a default CoS of 0.

```
Switch(config)#interface range fastethernet 0/7 - 11
Switch(config-if-range)#mls qos cos 0
```

Step 5

The personal computers use a network interface card (NIC) that supports 802.1p. Therefore, the PCs have the capability of setting the CoS. The marketing staff would never intentionally want to disrupt network services. However, if the CoS was set to a high value, data network traffic such as FTP could seriously disrupt voice or video services.

Configure interfaces 7 through 11 to override any incoming CoS and set it to the default.

```
Switch(config-if-range)#mls qos cos override
```

Step 6

The video traffic needs to be given priority treatment within the network. This is because video traffic has different requirements than voice traffic. Assign a separate CoS of 3, which assures the video traffic will be readily identified by other switches and routers within the network.

The camera is not capable of setting its own CoS. Configure a default CoS of 3 on interface 12.

```
Switch(config)#interface fastethernet 0/12
Switch(config-if)#mls qos cos 3
```

Step 7

It is possible that in the future the marketing department will upgrade the camera to a more advanced model that supports setting of its own CoS. Configure the switch port so that if frames are received with the CoS already set, the switch will use that value instead of the default.

```
Switch(config-if-range)#mls qos trust cos
```

Step 8

Verify the QoS settings for each of the interfaces using the `show mls qos interface` command.

```
Switch#show mls qos interface fastethernet 0/1
FastEthernet0/1
trust state: trust cos
trust mode: trust cos
COS override: dis
default COS: 0
pass-through: none
trust device: none
```

1. What is the trust state for interface fa0/7? _____
2. What command brought about this trust state? _____
3. Is it possible to use the commands `mls qos cos override` and `mls qos trust cos` on the same interface? _____

Configuration File

```
hostname Switch
!
!
ip subnet-zero
!
spanning-tree extend system-id
!
!
interface FastEthernet0/1
  switchport access vlan 10
  no ip address
  mls qos trust cos
!
interface FastEthernet0/2
  switchport access vlan 10
  no ip address
  mls qos trust cos
!
interface FastEthernet0/3
  switchport access vlan 10
  no ip address
  mls qos trust cos
!
interface FastEthernet0/4
  switchport access vlan 10
  no ip address
  mls qos trust cos
!
interface FastEthernet0/5
  switchport access vlan 10
  no ip address
  mls qos trust cos
!
interface FastEthernet0/6
  switchport access vlan 10
  no ip address
  mls qos trust cos
!
interface FastEthernet0/7
  switchport access vlan 20
  no ip address
  mls qos cos override
!
interface FastEthernet0/8
  switchport access vlan 20
  no ip address
  mls qos cos override
!
interface FastEthernet0/9
  switchport access vlan 20
  no ip address
  mls qos cos override
!
interface FastEthernet0/10
  switchport access vlan 20
  no ip address
  mls qos cos override
```

```
!  
interface FastEthernet0/11  
  switchport access vlan 20  
  no ip address  
  mls qos cos override  
!  
interface FastEthernet0/12  
  switchport access vlan 30  
  no ip address  
  mls qos cos 3  
  mls qos trust cos  
!  
interface GigabitEthernet0/1  
  no ip address  
!  
interface GigabitEthernet0/2  
  no ip address  
!  
interface Vlan1  
  no ip address  
  no ip route-cache  
  shutdown  
!  
ip http server  
!  
!  
line con 0  
line vty 5 15  
!  
end
```