



BGP Policy Accounting Output Interface Accounting

Border Gateway Protocol (BGP) policy accounting (PA) measures and classifies IP traffic that is sent to, or received from, different peers. Policy accounting was previously available on an input interface only. The BGP Policy Accounting Output Interface Accounting feature introduces several extensions to enable BGP PA on an output interface and to include accounting based on a source address for both input and output traffic on an interface. Counters based on parameters such as community list, autonomous system number, or autonomous system path are assigned to identify the IP traffic.

Feature History for BGP PA Output Interface Accounting

Release	Modification
12.0(9)S	This feature was introduced.
12.0(17)ST	This feature was integrated into Cisco IOS Release 12.0(17)ST.
12.0(22)S	Output interface accounting was added, and the bucket size was increased.
12.3(4)T	This feature was integrated into Cisco IOS Release 12.3(4)T.
12.2(25)S	This feature was integrated into Cisco IOS Release 12.2(25)S.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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Prerequisites for BGP PA Output Interface Accounting

Before using the BGP Policy Accounting Output Interface Accounting feature, you must enable BGP and Cisco Express Forwarding (CEF) or distributed CEF (dCEF) on the router.

Information About BGP PA Output Interface Accounting

To configure BGP PA output interface accounting, you should understand the following concepts:

- [BGP PA Output Interface Accounting, page 2](#)
- [Benefits of BGP PA Output Interface Accounting, page 3](#)

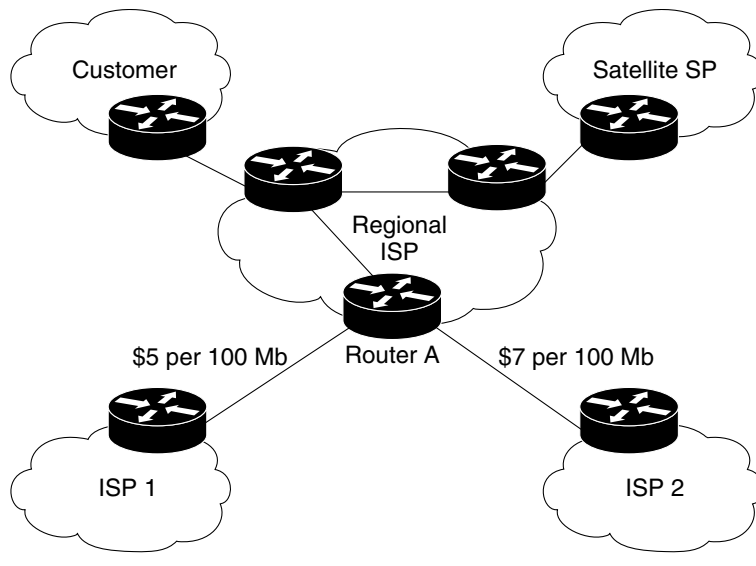
BGP PA Output Interface Accounting

Policy accounting using BGP measures and classifies IP traffic that is sent to, or received from, different peers. Originally, BGP PA was available on an input interface only. BGP PA output interface accounting introduces several extensions to enable BGP PA on an output interface and to include accounting based on a source address for both input and output traffic on an interface. Counters based on parameters such as community list, autonomous system number, or autonomous system path are assigned to identify the IP traffic.

Using the BGP **table-map** command, prefixes added to the routing table are classified by BGP attribute, autonomous system number, or autonomous system path. Packet and byte counters are incremented per input or output interface. A Cisco IOS policy-based classifier maps the traffic into one of eight possible buckets that represent different traffic classes.

Using BGP PA, you can account for traffic according to its origin or the route it traverses. Service providers (SPs) can identify and account for all traffic by customer and can bill accordingly. In [Figure 1](#), BGP PA can be implemented in Router A to measure packet and byte volumes in autonomous system buckets. Customers are billed appropriately for traffic that is routed from a domestic, international, or satellite source.

Figure 1 Sample Topology for BGP Policy Accounting



BGP policy accounting using autonomous system numbers can be used to improve the design of network circuit peering and transit agreements between Internet service providers (ISPs).

Benefits of BGP PA Output Interface Accounting

Accounting for IP Traffic Differentially

BGP policy accounting classifies IP traffic by autonomous system number, autonomous system path, or community list string, and increments packet and byte counters. Policy accounting can also be based on the source address. Service providers can account for traffic and apply billing according to the origin of the traffic or the route that specific traffic traverses.

Efficient Network Circuit Peering and Transit Agreement Design

Implementing BGP policy accounting on an edge router can highlight potential design improvements for peering and transit agreements.

How to Configure BGP PA Output Interface Accounting

This section contains the following tasks:

- [Specifying the Match Criteria for BGP PA, page 4](#) (required)
- [Classifying the IP Traffic and Enabling BGP PA, page 5](#) (required)
- [Verifying BGP Policy Accounting, page 7](#) (optional)

Specifying the Match Criteria for BGP PA

The first task in configuring BGP PA is to specify the criteria that must be matched. Community lists, autonomous system paths, or autonomous system numbers are examples of BGP attributes that can be specified and subsequently matched using a route map. Perform this task to specify the BGP attribute to use for BGP PA and to create the match criteria in a route map.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip community-list** {*standard-list-number* | *expanded-list-number* [*regular-expression*] | {**standard** | **expanded**} *community-list-name*} {**permit** | **deny**} {*community-number* | *regular-expression*}
4. **route-map** *map-name* [**permit** | **deny**] [*sequence-number*]
5. **match community-list** *community-list-number* [**exact**]
6. **set traffic-index** *bucket-number*
7. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	ip community-list { <i>standard-list-number</i> <i>expanded-list-number</i> [<i>regular-expression</i>] { standard expanded } <i>community-list-name</i> } { permit deny } { <i>community-number</i> <i>regular-expression</i> } Example: Router(config)# ip community-list 30 permit 100:190	Creates a community list for BGP and controls access to it. <ul style="list-style-type: none"> • Repeat this step for each community to be specified.

	Command or Action	Purpose
Step 4	<pre>route-map map-name [permit deny] [sequence-number]</pre> <p>Example: Router(config)# route-map set_bucket permit 10</p>	<p>Enters route-map configuration mode and defines the conditions for policy routing.</p> <ul style="list-style-type: none"> The <i>map-name</i> argument identifies a route map. The optional permit and deny keywords work with the match and set criteria to control how the packets are accounted for. The optional <i>sequence-number</i> argument indicates the position that a new route map is to have in the list of route maps already configured with the same name.
Step 5	<pre>match community-list community-list-number [exact]</pre> <p>Example: Router(config-route-map)# match community-list 30</p>	<p>Matches a BGP community.</p>
Step 6	<pre>set traffic-index bucket-number</pre> <p>Example: Router(config-route-map)# set traffic-index 2</p>	<p>Indicates where to output packets that pass a match clause of a route map for BGP policy accounting.</p>
Step 7	<pre>exit</pre> <p>Example: Router(config-route-map)# exit</p>	<p>Exits route-map configuration mode and returns to global configuration mode.</p>

Classifying the IP Traffic and Enabling BGP PA

After a route map has been defined to specify match criteria, you must configure a way to classify the IP traffic before enabling BGP policy accounting.

Using the **table-map** command, BGP classifies each prefix that it adds to the routing table according to the match criteria. When the **bgp-policy accounting** command is configured on an interface, BGP policy accounting is enabled.

Perform this task to classify the IP traffic and enable BGP policy accounting.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *as-number*
4. **table-map** *route-map-name*
5. **network** *network-number* [**mask** *network-mask*]
6. **neighbor** *ip-address* **remote-as** *as-number*
7. **exit**
8. **interface** *type number*

9. `ip address ip-address mask`
10. `bgp-policy accounting [input | output] [source]`
11. `exit`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><code>enable</code></p> <p>Example: Router> enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<p><code>configure terminal</code></p> <p>Example: Router# configure terminal</p>	<p>Enters global configuration mode.</p>
Step 3	<p><code>router bgp as-number</code></p> <p>Example: Router(config)# router bgp 65000</p>	<p>Configures a BGP routing process and enters router configuration mode for the specified routing process.</p> <ul style="list-style-type: none"> The <i>as-number</i> argument identifies a BGP autonomous system number.
Step 4	<p><code>table-map route-map-name</code></p> <p>Example: Router(config-router)# table-map set_bucket</p>	<p>Classifies BGP prefixes entered in the routing table.</p>
Step 5	<p><code>network network-number [mask network-mask]</code></p> <p>Example: Router(config-router)# network 10.15.1.0 mask 255.255.255.0</p>	<p>Specifies a network to be advertised by the BGP routing process.</p>
Step 6	<p><code>neighbor ip-address remote-as as-number</code></p> <p>Example: Router(config-router)# neighbor 10.14.1.1 remote-as 65100</p>	<p>Specifies a BGP peer by adding an entry to the BGP routing table.</p>
Step 7	<p><code>exit</code></p> <p>Example: Router(config-router)# exit</p>	<p>Exits router configuration mode and returns to global configuration mode.</p>
Step 8	<p><code>interface type number</code></p> <p>Example: Router(config)# interface POS 7/0</p>	<p>Specifies the interface type and number and enters interface configuration mode.</p> <ul style="list-style-type: none"> The <i>type</i> argument identifies the type of interface. The <i>number</i> argument identifies the slot and port numbers of the interface. The space between the interface type and number is optional.

	Command or Action	Purpose
Step 9	<p>ip address <i>ip-address mask</i></p> <p>Example: Router(config-if)# ip-address 10.15.1.2 255.255.255.0</p>	Configures the interface with an IP address.
Step 10	<p>bgp-policy accounting [input output] [source]</p> <p>Example: Router(config-if)# bgp-policy accounting input source</p>	<p>Enables BGP policy accounting for the interface.</p> <ul style="list-style-type: none"> Use the optional input or output keyword to account for traffic either entering or leaving the router. By default, BGP policy accounting is based on traffic entering the router. Use the optional source keyword to account for traffic based on source address.
Step 11	<p>exit</p> <p>Example: Router(config-if)# exit</p>	Exits interface configuration mode and returns to global configuration mode.

Verifying BGP Policy Accounting

Perform this task to verify that BGP policy accounting is operating.

SUMMARY STEPS

- show ip cef** [*network [mask]*] [**detail**]
- show ip bgp** [*network*] [*network-mask*] [**longer-prefixes**]
- show cef interface** [*type number*] **policy-statistics** [**input** | **output**]
- show cef interface** [*type number*] [**statistics**] [**detail**]

DETAILED STEPS

Step 1 **show ip cef** [*network [mask]*] [**detail**]

Enter the **show ip cef** command with the **detail** keyword to learn which accounting bucket is assigned to a specified prefix.

In this example, the output is displayed for the prefix 192.168.5.0. It shows that accounting bucket number 4 (traffic_index 4) is assigned to this prefix.

```
Router# show ip cef 192.168.5.0 detail

192.168.5.0/24, version 21, cached adjacency to POS7/2
0 packets, 0 bytes, traffic_index 4
  via 10.14.1.1, 0 dependencies, recursive
  next hop 10.14.1.1, POS7/2 via 10.14.1.0/30
  valid cached adjacency
```

Step 2 **show ip bgp** [*network*] [*network-mask*] [**longer-prefixes**]

Enter the **show ip bgp** command for the same prefix used in Step 1—192.168.5.0—to learn which community is assigned to this prefix.

In this example, the output is displayed for the prefix 192.168.5.0. It shows that the community of 100:197 is assigned to this prefix.

```
Router# show ip bgp 192.168.5.0
```

```
BGP routing table entry for 192.168.5.0/24, version 2
Paths: (1 available, best #1)
  Not advertised to any peer
  100
    10.14.1.1 from 10.14.1.1 (32.32.32.32)
      Origin IGP, metric 0, localpref 100, valid, external, best
      Community: 100:197
```

Step 3 show cef interface [type number] policy-statistics [input | output]

Enter the **show cef interface policy-statistics** command to display the per-interface traffic statistics.

In this example, the output shows the number of packets and bytes that have been assigned to each accounting bucket:

```
Router# show cef interface policy-statistics input
```

```
FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  BGP based Policy accounting on input is enabled
```

Index	Packets	Bytes
1	9999	999900
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	1234	123400
35	0	0
36	0	0
37	0	0

38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	1000	100000
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	5123	1198782
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0

Step 4 **show cef interface** [*type number*] [*statistics*] [*detail*]

Enter the **show cef interface EXEC** command to display the state of BGP policy accounting on a specified interface.

In this example, the output shows that BGP policy accounting has been configured to be based on input traffic at Fast Ethernet interface 1/0/0:

```
Router# show cef interface Fast Ethernet 1/0/0

FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  Internet address is 10.1.1.1/24
  ICMP redirects are always sent
  Per packet load-sharing is disabled
  IP unicast RPF check is disabled
  Inbound access list is not set
  Outbound access list is not set
  IP policy routing is disabled
  BGP based policy accounting on input is enabled
  BGP based policy accounting on output is disabled
  Hardware idb is FastEthernet1/0/0 (6)
  Software idb is FastEthernet1/0/0 (6)
  Fast switching type 1, interface type 18
  IP Distributed CEF switching enabled
  IP Feature Fast switching turbo vector
  IP Feature CEF switching turbo vector
  Input fast flags 0x100, Output fast flags 0x0, Flags 0x0
  ifindex 7(7)
  Slot 1 Slot unit 0 VC -1
  Transmit limit accumulator 0xE8001A82 (0xE8001A82)
  IP MTU 1500
```

Configuration Examples for BGP PA Output Interface Accounting

This section contains the following configuration examples:

- [Specifying the Match Criteria for BGP Policy Accounting: Example, page 10](#)
- [Classifying the IP Traffic and Enabling BGP Policy Accounting: Example, page 10](#)

Specifying the Match Criteria for BGP Policy Accounting: Example

In the following example, BGP communities are specified in community lists, and a route map named `set_bucket` is configured to match each of the community lists to a specific accounting bucket using the `set traffic-index` command:

```
ip community-list 30 permit 100:190
ip community-list 40 permit 100:198
ip community-list 50 permit 100:197
ip community-list 60 permit 100:296
!
route-map set_bucket permit 10
 match community-list 30
  set traffic-index 2
!
route-map set_bucket permit 20
 match community-list 40
  set traffic-index 3
!
route-map set_bucket permit 30
 match community-list 50
  set traffic-index 4
!
route-map set_bucket permit 40
 match community-list 60
  set traffic-index 5
```

Classifying the IP Traffic and Enabling BGP Policy Accounting: Example

In the following example, BGP policy accounting is enabled on POS interface 7/0. The policy accounting criteria is based on the source address of the input traffic, and the `table-map` command is used to modify the bucket number when the IP routing table is updated with routes learned from BGP.

```
router bgp 65000
 table-map set_bucket
 network 10.15.1.0 mask 255.255.255.0
 neighbor 10.14.1.1 remote-as 65100
!
ip classless
ip bgp-community new-format
!
interface POS7/0
 ip address 10.15.1.2 255.255.255.0
 bgp-policy accounting input source
 no keepalive
 crc 32
 clock source internal
```

Where to Go Next

Additional BGP, CEF, and dCEF command and configuration information is available from the appropriate Cisco IOS command reference or configuration guide documents. For more details, see the “[Related Documents](#)” section.

Additional References

The following sections provide references related to BGP policy accounting.

Related Documents

Related Topic	Document Title
BGP commands: complete command syntax, command mode, defaults, usage guidelines, and examples	<ul style="list-style-type: none"> • Cisco IOS IP Command Reference, Volume 2 of 3: Routing Protocols, Release 12.2 • Cisco IOS IP Command Reference, Volume 2 of 4: Routing Protocols, Release 12.3 T
BGP configuration	<ul style="list-style-type: none"> • Cisco IOS IP Configuration Guide, Release 12.2 • Cisco IOS IP Configuration Guide, Release 12.3
Switching commands: complete command syntax, command mode, defaults, usage guidelines, and examples	<ul style="list-style-type: none"> • Cisco IOS Switching Services Command Reference, Release 12.2 • Cisco IOS Switching Services Command Reference, Release 12.3 T
Switching configuration	<ul style="list-style-type: none"> • Cisco IOS Switching Services Configuration Guide, Release 12.2 • Cisco IOS Switching Services Configuration Guide, Release 12.3

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIBs	MIBs Link
CISCO-BGP-POLICY-ACCOUNTING-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents modified commands.

- [bgp-policy](#)
- [set traffic-index](#)
- [show cef interface](#)
- [show cef interface policy-statistics](#)

bgp-policy

To enable Border Gateway Protocol (BGP) policy accounting or policy propagation on an interface, use the **bgp-policy** command in interface configuration mode. To disable BGP policy accounting or policy propagation, use the **no** form of this command.

bgp-policy { **accounting** | **ip-prec-map** } [**input** | **output**] [**source**]

no bgp-policy { **accounting** | **ip-prec-map** } [**input** | **output**] [**source**]

Syntax Description

accounting	Enables accounting policy on the basis of community lists, autonomous system numbers, or autonomous system paths.
ip-prec-map	Enables quality of service (QoS) policy on the basis of the IP precedence.
input	(Optional) Enables accounting policy on the basis of traffic that is traveling through an input interface.
output	(Optional) Enables accounting policy on the basis of traffic that is traveling through an output interface.
source	(Optional) Enables accounting policy on the basis of the source address.

Defaults

BGP policy accounting and policy propagation are disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CC	This command was introduced.
12.0(9)S	This command was integrated into Cisco IOS Release 12.0(9)S, and the accounting keyword was added.
12.0(17)ST	This command was integrated into Cisco IOS Release 12.0(17)ST.
12.0(22)S	The input , output , and source keywords were added for the Cisco 7200 series and Cisco 7500 series platforms.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines

For BGP policy propagation to function, you must enable BGP and either Cisco Express Forwarding (CEF) or distributed CEF (dCEF).

To specify the QoS policy based on the IP precedence, the proper route-map configuration must be in place (for example, the **set ip precedence** route-map configuration command). To display QoS policy information for the interface, use the **show ip interface** command.

**Note**

If you specify both the source and destination addresses when configuring policy propagation based on an access control list (ACL), the software looks up the source address in the routing table and classifies the packet based on the source address first; then the software looks up the destination address in the routing table and reclassifies the packet based on the destination address.

To specify the accounting policy, the proper route-map configuration must be in place matching specific BGP attributes using the **set traffic-index** command. In BGP router configuration mode, use the **table-map** command to modify the accounting buckets when the IP routing table is updated with routes learned from BGP. To display accounting policy information, use the **show cef interface policy-statistics**, **show ip bgp**, and **show ip cef detail EXEC** commands.

Examples

The following example enables the BGP policy propagation feature on an interface based on the source address and the IP precedence setting:

```
configure terminal
interface ethernet 4/0/0
  bgp-policy ip-prec-map
end
```

The following example shows the BGP policy accounting feature using a source address on input traffic being enabled on GE-WAN interface 9/1. The policy is classified by autonomous system paths.

```
router bgp 65000
  no synchronization
  table-map buckets
!
ip as-path access-list 1 permit _10_
ip as-path access-list 2 permit _11_
!
route-map buckets permit 10
  match as-path 1
  set traffic-index 1
!
route-map buckets permit 20
  match as-path 2
  set traffic-index 2
!
route-map buckets permit 80
  set traffic-index 7
!
interface GE-WAN9/1
  ip address 10.0.2.2 255.255.255.0
  bgp-policy accounting input source
  no negotiation auto
```

Related Commands

Command	Description
set ip precedence	Sets the precedence values in the IP header.
set traffic-index	Defines how to classify packets that pass a match clause of a route map for BGP policy accounting.
show cef interface policy-statistics	Displays detailed CEF policy statistical information for all interfaces.
show ip bgp	Displays entries in the BGP routing table.

show ip cef	Displays entries in the FIB or FIB summary information.
show ip interface	Displays the usability status of interfaces.
table-map	Classifies routes according to a route map.

set traffic-index

To indicate how to classify packets that pass a match clause of a route map for Border Gateway Protocol (BGP) policy accounting, use the **set traffic-index** command in route-map configuration mode. To disable traffic classification, use the **no** form of this command.

set traffic-index *bucket-number*

no set traffic-index *bucket-number*

Syntax Description

bucket-number Number that represents a bucket into which packet and byte statistics are collected for a specific traffic classification. The range is from 1 to 64. There is no default value.

Defaults

Routing traffic is not classified.

Command Modes

Route-map configuration

Command History

Release	Modification
12.0(9)S	This command was introduced.
12.0(17)ST	This command was integrated into Cisco IOS Release 12.0(17)ST.
12.0(22)S	Support for 64 buckets was added for the Cisco 12000 series Internet router.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T, and support for 64 buckets was added for all platforms.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines

Use the **set traffic-index** route-map configuration command, the **route-map** global configuration command, and one of the **match** route-map configuration commands to define the conditions for BGP policy accounting. The **match** commands specify the *match criteria*—the conditions under which policy routing occurs. The **set traffic-index** command specifies the *set actions*—the particular routing actions to perform if the criteria specified by the **match** commands are met.

Examples

In the following example, an index for BGP policy accounting is set according to autonomous system path criteria:

```
route-map buckets permit 10
 match as-path 1
 set traffic-index 1
```

Related Commands	Command	Description
	bgp-policy	Enables BGP policy accounting or policy propagation on an interface.
	route-map	Defines the conditions for redistributing routes from one routing protocol to another, or enables policy routing.

show cef interface

To display Cisco Express Forwarding (CEF) information for a specified interface or for all interfaces, use the **show cef interface** command in user EXEC or privileged EXEC mode.

show cef interface [*type number*] [**statistics**] [**detail**]

Syntax Description		
	<i>type number</i>	(Optional) Displays CEF information for the specified interface type and number.
		Note No space is required between the interface type and number.
	statistics	(Optional) Displays switching statistics for the line card.
	detail	(Optional) Displays detailed CEF information for the specified interface type and number.

Command Modes	
	User EXEC Privileged EXEC

Command History	Release	Modification
	11.2 GS	This command was introduced on the Cisco 12012 Internet router.
	11.1 CC	Multiple platform support was added.
	12.0(14)ST	This command was integrated into Cisco IOS Release 12.0(14)ST, and the statistics keyword was added.
	12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T, and the detailed keyword was added.
	12.0(22)S	Output fields that support BGP policy accounting were added for the Cisco 7200 series and Cisco 7500 series platforms.
	12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Examples

The following is sample output from the **show cef interface** command for Fast Ethernet interface 1/0/0 with BGP policy accounting configured for input traffic:

```
Router# show cef interface FastEthernet 1/0/0

FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  Internet address is 10.1.1.1/24
  ICMP redirects are always sent
  Per packet load-sharing is disabled
  IP unicast RPF check is disabled
  Inbound access list is not set
  Outbound access list is not set
  IP policy routing is disabled
  BGP based policy accounting on input is enabled
  BGP based policy accounting on output is disabled
```

```

Hardware idb is FastEthernet1/0/0 (6)
Software idb is FastEthernet1/0/0 (6)
Fast switching type 1, interface type 18
IP Distributed CEF switching enabled
IP Feature Fast switching turbo vector
IP Feature CEF switching turbo vector
Input fast flags 0x100, Output fast flags 0x0, Flags 0x0
ifindex 7(7)
Slot 1 Slot unit 0 VC -1
Transmit limit accumulator 0xE8001A82 (0xE8001A82)
IP MTU 1500

```

The following is sample output from the **show cef interface detail** command for Ethernet interface 1/0/0:

```
Router# show cef interface Ethernet 1/0/0 detail
```

```

FastEthernet1/0/0 is up (if_number 6)
Corresponding hwidb fast_if_number 6
Corresponding hwidb firstsw->if_number 6
Internet address is 10.1.1.1/24
ICMP redirects are always sent
Per packet load-sharing is disabled
IP unicast RPF check is disabled
Inbound access list is not set
Outbound access list is not set
IP policy routing is disabled
BGP based policy accounting on input is enabled
BGP based policy accounting on output is disabled
Hardware idb is FastEthernet1/0/0 (6)
Software idb is FastEthernet1/0/0 (6)
Fast switching type 1, interface type 18
IP Distributed CEF switching enabled
IP Feature Fast switching turbo vector
IP Feature CEF switching turbo vector
Input fast flags 0x100, Output fast flags 0x0, Flags 0x0
ifindex 7(7)
Slot 1 Slot unit 0 VC -1
Transmit limit accumulator 0xE8001A82 (0xE8001A82)
IP MTU 1500

```

The following is sample output from the **show cef interface Null 0 detail** command:

```
Router# show cef interface Null 0 detail
```

```

Null0 is up (if_number 1)
Corresponding hwidb fast_if_number 1
Corresponding hwidb firstsw->if_number 1
Internet Protocol processing disabled
Interface is marked as nullidb
Packets switched to this interface on linecard are dropped to next slow path
Hardware idb is Null0
Fast switching type 13, interface type 0
IP CEF switching enabled
IP Feature CEF switching turbo vector
Input fast flags 0x0, Output fast flags 0x0
ifindex 0(0)
Slot -1 Slot unit -1 VC -1
Transmit limit accumulator 0x0 (0x0)
IP MTU 1500

```

Table 1 describes the significant fields shown in the displays.

Table 1 *show cef interface Field Descriptions*

Field	Description
FastEthernet1/0/0 is up	Indicates type, number, and status of the interface.
Internet address is	Internet address of the interface.
ICMP redirects are always sent	Indicates how packet forwarding is configured.
Per packet load-sharing is disabled	Indicates status of load sharing on the interface.
IP unicast RPF check is disabled	Indicates status of the IP unicast Reverse Path Forwarding (RPF) check on the interface.
Inbound access list is not set	Indicates the number or name of the inbound access list if one is applied to this interface.
Outbound access list is not set	Indicates the number or name of the outbound access list if one is applied to this interface.
IP policy routing is disabled	Indicates the status of IP policy routing on the interface.
BGP based policy accounting on input is enabled	Indicates the status of BGP policy accounting on the input interface.
BGP based policy accounting on output is disabled	Indicates the status of BGP policy accounting on the output interface.
Hardware idb is Ethernet1/0/0	Interface type and number configured.
Fast switching type	Indicates switching mode in use. Used for troubleshooting.
interface type	Indicates interface type.
IP Distributed CEF switching enabled	Indicates whether distributed CEF is enabled on this interface. (Cisco 7500 and Cisco 12000 series Internet routers only.)
IP Feature Fast switching turbo vector	Indicates the IP fast switching type configured.
IP Feature CEF switching turbo vector	Indicates the IP feature CEF switching type configured.

Table 1 *show cef interface Field Descriptions (continued)*

Field	Description
Input fast flags	<p data-bbox="941 317 1453 373">Indicates the input status of various switching features:</p> <ul style="list-style-type: none"> <li data-bbox="941 394 1429 451">• 0x0001 (input access control list [ACL] enabled) <li data-bbox="941 472 1347 504">• 0x0002 (policy routing enabled) <li data-bbox="941 514 1299 546">• 0x0004 (input rate limiting) <li data-bbox="941 556 1347 588">• 0x0008 (MAC/Prec accounting) <li data-bbox="941 598 1404 630">• 0x0010 (DSCP/PREC/QOS GROUP) <li data-bbox="941 640 1372 672">• 0x0020 (input named access lists) <li data-bbox="941 682 1339 714">• 0x0040 (NAT enabled on input) <li data-bbox="941 724 1323 756">• 0x0080 (crypto map on input) <li data-bbox="941 766 1323 798">• 0x0100 (QPPB classification) <li data-bbox="941 808 1274 840">• 0x0200 (inspect on input) <li data-bbox="941 850 1307 882">• 0x0400 (input classification) <li data-bbox="941 892 1291 924">• 0x0800 (casa input enable) <li data-bbox="941 934 1453 1039">• 0x1000 (Virtual Private Network [VPN] enabled on a software interface descriptor block (swidb)) <li data-bbox="941 1060 1364 1092">• 0x2000 (input idle timer enabled) <li data-bbox="941 1102 1453 1165">• 0x4000 (unicast Reverse Path Forwarding [RPF] check) <li data-bbox="941 1186 1380 1218">• 0x8000 (per-address ACL enabled) <li data-bbox="941 1228 1372 1260">• 0x10000 (Deaggregating a packet) <li data-bbox="941 1270 1372 1302">• 0x20000 (GPRS enabled on input) <li data-bbox="941 1312 1315 1344">• 0x40000 (URL RenDezvous) <li data-bbox="941 1354 1315 1386">• 0x80000 (QoS classification) <li data-bbox="941 1396 1339 1428">• 0x100000 (FR switching on i/f) <li data-bbox="941 1438 1388 1470">• 0x200000 (WCCP redirect on input) <li data-bbox="941 1480 1339 1512">• 0x400000 (input classification)

Table 1 *show cef interface Field Descriptions (continued)*

Field	Description
Output fast flags	Indicates the output status of various switching features: <ul style="list-style-type: none"> • 0x0001 (output ACL enabled) • 0x0002 (IP accounting enabled) • 0x0004 (WCC redirect enable i/f) • 0x0008 (rate limiting) • 0x0010 (MAC/Prec accounting) • 0x0020 (DSCP/PREC/QOS GROUP) • 0x0040 (D-QOS classification) • 0x0080 (output named access lists) • 0x0100 (NAT enabled on output) • 0x0200 (TCP intercept enabled) • 0x0400 (crypto map set on output) • 0x0800 (output firewall) • 0x1000 (RSVP classification) • 0x2000 (inspect on output) • 0x4000 (QoS classification) • 0x8000 (QoS preclassification) • 0x10000 (output stile)
ifindex	Indicates the SNMP ifindex for this interface.
Slot 1 Slot unit 0 VC -1	The slot number and slot unit.
Transmit limit accumulator	Indicates the maximum number of packets allowed in the transmit queue.
IP MTU	The value of the MTU size set on the interface.

Related Commands

Command	Description
show cef	Displays which packets the line cards dropped or displays which packets were not express-forwarded.
show cef linecard	Displays CEF-related interface information by line card.

show cef interface policy-statistics

To display Cisco Express Forwarding (CEF) policy statistical information for a specified interface or for all interfaces, use the **show cef interface policy-statistics** command in user EXEC or privileged EXEC mode.

show cef interface [*type number*] **policy-statistics** [**input** | **output**]

Syntax Description	
<i>type number</i>	(Optional) Interface type and number. Note No space is required between the interface type and number.
input	(Optional) Displays BGP accounting policy statistics on the basis of traffic that is traveling through an input interface.
output	(Optional) Displays BGP accounting policy statistics on the basis of traffic that is traveling through an output interface.

Command Modes	
	User EXEC Privileged EXEC

Command History	Release	Modification
	12.0(9)S	This command was introduced on the Cisco 12000 series Internet routers.
	12.0(14)ST	This command was integrated into Cisco IOS Release 12.0(14)ST.
	12.0(22)S	The input and output keywords were added.
	12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines	
	This command is available only on distributed switching platforms.

Examples The following is sample output from the **show cef interface policy-statistics** command showing policy statistics for Fast Ethernet interface 1/0/0 with the policy accounting based on input traffic:

```
Router# show cef interface FastEthernet 1/0/0 policy-statistics input
```

```
FastEthernet1/0/0 is up (if_number 6)
  Corresponding hwidb fast_if_number 6
  Corresponding hwidb firstsw->if_number 6
  BGP based Policy accounting on input is enabled
  Index          Packets          Bytes
  1              9999             999900
  2              0                0
  3              0                0
  4              0                0
  5              0                0
  6              0                0
  7              0                0
  8              0                0
  9              0                0
```

■ show cef interface policy-statistics

10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	1234	123400
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	1000	100000
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	5123	1198782
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0

The following is sample output from the **show cef interface policy-statistics** command showing policy statistics for serial interface 1/1/2 with the policy accounting based on output traffic:

```
Router# show cef interface serial 1/1/2 policy-statistics output
```

```
Serial1/1/2 is up (if_number 9)
Corresponding hwidb fast_if_number 9
Corresponding hwidb firstsw->if_number 9
BGP based Policy accounting on output is enabled
```

Index	Packets	Bytes
1	9999	999900
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	1234	123400
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	1000	100000
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	5123	1198782

```
show cef interface policy-statistics
```

```

55          0          0
56          0          0
57          0          0
58          0          0
59          0          0
60          0          0
61          0          0
62          0          0
63          0          0
64          0          0

```

Table 2 describes the significant fields shown in the display.

Table 2 *show cef interface policy-statistics Field Descriptions*

Field	Description
Index	Traffic index set with the route-map command.
Packets	Number of packets switched matching the index definition.
Bytes	Number of bytes switched matching the index definition.

Related Commands

Command	Description
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol to another, or enables policy routing.
show cef	Displays which packets the line cards dropped or displays which packets were not express-forwarded.
show cef linecard	Displays CEF-related interface information by line card.

Glossary

AS—autonomous system. An IP term to describe a routing domain that has its own independent routing policy and is administered by a single authority.

BGP—Border Gateway Protocol. Interdomain routing protocol that exchanges reachability information with other BGP systems.

CEF—Cisco Express Forwarding.

dCEF—distributed Cisco Express Forwarding.

**Note**

Refer to *Internetworking Terms and Acronyms* for terms not included in this glossary.

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