

Per ACE QoS Statistics

The Per ACE QoS Statistics feature extends the QoS Packet Matching Statistics feature to allow you to track the number of packets and bytes matching individual access control elements (ACEs) used in a filter. The filter is part of the class-map definition of a quality of service (QoS) policy-map.

You can use the **show access-lists** command to display per-ACE statistics.

See the "QoS Packet Matching Statistics" module for information on defining a QoS packet filter and displaying the number of packets and bytes matching that filter.

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Prerequisites for Per ACE QoS Statistics

Before you configure the **platform qos match-statistics per-ace** command to enable QoS per-ACE packet-matching statistics, you must configure the **platform qos match-statistics per-filter** command to enable QoS per-filter packet-matching statistics. If you do not, the CLI rejects the command and displays an error message.

Restrictions for Per ACE QoS Statistics

If a QoS policy-map is attached to the device when you configure the **platform qos match-statistics per-ace** command, the command does not take effect until you reload the device.

Enabling the Per ACE QoS Statistics feature may increase CPU utilization on a scaled configuration. Before you enable it, you should weigh the benefits of the statistics information against the increased CPU utilization on the system.

Note You must configure the **platform qos match-statistics per-filter** command before you configure the **platform qos match-statistics per-ace** command.

Information About Per ACE QoS Statistics

Per ACE QoS Statistics Overview

The Per ACE QoS Statistics feature provides hit counters for ACEs used in QoS policies. When enabled, the feature adds QoS hit counters for any ACEs used in a QoS policy to the existing security access-list counters for that ACE. You can use the **show ip access-lists** command to display the access-list counters, as shown in this example:

```
Device# show ip access-lists

Extended IP access list A1
10 permit ip 10.1.1.0 0.0.0.255 any (129580275 matches)
Extended IP access list A6and7
10 permit ip 10.1.6.0 0.0.0.255 any (341426749 matches)
20 permit ip 10.1.7.0 0.0.0.255 any (398245767 matches)
Extended IP access list source
10 permit ip any host 10.1.1.5 (16147976 matches)
```

The QoS hit counters (for ACEs used in QoS policies) will be added to the counters shown in the sample output.

Note the following conditions when you enable the Per ACE QoS Statistics feature:

- The **show ip access-lists** command does not display interface information. This means that access-list counts are not interface-specific; they are aggregate counters of all hits for all features that use the ACEs and support the counts across all interfaces and directions.
- You can use the **show policy-map interface** command to display interface-specific counts if QoS per-filter packet matching statistics is enabled. However, this command displays only counts per-filter [access-control list (ACL) or access-group], not counts per-ACE, as shown in this example:

  ```
  Device# show policy-map interface GigabitEthernet0/0/2

   GigabitEthernet0/0/2

    Service-policy input: test-match-types

      Class-map: A1orA2-class (match-any)
        482103366 packets, 59780817384 bytes
        5 minute offered rate 6702000 bps
        Match: access-group name A1
          62125633 packets, 7703578368 bytes
          5 minute rate 837000 bps
        Match: access-group name A2
          419977732 packets, 52077238892 bytes
          5 minute rate 5865000 bps
  ```

- If an ACE is present in a QoS filter (that is, a match statement within a class map) but the packet does not match the ACE, the ACE counter is not incremented for that packet. This can happen in the following circumstances:
  - The ACE is used in a “deny” statement.
  - Other matching criteria in a “match-all” class-map definition (for example, “match ip prec 1”) prevent the packet from matching the class.

- Other matching criteria in a “match-any” class-map definition (for example, “match ip prec 1”) match the packet and prevent it from matching the ACE match criteria (that filter precedes the ACE filter and the packet matches both statements).

- Access-list counts are an aggregate, for a particular ACE, of the hit counts for all features that use that ACE and support per-ACE counts. This means that a single packet might hit, and be counted by, multiple features using the same ACE, and, therefore, result in multiple counts for the same packet as it traverses each feature.

  The following example shows these multiple counts. Only 1,000 packets were received on the interface but the access-list counts show 2,000 hits, 1,000 for the security access list and 1,000 for the QoS service policy.

```
Device(config)# ip access-list extended A1
permit ip 32.1.1.0 0.0.0.255 any
class-map match-all A1-class
match access-group name A1
interface GigabitEthernet0/0/2
ip address 10.0.0.1 240.0.0.0
ip access-group A1 in
duplex auto
speed auto
media-type rj45
no negotiation auto
service-policy input simple
end

Device# show access-lists

Extended IP access list A1
10 permit ip 10.1.1.0 0.0.0.255 any (2000 matches)

Device# show policy-map interface GigabitEthernet0/0/2

Service-policy input: simple
Class-map: A1-class (match-all)
1000 packets, 124000 bytes
5 minute offered rate 4000 bps
Match: access-group name A1
Class-map: class-default (match-any)
0 packets, 0 bytes
5 minute offered rate 261000 bps, drop rate 0 bps
Match: any
```

How to Configure Per ACE QoS Statistics

Configuring Per ACE QoS Statistics

Before you begin

The **platform qos match-statistics per-filter** command must be configured to enable QoS per-filter packet-matching statistics. You can use the **show platform hardware qfp active feature qos config global** command to verify the status of packet-matching statistics.

```
Device# show platform hardware qfp active feature qos config global

Marker statistics are: disabled
Match per-filter statistics are: enabled <<<<<<<
Match per-ace statistics are: disabled <<<<<<
Performance-Monitor statistics are: disabled
```

SUMMARY STEPS

1. **platform qos match-statistics per-filter**
2. **platform qos match-statistics per-ace**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**platform qos match-statistics per-filter** **Example:** `Device(config)# platform qos match-statistics per-filter`	Enables QoS packet-matching statistics for individual filters in a class map.
Step 2	**platform qos match-statistics per-ace** **Example:** `Device(config)# platform qos match-statistics per-ace`	Enables QoS packet-matching statistics for ACEs used in QoS filters.

Additional References for Per ACE QoS Statistics

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Command List, All Releases*
QoS commands	*Cisco IOS Quality of Service Solutions Command Reference*
Defining a QoS packet filter and displaying the number of packets and bytes matching it	"QoS Packet Matching Statistics"

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Per ACE QoS Statistics

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to https://cfnng.cisco.com/. An account on Cisco.com is not required.

Table 1: Feature Information for Per ACE QoS Statistics

Feature Name	Releases	Feature Information
Per ACE QoS Statistics	Cisco IOS XE Release 3.10S	Allows you to configure per ACE QoS statistics to track the number of packets and bytes matching individual ACEs used in a filter within a QoS service policy. The following command was introduced or modified: **platform qos match-statistics per-ace**.