
# Monitoring and Troubleshooting

This chapter provides an introduction to monitoring and troubleshooting the Cisco Ethernet switches in the Cisco Gigabit-Ethernet Optimized VoD Solution, Release 2.0, and presents the following major topics:



For the architecture of the components discussed here, see Chapter 3, “Implementing and Configuring the Solution.”

## Using CLI Commands to Monitor the Cisco 7609 and Cisco Catalyst 6500

This section addresses the following command-line interface (CLI) commands, presented in alphabetical order:

# logging event link-status

The command **logging event link-status** is useful in providing the up/down status of links, sending messages to the console when the status of a link changes. This command can be used in conjunction with management applications such as Cisco Info Center (CIC) (which can pick up console messages and perform a notification process), as there is less latency with this command than there is with MIBs and traps. However, take into account that the **logging event link-status** command should not be used unless it is necessary, because logging can burden the CPU, especially if traps are also being used.

# show access-lists

The **show access-lists** command displays the access lists that are defined on the switch. The syntax is

**show access-lists** [*number* | *name*]

where

*number* = Access list number <1–2699>.

*name* = Extended access list name.

The following displays the access lists defined on the switch Headend.

```
Headend# show access-lists

Extended IP access list acl_VoD_OOB
    10 permit ip 192.168.67.0 0.0.0.255 any
Extended IP access list acl_VoIP
    10 permit ip 192.168.66.0 0.0.0.255 any
Extended IP access list acl_high_speed_data
    10 permit ip 192.168.65.0 0.0.0.255 any
Extended IP access list acl_video_high
    10 permit udp 192.168.48.0 0.0.7.255 192.168.160.0 0.0.3.255 range 3329 6399
Extended IP access list acl_video_low
    10 permit udp 192.168.48.0 0.0.7.255 192.168.160.0 0.0.3.255 range 257 3327
```

# show arp

The command **show arp** displays the ARP table for all ARP entries related to the global routing table. The following displays the ARP table for the switch Headend.

```
Headend# show arp

Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  1.14.0.3             141   0060.2fa3.e6f1  ARPA   GigabitEthernet5/2
Internet  1.14.0.1             225   0000.0c07.ac16  ARPA   GigabitEthernet5/2
Internet  192.168.65.1           -   000f.24c0.f080  ARPA   Vlan65
Internet  192.168.67.1           -   000f.24c0.f080  ARPA   Vlan67
Internet  192.168.66.1           -   000f.24c0.f080  ARPA   Vlan66
Internet  192.168.65.101        13   0010.9402.0818  ARPA   Vlan65
Internet  192.168.65.100        79   0010.9402.0817  ARPA   Vlan65
Internet  192.168.67.100       119   0000.0000.0016  ARPA   Vlan67
Internet  1.14.135.1             -   000f.24c0.f080  ARPA   GigabitEthernet5/2
Internet  1.14.133.1             9   0040.f488.57c0  ARPA   GigabitEthernet5/2
Internet  192.168.168.1          -   000f.24c0.f080  ARPA   GigabitEthernet2/15
Internet  192.168.168.2        195   000e.d631.8800  ARPA   GigabitEthernet2/15
Internet  192.168.168.13         -   000f.24c0.f080  ARPA   GigabitEthernet2/16
Internet  192.168.168.14       164   000c.cfbe.f100  ARPA   GigabitEthernet2/16
```

# show class-map

The **show class-map** command displays class map information. The syntax is

**show class-map** *class_name*

where

*class_name* = Name of the class map.

The following displays the class map defined on the switch Headend.

```
Headend# show class-map

 Class Map match-all class_video_high (id 1)
   Match access-group name acl_video_high
 Class Map match-all class_VoIP (id 2)
   Match access-group name acl_VoIP
 Class Map match-any class-default (id 0)
   Match any
 Class Map match-all class_high_speed_data (id 3)
   Match access-group name acl_high_speed_data
 Class Map match-all class_VoD_OOB (id 4)
   Match access-group name acl_VoD_OOB
 Class Map match-all class_video_low (id 5)
   Match access-group name acl_video_low
```

# show interfaces

The **show interfaces** command displays a summary of IP information and status for an interface. The syntax is

**show interfaces** [*type number*]

where

*type* = (Optional) Interface type. For this example, values for type include **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **loopback**, **port-channel**, **vlan**, and **tunnel**.

*number* = (Optional) Port number on the selected interface.

The **show interfaces** command, without a specific interface as an option, retrieves information from every interface. Below are the counters that are relevant to troubleshooting:

- *input errors*—This is a count of any errors that occurred while the switch is trying to receive packets from the referenced port. The counter includes both cyclic redundancy check (**CRC**) and **frame errors**, but does not include ignored packets. CRC errors occur when the received packets fail the CRC. Frame errors occur when the receiving frame is not complete. The **ignored** counter counts the number of frames dropped on input because of resource exhaustion in the switch fabric. **Overruns** occur when interframe gaps (IFGs) are so short that a new Ethernet frame arrives before the previous frame has been completely stored in shared memory.
- *output errors*—This is a count of any errors that occurred while the switch is trying to transmit packets from the referenced port. **Collisions** shows the number of times a collision occurred while the switch is trying to transmit a packet from the referenced port. This counter should be 0 for a port operating in full-duplex mode. The **interface resets** counter counts the number of times the port resets itself, generally the result of link-up or link-down transitions. **Underruns** occur when packets are not retrieved quickly enough from shared memory to be transmitted.

- *babbles* and *late collisions*—A **babble** is an error caused by the transmission of frames in excess of 1518 bytes in size. A **late collision** is a collision that occurs outside of the collision window, which is typically caused by a duplex mismatch or a wire length that exceeds the distance limitations (100 meters for 10/100BASE-T ports). The **deferred** counter tabulates the number of times the port had to wait to transmit as a result of traffic on the wire.
- *lost carrier* and *no carrier*—The carrier is an electrical signal that Ethernet devices use to detect whether the wire is currently being used by another transmitting station. The **lost carrier** counter increases each time a carrier sense loss occurs. This happens when the hardware is transmitting a frame onto the wire and does not see its own carrier wave on the Ethernet. The absence of the carrier signal increments the **no carrier** counter.

The following forms of the **show interfaces** command can provide a great deal of information of assistance in troubleshooting Cisco 7609 and Cisco Catalyst 6500 series switches. The examples below show nominal values for a **show interfaces** command on a headend switch for the following interfaces.

The following shows the VoD ingress port GigabitEthernet 3/38 on Headend.

```
Headend# show interfaces GigabitEthernet 3/38

GigabitEthernet3/38 is up, line protocol is up (connected)
  Hardware is C6k 1000Mb 802.3, address is 000e.8400.2305 (bia 000e.8400.2305)
  Description: BDL7: SeaChange VoD server ingress (ITVDemo1)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 78/255
  Encapsulation ARPA, loopback not set
  Full-duplex, 1000Mb/s
  input flow-control is off, output flow-control is on
  Clock mode is auto
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 00:08:46
  Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  30 second input rate 308167000 bits/sec, 28283 packets/sec
  30 second output rate 0 bits/sec, 0 packets/sec
     14704804 packets input, 20027945772 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     231 packets output, 16093 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

The following shows the 10-GE optical transport link on Headend. The destination is DHub_Sw_A.

```
Headend# show interfaces TenGigabitEthernet 7/1

TenGigabitEthernet7/1 is up, line protocol is up (connected)
  Hardware is C6k 10000Mb 802.3, address is 000e.834a.2160 (bia 000e.834a.2160)
  Description: UDL1: Video traffic to DHub_Sw_A (TenGig1/1)
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 6/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Full-duplex, 10Gb/s
  input flow-control is off, output flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:24, output hang never
  Last clearing of "show interface" counters 00:10:10
  Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0
```

```
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  30 second input rate 0 bits/sec, 0 packets/sec
  30 second output rate 240000000 bits/sec, 21962 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     13394906 packets output, 18297351799 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

The following shows the VoD ingress VLAN on Headend.

```
Headend# show interfaces vlan 50

Vlan50 is up, line protocol is up
  Hardware is EtherSVI, address is 000f.24c0.f080 (bia 000f.24c0.f080)
  Description: VoD servers
  Internet address is 192.168.50.2/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 67/255
  Encapsulation ARPA, loopback not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:17:51, output 00:00:02, output hang never
  Last clearing of "show interface" counters 00:11:13
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  30 second input rate 262858000 bits/sec, 24123 packets/sec
  30 second output rate 0 bits/sec, 0 packets/sec
  L2 Switched: ucast: 0 pkt, 0 bytes - mcast: 0 pkt, 0 bytes
  L3 in Switched: ucast: 14871348 pkt, 20254775976 bytes - mcast: 0 pkt, 0 bytes

mcast
  L3 out Switched: ucast: 0 pkt, 0 bytes mcast: 0 pkt, 0 bytes
     14985714 packets input, 20409197752 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     299 packets output, 20821 bytes, 0 underruns
     0 output errors, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

# show ip arp vrf

The **show ip arp vrf** command displays the ARP table for all ARP entries related to the Video VRF. The syntax is

**show ip arp** [**vrf** *vrf_name*]

where

*vrf_name* = Name of the VRF routing table.

The following displays the ARP table for the switch Headend.

```
Headend# show ip arp vrf Video

Protocol Address Age (min) Hardware Addr Type Interface
```

```
Internet 192.168.50.111 150 000b.dbe7.4e9c ARPA Vlan50
Internet 192.168.50.2 - 000f.24c0.f080 ARPA Vlan50
Internet 192.168.50.1 - 0000.0c07.ac32 ARPA Vlan50
Internet 192.168.169.1 - 000f.24c0.f080 ARPA Vlan1690
Internet 192.168.169.2 198 000e.d631.8800 ARPA Vlan1690 pv 1022
Internet 192.168.169.9 - 000f.24c0.f080 ARPA TenGigabitEthernet7/3
Internet 192.168.169.10 201 000c.cfbe.f100 ARPA TenGigabitEthernet7/3
```

# show ip route

The **show ip route** command displays the global IP routing table. The following displays the global IP routing table for the switch Headend.

```
Headend# show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

O    192.168.166.0/24 [110/3] via 192.168.168.2, 1w6d, GigabitEthernet2/15
                      [110/3] via 192.168.168.14, 1w6d, GigabitEthernet2/16

O    192.168.164.0/24 [110/3] via 192.168.168.2, 1w6d, GigabitEthernet2/15
                      [110/3] via 192.168.168.14, 1w6d, GigabitEthernet2/16
O    192.168.165.0/24 [110/2] via 192.168.168.14, 1w6d, GigabitEthernet2/16
C    192.168.65.0/24 is directly connected, Vlan65
C    192.168.66.0/24 is directly connected, Vlan66
     10.0.0.0/32 is subnetted, 1 subnets
C       10.10.10.10 is directly connected, Loopback1
C    192.168.67.0/24 is directly connected, Vlan67
     11.0.0.0/32 is subnetted, 1 subnets
O       11.11.11.11 [110/2] via 192.168.168.2, 1w6d, GigabitEthernet2/15
     12.0.0.0/32 is subnetted, 1 subnets
O       12.12.12.12 [110/2] via 192.168.168.2, 1w6d, GigabitEthernet2/15
     13.0.0.0/32 is subnetted, 1 subnets
O       13.13.13.13 [110/3] via 192.168.168.2, 1w6d, GigabitEthernet2/15
                    [110/3] via 192.168.168.14, 1w6d, GigabitEthernet2/16
     192.168.168.0/30 is subnetted, 6 subnets
C       192.168.168.0 is directly connected, GigabitEthernet2/15
O       192.168.168.4 [110/2] via 192.168.168.2, 1w6d, GigabitEthernet2/15
O       192.168.168.8 [110/2] via 192.168.168.14, 1w6d, GigabitEthernet2/16
C       192.168.168.12 is directly connected, GigabitEthernet2/16
O       192.168.168.16 [110/2] via 192.168.168.2, 1w6d, GigabitEthernet2/15
O       192.168.168.20 [110/3] via 192.168.168.2, 1w6d, GigabitEthernet2/15
                       [110/3] via 192.168.168.14, 1w6d, GigabitEthernet2/16
     14.0.0.0/32 is subnetted, 1 subnets
C       14.14.14.14 is directly connected, Loopback3
     15.0.0.0/32 is subnetted, 1 subnets
O       15.15.15.15 [110/2] via 192.168.168.14, 1w6d, GigabitEthernet2/16
```

# show ip route vrf

The **show ip route vrf** command displays the Video VRF IP routing table. The syntax is

**show ip route** [**vrf** *vrf_name*]

where

*vrf_name* = Name of the VRF routing table.

The following displays the Video VRF IP routing table for the switch Headend.

```
Headend# show ip route vrf Video

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     192.168.162.0/29 is subnetted, 1 subnets
O       192.168.162.0
           [110/2] via 192.168.169.10, 00:00:19, TenGigabitEthernet7/3
     192.168.160.0/24 is variably subnetted, 2 subnets, 2 masks
O       192.168.160.0/28 [110/2] via 192.168.169.2, 00:00:19, Vlan1690
O       192.168.160.16/30 [110/2] via 192.168.169.2, 00:00:19, Vlan1690
     192.168.161.0/28 is subnetted, 1 subnets
O       192.168.161.0 [110/3] via 192.168.169.2, 00:00:19, Vlan1690
C    192.168.50.0/24 is directly connected, Vlan50
     192.168.169.0/30 is subnetted, 3 subnets
C       192.168.169.0 is directly connected, Vlan1690
O       192.168.169.4 [110/2] via 192.168.169.2, 00:00:20, Vlan1690
C       192.168.169.8 is directly connected, TenGigabitEthernet7/3
```

# show ip vrf

The **show ip vrf** command lists a summary of defined Virtual Private Network (VPN) routing/forwarding instances (VRFs) and associated interfaces. The syntax is

**show ip vrf** [**brief** | **detail** | **interfaces** | **id**] [*vrf-name*]

where

**brief** = (Optional) Displays concise information on the VRFs and associated interfaces.

**detail** = (Optional) Displays detailed information on the VRFs and associated interfaces.

**interfaces** = (Optional) Displays detailed information about all interfaces bound to a particular VRF or any VRF.

**id** = (Optional) Displays the VPN IDs that are configured in a PE router for different VPNs.

*vrf-name* = (Optional) Name assigned to a VRF.

The following displays summary information about the VRF and interfaces associated with the VRF.

```
Headend# show ip vrf

  Name                             Default RD          Interfaces
  Video                            1000:1              Vlan50
                                                       Vlan1690
                                                       TenGigabitEthernet7/3
                                                       Tunnel1
                                                       Tunnel3
```

The following displays detailed information about all interfaces bound to a particular VRF or any VRF.

```
Headend# show ip vrf interfaces

Interface              IP-Address      VRF                              Protocol
Vlan50                 192.168.50.2    Video                            up
Vlan1690               192.168.169.1   Video                            up
TenGigabitEthernet7/3  192.168.169.9   Video                            up
Tunnel1                unassigned      Video                            up
Tunnel3                unassigned      Video                            up
```

# show mls qos

The **show mls qos** command displays the QoS information. The syntax is

**show mls qos** [{**ip** | **mac** | **maps**} [*interface-number*]

where

**ip** = (Optional) Displays IP status information.

**mac** = (Optional) Displays MAC address-based QoS status information.

**maps** = (Optional) Displays QoS mapping information.

*interface-number* = Number of the interface.

The following displays a summary status of QoS on the switch Headend.

```
Headend# show mls qos

  QoS is enabled globally
  Microflow policing is enabled globally
  QoS ip packet dscp rewrite enabled globally

  Qos trust state is DSCP on the following interfaces:
    Gi2/15 Gi2/16
  Vlan or Portchannel(Multi-Earl) policies supported: Yes
  Egress policies supported: Yes

 ----- Module [1] -----
  QoS global counters:
    Total packets: 0
    IP shortcut packets: 0
    Packets dropped by policing: 0
    IP packets with TOS changed by policing: 0
    IP packets with COS changed by policing: 0
    Non-IP packets with COS changed by policing: 0
    MPLS packets with EXP changed by policing: 0

 ----- Module [2] -----
  QoS global counters:
```

```
    Total packets: 38
    IP shortcut packets: 0
    Packets dropped by policing: 0
    IP packets with TOS changed by policing: 0
    IP packets with COS changed by policing: 38
    Non-IP packets with COS changed by policing: 0
    MPLS packets with EXP changed by policing: 0

 ----- Module [5] -----
  QoS global counters:
    Total packets: 1304497
    IP shortcut packets: 0
    Packets dropped by policing: 0
    IP packets with TOS changed by policing: 1304356
    IP packets with COS changed by policing: 1304354
    Non-IP packets with COS changed by policing: 0
    MPLS packets with EXP changed by policing: 0

 ----- Module [7] -----
  QoS global counters:
    Total packets: 0
    IP shortcut packets: 0
    Packets dropped by policing: 0
    IP packets with TOS changed by policing: 0
    IP packets with COS changed by policing: 0
    Non-IP packets with COS changed by policing: 0
    MPLS packets with EXP changed by policing: 0
```

The following displays the status of QoS on the VoD ingress interface (GigabitEthernet 3/38) on the switch Headend.

```
Headend# show mls qos ip GigabitEthernet 3/38

   [In] Policy map is setDSCP   [Out] Default.
 QoS Summary [IP]:      (* - shared aggregates, Mod - switch module)

      Int Mod Dir  Class-map DSCP  Agg  Trust Fl   AgForward-By   AgPoliced-By
                                   Id         Id
-------------------------------------------------------------------------------
    Gi3/38  5  In class_vide   32   16     No  0    36965569386              0
    Gi3/38  5  In class_vide   34   22     No  0    36965572110              0
    Gi3/38  5  In class_VoIP   46   23     No  0              0              0
    Gi3/38  5  In class_VoD_   24   24     No  0              0              0
    Gi3/38  5  In class_high    0   25     No  0              0              0
```

The following displays the DSCP-to-CoS mapping on Headend.

```
Headend# show mls qos maps dscp-cos

   Dscp-cos map:                                (dscp= d1d2)
     d1 :  d2 0  1  2  3  4  5  6  7  8  9
     ---------------------------------------
      0 :    00 00 00 00 00 00 00 00 01 01
      1 :    01 01 01 01 01 01 02 02 02 02
      2 :    02 02 02 02 03 03 03 03 03 03
      3 :    03 03 05 04 04 04 04 04 04 04
      4 :    05 05 05 05 05 05 05 05 06 06
      5 :    06 06 06 06 06 06 07 07 07 07
      6 :    07 07 07 07
```

# show policy-map

The **show policy-map** command displays the packet statistics of all classes that are configured for all service policies either on the switch or on a specified interface. The syntax is

**show policy-map** [**interface** *interface-name* [**input** | **output**]]

where

*interface-name* = Name of the interface or subinterface whose policy configuration is to be displayed.

**input** = (Optional) Displays statistics for the attached input policy.

**output** = (Optional) Displays statistics for the attached output policy.

The following displays the policy-map for the VoD ingress interface (GigabitEthernet 3/38) on the switch Headend.

```
Headend# show policy-map interface GigabitEthernet 3/38

 GigabitEthernet3/38

  Service-policy input: setDSCP

    class-map: class_video_high (match-all)
      Match: access-group name acl_video_high
      set dscp 32:
      Earl in slot 5 :
        63643922502 bytes
        30 second offered rate 154240528 bps
        aggregate-forwarded 63643922502 bytes

    class-map: class_video_low (match-all)
      Match: access-group name acl_video_low
      set dscp 34:
      Earl in slot 5 :
        63643921140 bytes
        30 second offered rate 154240400 bps
        aggregate-forwarded 63643921140 bytes

    class-map: class_VoIP (match-all)
      Match: access-group name acl_VoIP
      set dscp 46:
      Earl in slot 5 :
        0 bytes
        30 second offered rate 0 bps
        aggregate-forwarded 0 bytes

    class-map: class_VoD_OOB (match-all)
      Match: access-group name acl_VoD_OOB
      set dscp 24:
      Earl in slot 5 :
        0 bytes
        30 second offered rate 0 bps
        aggregate-forwarded 0 bytes
```

```
    class-map: class_high_speed_data (match-all)
      Match: access-group name acl_high_speed_data
      set dscp 0:
      Earl in slot 5 :
        0 bytes
        30 second offered rate 0 bps
        aggregate-forwarded 0 bytes
```

# show queueing interface

The **show queueing interface** command displays the queueing statistics of an interface. The syntax is

**show queueing interface** *interface-number*

where

*interface-number* = Number of the interface.

The following displays queueing information for the 10-GE transport interface on the switch Headend.

**Note** When this capture was taken, there was approximately 9.9 Gbps of data being transmitted out the interface. From the second to the last table in the output, you can see that low-priority video traffic in Tx Queue 3 has experienced dropped packets, while the high-priority video traffic in Tx Queue 8 has not experienced any dropped packets.

```
Headend# show queueing interface TenGigabitEthernet 7/1

Interface TenGigabitEthernet7/1 queueing strategy:  Weighted Round-Robin
  Port QoS is enabled
  Port is untrusted
  Extend trust state: not trusted [COS = 0]
  Default COS is 0
    Queueing Mode In Tx direction: mode-cos
    Transmit queues [type = 1p7q8t]:
    Queue Id    Scheduling  Num of thresholds
    -----------------------------------------
       01         WRR                 08
       02         WRR                 08
       03         WRR                 08
       04         WRR                 08
       05         WRR                 08
       06         WRR                 08
       07         WRR                 08
       08         Priority            01

<---output omitted--->

Packets dropped on Transmit:

    queue     dropped  [cos-map]
    ---------------------------------------------
    1               0  [0 1 ]
    2          377679  [2 3 4 ]
    3               0  [6 7 ]
    4               0  []
    5               0  []
    6               0  []
    7               0  []
```

```
  8               0  [5 ]

Packets dropped on Receive:

  queue     dropped  [cos-map]
  ---------------------------------------------
  1               0  [0 1 2 3 4 5 6 7 ]
  2               0  []
  3               0  []
  4               0  []
  5               0  []
  6               0  []
  7               0  []
  8               0  []
```

## show standby

When using HSRP on an interface or VLAN, the virtual IP address and virtual MAC address are not shown in the running configuration. The **show standby** command can be used to verify this information. The syntax is

**show standby** [*interface-number*]

where

*interface-number* = Number of the interface.

The following displays the HSRP for the VoD ingress VLAN 50.

```
Headend# show standby vlan 50

Vlan50 - Group 50
  Local state is Active, priority 100
  Hellotime 3 sec, holdtime 10 sec
  Next hello sent in 0.658
  Virtual IP address is 192.168.50.1 configured
  Active router is local
  Standby router is unknown
  Virtual mac address is 0000.0c07.ac32
  2 state changes, last state change 3w6d
  IP redundancy name is "hsrp-Vl50-50" (default)
```

# Using CLI Commands to Monitor the Cisco Catalyst 4500

This section addresses the followingCLI commands, presented in alphabetical order:

# show arp

The **show arp** command displays the ARP table for all ARP entries related to the global routing table.

The following displays the ARP table for the QAM switch QAM_Sw_A. The three entries are for the DHub_Sw_A side of the EtherChannel, VLAN 160 on QAM_Sw_A, and the Cisco uMG9850 in slot 4.

```
QAM_Sw_A# show arp

Protocol Address Age (min) Hardware Addr Type Interface
Internet 192.168.65.1 - 000f.24c0.f080 ARPA Vlan65
Internet 192.168.67.1 - 000f.24c0.f080 ARPA Vlan67
Internet 192.168.66.1 - 000f.24c0.f080 ARPA Vlan66
Internet 192.168.65.101 13 0010.9402.0818 ARPA Vlan65
Internet 192.168.65.100 79 0010.9402.0817 ARPA Vlan65
Internet 192.168.67.100 119 0000.0000.0016 ARPA Vlan67
Internet 192.168.168.1 - 000f.24c0.f080 ARPA GigabitEthernet2/15
Internet 192.168.168.2 195 000e.d631.8800 ARPA GigabitEthernet2/15
Internet 192.168.168.13 - 000f.24c0.f080 ARPA GigabitEthernet2/16
Internet 192.168.168.14 164 000c.cfbe.f100 ARPA GigabitEthernet2/16
```

# show interfaces

The **show interfaces** command here is similar in function to logging event link-status, page 5-2. It displays a summary of IP information and status for an interface. The syntax is

**show interfaces** [*type number*]

where

*type* = (Optional) Interface type. For this example, values for type include **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **loopback**, **port-channel**, **vlan**, and **tunnel**.

*number* = (Optional) Port number on the selected interface.

The following displays interface statistics for the EtherChannel coming into QAM_Sw_A from DHub_Sw_A.

```
QAM_Sw_A# show interfaces port-channel 1

Port-channel1 is up, line protocol is up (connected)
  Hardware is EtherChannel, address is 0008.e365.fc7a (bia 0008.e365.fc7a)
  Description: Video traffic to/from DHub_Sw_A (Gig3/6,Gig3/7)
  MTU 1500 bytes, BW 2000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 10/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s, media type is unknown media type
  input flow-control is off, output flow-control is unsupported
  Members in this channel: Gi3/1 Gi4/14
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 01:16:41
  Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  30 second input rate 79138000 bits/sec, 7263 packets/sec
  30 second output rate 0 bits/sec, 0 packets/sec
     33522516 packets input, 45653971005 bytes, 0 no buffer
     Received 2889 broadcasts (635 multicast)
0 runts, 0 giants, 0 throttles
```

```
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 input packets with dribble condition detected
     3080 packets output, 272967 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

## show mac-address-table

The **show mac-address-table** command displays the MAC address table.

The following displays the MAC address table for the QAM switch QAM_Sw_A. The static type entries are for interfaces on the switch, and the dynamic type entries are for learned MAC addresses. The three learned MAC addresses are for the DHub_Sw_A side of the EtherChannel and the two Cisco uMG9850s.

```
QAM_Sw_A# show mac-address-table

Unicast Entries

 vlan   mac address     type        protocols               port
-------+---------------+--------+---------------------+--------------------
 160    000c.8523.74bf    static ip,ipx,assigned,other  Switch
 160    0005.9a3f.53ff   dynamic ip                     GigabitEthernet4/17
 160    000e.d631.8800   dynamic ip,assigned            Port-channel1
 160    000f.3449.af44   dynamic ip                     GigabitEthernet7/17

Multicast Entries

 vlan    mac address     type    ports
-------+---------------+-------+-----------------------------------------
   1    ffff.ffff.ffff   system Gi4/16,Gi7/16
 160    ffff.ffff.ffff   system Switch,Gi4/17,Gi7/17,Po1
```

# Using CLI Commands to Monitor and Troubleshoot the Cisco uMG9820

For these commands, see Chapter 5, “Troubleshooting,” in *Cisco uMG9820 QAM Gateway Installation and Configuration Guide* at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/cable/vod/umg9820/index.htm

# Using CLI Commands to Monitor and Troubleshoot the Cisco uMG9850

For these commands, see “Monitoring and Troubleshooting” in *Configuring the Cisco uMG9850 QAM Module for Cisco IOS Release 12.1(20)EU* at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/cable/vod/umg9850/index.htm