Extract Class Based QoS Details Applied Against Control Plane with SNMP

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Introduction

This document describes how to extract the various values related to Class Based Quality of Service (QoS) details (CISCO−CLASS−BASED−QOS−MIB) applied against Control Plane with Simple Network Management Protocol (SNMP).

Prerequisites

Extract Class Based QoS Details Applied Against Control Plane with SNMP

Requirements

- Net–SNMP or any similar command line based utility that runs on a UNIX based operating system that polls SNMP Management Information Bases (MIBs) from a Cisco device. Net–SNMP is a 3rd Party Open Source utility available for download here.
- Ensure Control Plane Policing (CoPP) is configured.

Components Used

The information in this document is based on these software and hardware versions:

- Cisco IOS® Software Release 12.0(3)T or later
- Cisco Catalyst 6500 Series Switch
- Cisco SNMP Object Navigator

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Procedure

1. Get ifindex (1.3.6.1.2.1.2.2.1.1) for the Control Plane as this example output shows:

```
show snmp mib ifmib ifindex | include Cont

Control Plane: Ifindex = 268
```

You can also achieve this with SNMP as this example shows:

```
UNIX #snmpwalk –v2c –c <community-name>  <ip address of device> | grep –i control plane

IF–MIB::ifDescr.268 = STRING: Control Plane
```

Note in this output that the ifIndex is *268*.

2. Get the cbQosIfindex (1.3.6.1.4.1.9.9.166.1.1.1.1.4 for the corresponding IfIndex in the router:

```
UNIX # snmpwalk –v 2c –c  <community-name>  <ip address of device>
 1.3.6.1.4.1.9.9.166.1.1.1.1.4 | grep –i 268

SNMPv2–SMI::enterprises.9.9.166.1.1.1.1.4.225 = INTEGER: 268
```

The cbQosPolicyIndex (1.3.6.1.4.1.9.9.166.1.1.1.1.1) is *225*.

3. cbQosCMName (1.3.6.1.4.1.9.9.166.1.7.1.1.1) is the MIB Object that retrieves the names of class–maps configured on the router. This results in the output of the various class–maps configured with their indices..For example, cbQosConfigIndex (1.3.6.1.4.1.9.9.166.1.5.1.1.2).

```
UNIX #snmpwalk –v2c –c <community-name> <ip address of device>
    1.3.6.1.4.1.9.9.166.1.7.1.1.1
```

Example

```
UNIX # snmpwalk -v2c -c <community-name> <ip address of device>
        1.3.6.1.4.1.9.9.166.1.7.1.1.1 | egrep -i "copp|class"
```

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.1593 = STRING: "class-default"

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.**274033342** = STRING: "CoPP-IMPORTANT"

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.280880137 = STRING: "CoPP-Match-all"

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.321645237 = STRING: "CoPP-NORMAL"

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.347132543 = STRING: "CoPP-CRITICAL2"

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.373457077 = STRING: "CoPP-BAD"

SNMPv2-SMI::enterprises.9.9.166.1.7.1.1.1.383240351 = STRING: "CoPP-CRITICAL"

Note the highlighted value of *274033342* which is the cbQosConfigIndex.

4. Use cbQosConfigIndex in order to fetch the cbQosPolicyIndex (1.3.6.1.4.1.9.9.166.1.1.1.1.1) and cbQosObjectsIndex (1.3.6.1.4.1.9.9.166.1.5.1.1.1) for the particular class−map. The example in this step shows how to monitor class−map CoPP−IMPORTANT:

```
UNIX #snmpwalk -v2c -c <community-name> <ip address of device>
        1.3.6.1.4.1.9.9.166.1.5.1.1.2
```

Get the OID (Object Identifier) output by searching *274033342* (highlighted value taken from Step 3) in this output:

```
UNIX #snmpwalk -v2c -c <community-name> <ip address of device>
        1.3.6.1.4.1.9.9.166.1.5.1.1.2
```

Example

```
UNIX# snmpwalk -v2c -c <community-name>  <ip address of device>
1.3.6.1.4.1.9.9.166.1.5.1.1.2 | grep -i 'Gauge32: 274033342'
```

SNMPv2-SMI::enterprises.9.9.166.1.5.1.1.2.**225.131072** = Gauge32: ***274033342 <<<< Match these***

cbQosConfigIndex is *274033342,* cbQosPolicyIndex is *225* and cbQosObjectsIndex is *131072.*

Now we have various options in order to poll the specific data from the Policy−map:

+−− −R−− Counter   cbQosCMPrePolicyPktOverflow(1)

+−− −R−− Counter   cbQosCMPrePolicyPkt(2)

+−− −R−− Counter64 cbQosCMPrePolicyPkt64(3)

+−− −R−− Counter   cbQosCMPrePolicyByteOverflow(4)

+−− −R−− Counter   cbQosCMPrePolicyByte(5)

+−− −R−− Counter64 cbQosCMPrePolicyByte64(6)

+−− −R−− Gauge   cbQosCMPrePolicyBitRate(7)

+−− −R−− Counter   cbQosCMPostPolicyByteOverflow(8)

+-- –R–– Counter   cbQosCMPostPolicyByte(9)

+-- –R–– Counter64 cbQosCMPostPolicyByte64(10)

+-- –R–– Gauge   cbQosCMPostPolicyBitRate(11)

+-- –R–– Counter   cbQosCMDropPktOverflow(12)

+-- –R–– Counter   cbQosCMDropPkt(13)

+-- –R–– Counter64 cbQosCMDropPkt64(14)

+-- –R–– Counter   cbQosCMDropByteOverflow(15)

+-- –R–– Counter   cbQosCMDropByte(16)

+-- –R–– Counter64 cbQosCMDropByte64(17)

+-- –R–– Gauge   cbQosCMDropBitRate(18)

+-- –R–– Counter   cbQosCMNoBufDropPktOverflow(19)

–– –R–– Counter   cbQosCMNoBufDropPkt(20)

–– –R–– Counter64 cbQosCMNoBufDropPkt64(21)

For example, cbQosCMPostPolicyBitRate (1.3.6.1.4.1.9.9.166.1.15.1.1.11) is an object that polls "The bit rate of the traffic after executing QoS policies".

```
UNIX #snmpwalk –v2c –c <community-name><ip address of device>
      1.3.6.1.4.1.9.9.166.1.15.1.1.11.225.131072
```

```
SNMPv2–SMI::enterprises.9.9.166.1.15.1.1.11.225.131072 = Gauge32: 12000
!--- Match this from the output taken from the router for verification.
```

This *show policy–map control–plane input class CoPP–IMPORTANT* command output shows excerpts from the router in order to match values from snmpwalk and router counters:

```
Router # show policy-map control-plane input class CoPP-IMPORTANT


            Control Plane

                          Service-policy input: CoPP

                          Hardware Counters:


                            class-map: CoPP-IMPORTANT (match-all)

                  Match: access-group 121

                  police :

                    10000000 bps 312000 limit 312000 extended limit

                  Earl in slot 1 :

                    2881610867 bytes
```

```
                5 minute offered rate 13072 bps

                aggregate-forwarded 2881610867 bytes action: transmit

                exceeded 0 bytes action: drop

                aggregate-forward 13248 bps exceed 0 bps

            Earl in slot 2 :

                0 bytes

                5 minute offered rate 0 bps

                aggregate-forwarded 0 bytes action: transmit

                exceeded 0 bytes action: drop

                aggregate-forward 0 bps exceed 0 bps

            Earl in slot 3 :

                0 bytes

                5 minute offered rate 0 bps

                aggregate-forwarded 0 bytes action: transmit

                exceeded 0 bytes action: drop

                aggregate-forward 0 bps exceed 0 bps

            Earl in slot 5 :

                0 bytes

                5 minute offered rate 0 bps

                aggregate-forwarded 0 bytes action: transmit

                exceeded 0 bytes action: drop

                aggregate-forward 0 bps exceed 0 bps

                    Software Counters:

                      Class-map: CoPP-IMPORTANT (match-all)

16197981 packets, 3101873552 bytes

5 minute offered rate 12000 bps, drop rate 0000 bps

Match: access-group 121

police:

    cir 10000000 bps, bc 312500 bytes, be 312500 bytes

    conformed 16198013 packets, 3101878887 bytes; actions:

    transmit

    exceeded 0 packets, 0 bytes; actions:
```

```
        drop

    violated 0 packets, 0 bytes; actions:

    drop

  conformed 12000 bps, exceed 0000 bps, violate 0000 bps
```

Also use this procedure in order to find out/confirm the required OID for polling.

Additional Information

You can use SNMP in order to retrieve these counters in relation to platform(s):

- 6500 – CoPP hardware counters
- 7600 – CoPP software counters

If you try to get the counters the other way around (hardware counters in place of software counters and vice versa) via SNMP for respective platforms as mentioned, it is not possible. This is because the respective codes are designed this way and understand that you might need to use CLI only in order to get the counters and there is no alternative.

Related Information

- *Control Plane Policing Implementation Best Practices*
- *Cisco 7600 Series Router MIB Specifications Guide*
- *Configuring Denial of Service Protection*
- *Monitor CoPP*
- *Technical Support & Documentation – Cisco Systems*