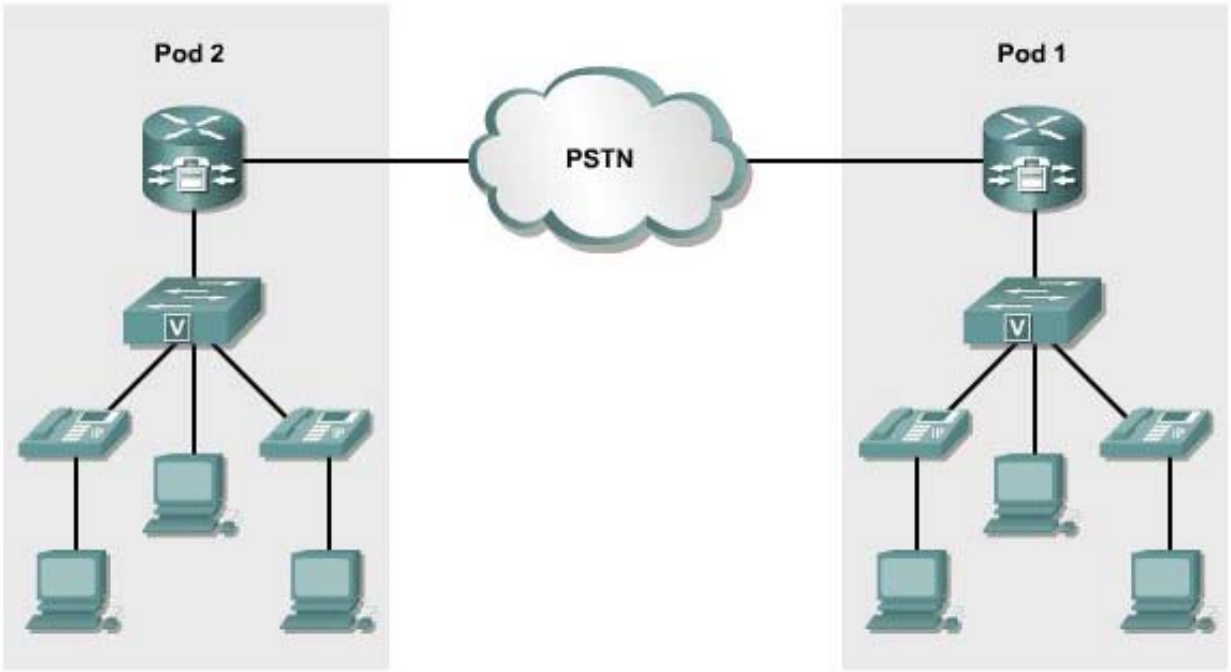
Lab 7.1.1 Configuring AutoQoS



Objective

- Enable the AutoQoS for VoIP feature on workgroup router interfaces

Equipment Requirements

- Two Cisco CallManager Express (CME) capable routers (each with a serial and PRI port configured)
- Two inline power capable switches or non-inline power switches with power injectors
- Adtran
- Two IP phones

This lab relies on labs 2.1.1, 2.1.3, 2.1.4, 3.1.1, 4.1.3, and 4.1.4 being successfully completed and loaded.

In this lab ACME.com wishes to implement AutoQoS for the VoIP network. The network support staffs are not very skilled in QoS, but they do know that Cisco has a command that will implement Cisco's "best guess" for QoS based on the router configuration currently implemented.

- Configure the command to implement AutoQoS for VoIP
- Examine the results of implementing AutoQoS for VoIP

Step 1 Verify Connectivity and IP Phones

a. This lab requires that two pods be used and both pods are functional. Ensure that an IP phone from one pod can call an IP phone on the other pod.

b. Does the phone call work from one pod to the other? If not, perform appropriate troubleshooting.

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c. Have one pod partner slowly count from one to 10 while one or two phone connections are made.

d. How is the voice quality? _____

e. From the lowest numbered pod router, do an extended ping to the other router with a packet size of 1500 bytes. Refer to IP Telephony Table 1 for a list of IP addresses

```
CMERouterX# ping
Protocol [ip]: <Enter>
Target IP address: <ip_address>
Repeat count [5]: 1000
Datagram size [100]: 15000
Timeout in seconds [2]: <Enter>
Extended commands [n]: <Enter>
```

While the ping is occurring, place at least one phone call from one pod to another. Multiple calls can be made. Have one pod partner slowly count from one to 10 while the phone connection is active.

f. How is the voice quality? _____

g. Stop the ping by pressing **CTRL+Shift+6** or wait for the ping to finish.

h. Display and examine the running configuration of the CME router.

Step 2 Configuring AutoQoS on Cisco IOS Routers

a. Set the clock rate on the DCE serial link between the two router pods to **72000**.

```
CMERouterX(config-if)# clock rate 72000
```

b. On both CME routers in dial peer configuration mode, set the codec to the G.711 u-law (pronounced myoo (like the greek leter) law) standard. Codec stands for coder/decoder. The defined codec is the set of rules for converting analog signals to digital and vice versa. The two main types of codecs used are G.711 and G.729. G.711 encodes audio on a 64kbps channel. G.729 encodes audio on a 8kbps channel. G.711 and G.729 come in two different types: a-law and u-law. A-law is used with international circuits and u-law is used with U.S. circuits.

```
CMERouterX(config)# dial-peer voice 6 voip
(CMERouterX(config-dial-peer)# codec g711ulaw
```

c. From the lowest numbered pod router, do an extended ping to the other router with a packet size of 1500 bytes. Refer to IP Telephony Table 1 for a list of IP addresses

```
CMERouterX# ping
Protocol [ip]: <Enter>
```



```
Target IP address: <ip_address>
Repeat count [5]: 1000
Datagram size [100]: 15000
Timeout in seconds [2]: <Enter>
Extended commands [n]: <Enter>
```

While the ping is occurring, place at least one phone call from one pod to another. Multiple calls can be made. Have one pod partner slowly count from one to 10 while the phone connection is active.

d. How is the voice quality? _____

e. On both CME routers in global configuration mode, enable CEF (Cisco Express Forwarding) on both CME routers.

```
CMERouterX(config)# ip cef
```

f. What is the purpose of CEF? _____

_____

g. On only one of the router pods, enable the AutoQoS for VoIP feature for traffic on the serial interface. Do not configure AutoQoS to trust differential services code point (DSCP) markings. Type the interface **serial slot/*mod/port*** command from global configuration mode to access the serial interface.

```
CMERouterX(config)# interface serial mod/port
CMERouterX(config-if)# auto qos voip
```

h. What happened to the serial link? _____

i. On the pod that does not have QoS enabled yet, enable AutoQoS for VoIP. Note that the module/port number that follows the **serial** parameter may be three digits separated by forward slashes.

```
CMERouterX(config)# interface serial mod/port
CMERouterX(config-if)# auto qos voip
```

j. Display and examine the running configuration and the resulting AutoQoS configuration after enabling AutoQoS. The following is a sample output.

```
class-map match-any AutoQoS-VoIP-Remark
 match ip dscp ef
 match ip dscp cs3
 match ip dscp af31

class-map match-any AutoQoS-VoIP-Control-UnTrust
 match access-group name AutoQoS-VoIP-Control

class-map match-any AutoQoS-VoIP-RTP-UnTrust
 match protocol rtp audio
 match access-group name AutoQoS-VoIP-RTCP
!
```



```
policy-map AutoQoS-Policy-UnTrust
 class AutoQoS-VoIP-RTP-UnTrust
  priority percent 70
  set dscp ef

 class AutoQoS-VoIP-Control-UnTrust
  bandwidth percent 5
  set dscp af31

 class AutoQoS-VoIP-Remark
  set dscp default

 class class-default
  fair-queue

interface Serial0/1/0
 ip address 10.19.0.2 255.255.255.0
 service-policy output AutoQoS-Policy-UnTrust
 auto qos voip

ip access-list extended AutoQoS-VoIP-Control
 permit tcp any any eq 1720
 permit tcp any any range 11000 11999
 permit udp any any eq 2427
 permit tcp any any eq 2428
 permit tcp any any range 2000 2002
 permit udp any any eq 1719
 permit udp any any eq 5060

ip access-list extended AutoQoS-VoIP-RTCP
 permit udp any any range 16384 32767
```

k. Do another extended ping and test voice quality by counting to ten.

l. How is the voice quality? _____

m. What is at least one disadvantage of AutoQoS for VoIP? _____

_____

