



NetFlow BGP Next Hop Support

The NetFlow Border Gateway Protocol (BGP) Next Hop Support feature lets you measure network traffic on a per BGP next hop basis. Without the NetFlow BGP Next Hop Support feature, NetFlow exports only IP next hop information (which provides only the next router); this feature adds BGP next hop information to the data export.

The NetFlow BGP Next Hop Support feature lets you track which service provider the traffic is going through. This functionality is useful if you have arrangements with several other service providers for fault-protected delivery of traffic. The feature lets you charge customers more per packet when traffic has a more costly destination—you can pass on some of the cost associated with expensive trans-oceanic links or charge more when traffic is sent to another ISP with which you have an expensive charge agreement.

This feature uses only the NetFlow Version 9 export format for its data export.

History for NetFlow BGP Next Hop Support

Release	Modification
12.3(1)	This feature was introduced.
12.2(18)S	This feature was integrated into Cisco IOS Release 12.2(18)S.
12.0(26)S	This feature was integrated into Cisco IOS Release 12.0(26)S.
12.2(27)SBC	This feature was integrated into Cisco IOS Release 12.2(27)SBC.

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.



Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Copyright © 2005 Cisco Systems, Inc. All rights reserved.

Contents

This document includes the following sections:

- [Prerequisites for NetFlow BGP Next Hop Support, page 16](#)
- [Restrictions for NetFlow BGP Next Hop Support, page 16](#)
- [Information About NetFlow BGP Next Hop Support, page 16](#)
- [How to Configure NetFlow BGP Next Hop Support, page 17](#)
- [Configuration Examples for NetFlow BGP Next Hop Support, page 19](#)
- [Additional References, page 21](#)
- [Command Reference, page 22](#)
- [Glossary, page 44](#)

Prerequisites for NetFlow BGP Next Hop Support

Before you can configure the NetFlow BGP Next Hop Support feature, you must configure

- NetFlow v9 (Version 9) data export (if only Version 5 is configured, then BGP next hop data is visible in the caches, but is not exported)
- Cisco Express Forwarding (CEF) switching or dCEF switching (fast switching is not supported)
- Border Gateway Protocol (BGP)

Restrictions for NetFlow BGP Next Hop Support

Recursive Load Sharing

The NetFlow cache does not capture the BGP next hop when the route to that BGP next hop is recursively load-shared via several IGP links. Instead, the NetFlow cache captures (as the BGP next hop) the effective simple next hop from a random selection of one of the load-shared routes to which the BGP route recurses.

Memory Impact

For BGP-controlled routes, the NetFlow BGP Next Hop Support feature adds 16 bytes to each NetFlow flow record. This increases memory requirements by 16 bytes times the number of flow cache entries that have BGP-controlled prefixes.

Performance Impact

Because the BGP next hop is fetched from the CEF path only once per flow, the performance impact of the NetFlow BGP Next Hop Support feature is minimal.

Information About NetFlow BGP Next Hop Support

To configure the NetFlow BGP Next Hop Support feature, you must understand the following concept:

- [Aggregation, page 17](#)

Aggregation

The Cisco IOS NetFlow Aggregation feature summarizes NetFlow export data on a router before the data is exported to the NetFlow Collection Engine (formerly called NetFlow FlowCollector). The NetFlow BGP Next Hop Support feature provides the BGP next hop and its related aggregation scheme and provides BGP next hop information within each NetFlow record.

How to Configure NetFlow BGP Next Hop Support

See the following sections for configuration tasks for the NetFlow BGP Next Hop Support feature. Each task in the list is identified as either required or optional.

- [Configuring NetFlow BGP Next Hop Accounting, page 17](#) (required)
- [Verifying the Configuration, page 18](#) (optional)
- [Troubleshooting Tips, page 19](#) (optional)

Configuring NetFlow BGP Next Hop Accounting


This section shows how to configure NetFlow BGP next hop accounting for the main cache and aggregation caches. You can enable the export of origin AS information or peer AS information, but not both.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip flow-export Version 9 [origin-as | peer-as] bgp-nexthop**
4. **ip flow-aggregation cache bgp-nexthop-tos**
5. **enabled**
6. **end**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router> enable	Enters privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.

Command	Purpose
<p>Step 3 <code>ip flow-export Version 9 [origin-as peer-as] bgp-nexthop</code></p> <p>Example: Router(config)# ip flow-export Version 9 origin-as bgp-nexthop</p>	<p>Enables the export of origin AS or peer AS information as well as BGP next hop information from the NetFlow main cache.</p> <p> Caution Entering this command on a Cisco 12000 series Internet Router causes packet forwarding to stop for a few seconds while NetFlow reloads the route processor and line card CEF tables. To avoid interruption of service to a live network, apply this command during a change window, or include it in the startup-config file to be executed during a router reboot.</p>
<p>Step 4 <code>ip flow-aggregation cache bgp-nexthop-tos</code></p> <p>Example: Router(config)# ip flow-aggregation cache bgp-nexthop-tos</p>	<p>(Optional) Specifies the BGP next hop ToS aggregation cache scheme and enables aggregation cache configuration mode.</p>
<p>Step 5 <code>enabled</code></p> <p>Example: Router(config-flow-cache)# enabled</p>	<p>Enables the aggregation cache.</p>
<p>Step 6 <code>end</code></p> <p>Example: Router(config-flow-cache)# end</p>	<p>Ends the configuration session and returns to privileged EXEC mode.</p>

Verifying the Configuration

This section shows how to verify successful configuration of NetFlow BGP next hop accounting.

SUMMARY STEPS

1. `show ip cache verbose flow`
2. `show ip cache flow aggregation bgp-nexthop-tos`

DETAILED STEPS

	Command	Purpose
Step 1	<pre>show ip cache verbose flow</pre> <p>Example: Router> show ip cache verbose flow</p>	Displays a detailed summary of NetFlow statistics (including additional NetFlow fields in the header when NetFlow Version 9 data export is configured).
Step 2	<pre>show ip cache flow aggregation bgp-nexthop-tos</pre> <p>Example: Router> show ip cache flow aggregation bgp-nexthop-tos</p>	Displays information about the BGP next hop ToS aggregation cache.

Troubleshooting Tips

If there are no BGP-specific flow records in the NetFlow cache, make sure that CEF or dCEF switching is enabled and that the destination for NetFlow data export is configured. Also check the routing table for BGP routes.

Configuration Examples for NetFlow BGP Next Hop Support

This section provides the following configuration examples:

- [Configuring NetFlow BGP Next Hop Accounting: Example, page 19](#)
- [Verifying the NetFlow BGP Next Hop Configuration: Example, page 19](#)

Configuring NetFlow BGP Next Hop Accounting: Example

The following example shows how to configure NetFlow BGP next hop accounting with origin AS and BGP next hop statistics:

```
Router> enable
Password:
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# ip flow-export Version 9 origin-as bgp-nexthop
Router(config)# end
Router#
3w1d:%SYS-5-CONFIG_I: Configured from console by console
Router# exit
```

Verifying the NetFlow BGP Next Hop Configuration: Example

The following example shows how to use the `show ip cache verbose flow` command to verify that NetFlow BGP next hop accounting is enabled:

```
Router> show ip cache verbose flow
IP packet size distribution (120 total packets):
```

```

    1-32  64  96 128 160 192 224 256 288 320 352 384 416 448
480
    .000 .000 .000 1.00 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000
.000

```

```

    512 544 576 1024 1536 2048 2560 3072 3584 4096 4608
    .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000

```

IP Flow Switching Cache, 17826816 bytes

```

8 active, 262136 inactive, 8 added
26 ager polls, 0 flow alloc failures
Active flows timeout in 30 minutes
Inactive flows timeout in 15 seconds

```

IP Sub Flow Cache, 1081480 bytes

```

8 active, 65528 inactive, 8 added, 8 added to flow
0 alloc failures, 0 force free
1 chunk, 1 chunk added
last clearing of statistics never

```

Protocol	Total	Flows	Packets	Bytes	Packets	Active(Sec)
Idle(Sec)						
-----	Flows	/Sec	/Flow	/Pkt	/Sec	/Flow
/Flow						

SrcIf	SrcIPAddress	DstIf	DstIPAddress	Pr	TOS	Flgs
Pkts						
Port Msk AS		Port Msk AS	NextHop			B/Pk
Active						
MUL:M_Opaks	M_Obytes	BGP:BGP_NextHop				
Et0/0/2	12.0.0.2	Et0/0/4	13.0.0.5	01	00	10
20						
0000 /8 0		0800 /8 0	11.0.0.6			100
0.0						
BGP:26.0.0.6						
Et0/0/2	12.0.0.2	Et0/0/4	15.0.0.7	01	00	10
20						
0000 /8 0		0800 /8 0	11.0.0.6			100
0.0						
BGP:26.0.0.6						
Et0/0/2	12.0.0.2	Et0/0/4	15.0.0.7	01	00	10
20						
0000 /8 0		0000 /8 0	11.0.0.6			100
0.0						
BGP:26.0.0.6						

Router> **exit**

The following example shows how to use the **show ip cache flow aggregation bgp-next-hop-tos** command to verify that NetFlow BGP next hop accounting is enabled:

```
Router> show ip cache flow aggregation bgp-next-hop-tos
```

IP Flow Switching Cache, 278544 bytes

```

1 active, 4095 inactive, 1 added
8 ager polls, 0 flow alloc failures
Active flows timeout in 30 minutes
Inactive flows timeout in 15 seconds

```

IP Sub Flow Cache, 17224 bytes

```

1 active, 1023 inactive, 1 added, 1 added to flow
0 alloc failures, 0 force free
1 chunk, 1 chunk added

```

Src If	Src AS	Dst If	Dst AS	TOS	Flows	Pkts	B/Pk
Active							
BGP NextHop							
Et0/0/2	0	Et0/0/4	0	00	9	36	40
8.2							

```
BGP:26.0.0.6
Router> exit
```

Additional References

The following sections provide references related to NetFlow BGP Next Hop Support:

- [Related Documents, page 21](#)
- [Standards, page 21](#)
- [MIBs, page 22](#)
- [RFCs, page 22](#)
- [Technical Assistance, page 22](#)

Related Documents

Related Topic	Document Title
NetFlow	<i>Cisco IOS Switching Services Configuration Guide</i> , Release 12.3 <i>Cisco IOS Switching Services Command Reference</i> , Release 12.3 T <i>Cisco IOS Command Reference Master Index</i> , Release 12.3
NetFlow Version 9 data export	<i>NetFlow v9 Export Format</i> feature module, Release 12.3
NetFlow Version 9 export format	<i>NetFlow Version 9 Flow-Record Format</i> white paper
Description of an actual customer deployment of NetFlow services within an IP network	<i>NetFlow Services for an Enterprise Network</i> integrated solutions document (ISD)
IP multicast routing	<i>Cisco IOS IP Configuration Guide</i> , Release 12.3, IP Multicast
NetFlow Minimum Prefix Mask For Router-Based Aggregation feature	<i>NetFlow Minimum Prefix Mask for Router-Based Aggregation</i> feature module, Release 12.1(3)T
NetFlow ToS-Based Router Aggregation feature	<i>NetFlow ToS-Based Router Aggregation</i> feature module, Release 12.1(3)T
Sampled NetFlow feature	<i>Sampled NetFlow</i> feature module, Release 12.0(26)S
NetFlow FlowCollector	<i>NetFlow FlowCollector Installation and User Guide</i> , Release 3.0 <i>Release Notes for FlowCollector Release 3.0 and Release 3.0 (2.0)</i>
NetFlow Data Analyzer	<i>Network Data Analyzer Installation and User Guide</i> , Release 3.0 <i>Release Notes for Network Data Analyzer</i> , Release 3.0

Standards

Standard	Title

MIBs

MIB	MIBs Link
<ul style="list-style-type: none"> • • 	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

RFC	Title

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of 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/techsupport

Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.3 T command reference publications.

- [ip flow-aggregation cache](#)
- [ip flow-export](#)
- [show ip cache flow aggregation](#)
- [show ip cache verbose flow](#)

ip flow-aggregation cache

To enable NetFlow accounting aggregation cache schemes, use the **ip flow-aggregation cache** command in global configuration mode. To disable NetFlow accounting aggregation cache schemes, use the **no** form of this command.

```
ip flow-aggregation cache { as | as-tos | bgp-nexthop-tos | destination-prefix |
destination-prefix-tos | prefix | prefix-port | prefix-tos | protocol-port | protocol-port-tos |
source-prefix | source-prefix-tos }
```

```
no ip flow-aggregation cache { as | as-tos | bgp-nexthop-tos | destination-prefix |
destination-prefix-tos | prefix | prefix-port | prefix-tos | protocol-port | protocol-port-tos |
source-prefix | source-prefix-tos }
```

Syntax Description		
as		Configures the autonomous system aggregation cache scheme.
as-tos		Configures the autonomous system type of service (ToS) aggregation cache scheme.
bgp-nexthop-tos		Configures the Border Gateway Protocol (BGP) next hop ToS aggregation cache scheme.
destination-prefix		Configures the destination-prefix aggregation cache scheme.
destination-prefix-tos		Configures the destination prefix ToS aggregation cache scheme.
prefix		Configures the prefix aggregation cache scheme.
prefix-port		Configures the prefix port aggregation cache scheme.
prefix-tos		Configures the prefix ToS aggregation cache scheme.
protocol-port		Configures the protocol-port aggregation cache scheme.
protocol-port-tos		Configures the protocol-port ToS aggregation cache scheme.
source-prefix		Configures the source-prefix aggregation cache scheme.
source-prefix-tos		Configures the source-prefix ToS aggregation cache scheme.

Command Default This command is not enabled by default.

Command Modes Global configuration

Command History	Release	Modification
	12.0(3)T	This command was introduced.
	12.0(15)S	This command was modified to include the ToS aggregation scheme keywords.
	12.2(2)T	This command was modified to enable multiple NetFlow export destinations.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.3(1)	The bgp-nexthop-tos aggregation scheme keyword was added.
	12.2(18)S	The bgp-nexthop-tos aggregation cache keyword was added.

Release	Modification
12.0(26)S	The bgp-nexthop-tos aggregation cache keyword was added.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

You must have NetFlow accounting configured on your router before you can use this command. The **export destination** command supports a maximum of two concurrent export destinations.

The ToS aggregation cache scheme keywords enable NetFlow accounting aggregation cache schemes that include the ToS byte in their export records. The ToS byte is an 8-bit field in the IP header. The ToS byte specifies the quality of service for a datagram during its transmission through the Internet.

You can enable only one aggregation cache configuration scheme per command line. The following rules apply to configuring source and destination masks.

- The source mask can only be configured in the prefix, prefix-port, prefix-tos, source-prefix and source-prefix-tos aggregation modes.
- The destination mask can only be configured in the prefix, prefix-port, prefix-tos, destination-prefix and destination-prefix-tos aggregation modes.
- No masks can be configured in non-prefix aggregation modes

To enable aggregation (whether or not an aggregation cache is fully configured), you must enter the **enabled** command in aggregation cache configuration mode. (You can use the **no** form of this command to disable aggregation. The cache configuration remains unchanged even if aggregation is disabled.)

Examples

The following example shows how to configure a NetFlow accounting autonomous system aggregation cache scheme:

```
Router(config)# ip flow-aggregation cache as
Router(config-flow-cache)# enabled
```

The following example shows how to configure a minimum prefix mask of 16 bits for the NetFlow accounting destination-prefix aggregation cache scheme:

```
Router(config)# ip flow-aggregation cache destination-prefix
Router(config-flow-cache)# mask destination minimum 16
Router(config-flow-cache)# enabled
```

The following example shows how to configure a minimum prefix mask of 16 bits for the NetFlow accounting source-prefix aggregation cache scheme:

```
Router(config)# ip flow-aggregation cache source-prefix
Router(config-flow-cache)# mask source minimum 16
Router(config-flow-cache)# enabled
```

The following example shows how to configure multiple export destinations for the NetFlow accounting autonomous system ToS aggregation cache scheme:

```
Router(config)# ip flow-aggregation cache as-tos
Router(config-flow-cache)# export destination 172.17.24.65 9991
Router(config-flow-cache)# export destination 172.16.10.2 9991
Router(config-flow-cache)# enabled
```

Related Commands

Command	Description
export destination (aggregation cache)	Enables the exporting of NetFlow accounting information from NetFlow aggregation caches.
enabled (aggregation cache)	Enables the NetFlow aggregation cache.
mask	Specifies the source or destination prefix mask.
show ip cache flow aggregation	Displays a summary of the NetFlow accounting aggregation cache statistics.
show ip cache flow	Displays a summary of the NetFlow accounting statistics.
show ip cache verbose flow	Displays a detailed summary of the NetFlow accounting statistics.
show ip flow interface	Displays NetFlow accounting configuration for interfaces.

ip flow-export

To enable the export of information in NetFlow cache entries, use the **ip flow-export** command in global configuration mode. To disable the export of information, use the **no** form of this command.

```
ip flow-export [destination ip-address udp-port] | [source {ip-address | interface-name}] |
  [version {1 | [5 | 9] [origin-as | peer-as] [bgp-nexthop] }] | [template {refresh-rate packets
  | timeout-rate minutes}] [options {export-stats | refresh-rate packets | timeout-rate
  minutes}] ] ]
```

```
no ip flow-export [destination ip-address udp-port] | [source {ip-address | interface-name}] |
  [version {1 | [5 | 9] [origin-as | peer-as] [bgp-nexthop] }] | [template {refresh-rate packets
  | timeout-rate minutes}] [options {export-stats | refresh-rate packets | timeout-rate
  minutes}] ] ]
```

Syntax Description

destination <i>ip-address udp-port</i>	IP address and protocol-specific port number of the workstation to which you want to send the NetFlow information.
source { <i>ip-address</i> <i>interface-name</i> }	IP address and interface type and number for the source address.
version 1	(Optional) Specifies that the export packet uses the version 1 format. This is the default. The version field occupies the first two bytes of the export record. The number of records stored in the datagram is a variable from 1 to 24 for version 1.
version 5	(Optional) Specifies that the export packet uses the version 5 format. The number of records stored in the datagram is a variable between 1 and 30 for version 5.
version 9	(Optional) Specifies that the export packet uses the version 9 format.
origin-as	(Optional) Specifies that export statistics include the origin autonomous system (AS) for the source and destination.
peer-as	(Optional) Specifies that export statistics include the peer AS for the source and destination.
bgp-nexthop	(Optional) Specifies that export statistics include BGP next hop related information.
template	Specifies that the refresh-rate and timeout-rate keywords apply to the template.
options	Specifies that the export-stats , refresh-rate , and timeout-rate keywords apply to the options template.
export-stats	(Optional) Specifies that the export statistics include the total number of flows exported and the total number of packets exported.
refresh-rate <i>packets</i>	(Optional) Specifies the number of export packets before the options are resent. You can specify from 1 to 600 packets. The default is 20 packets.
timeout-rate <i>minutes</i>	(Optional) Specifies the time before the options are resent. You can specify from 1 to 3600 minutes. The default is 30 minutes.

Command Default

Export of information in NetFlow cache entries is disabled. You can specify origin AS accounting or peer AS export accounting, but not both.

Command Modes Global configuration

Command History	Release	Modification
	11.1 CA	This command was introduced.
	12.0(24)S	This command was integrated into Cisco IOS Release 12.0(24)S, and the (version) 9 keyword was added.
	12.3(1)	This command was integrated into Cisco IOS Release 12.3(1), and the bgp-nexthop keyword was added.
	12.2(18)S	The bgp-nexthop keyword was added.
	12.0(26)S	The bgp-nexthop keyword was added.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Usage Guidelines

A NetFlow cache entry contains a lot of information. When flow switching is enabled with the **ip route-cache flow** command, you can use the **ip flow-export** command to configure the router to export the flow cache entries to a destination (such as a system running the NetFlow Collection Engine) when flows expire. This configuration can be useful for statistics, billing, and security.

Version 5 and version 9 formats include the source and destination AS addresses and source and destination prefix masks. Also, version 9 includes BGP next hop information. Because this change might appear on your router as a maintenance release, support for version 1 format is maintained with the **version 1** keyword.



Caution

Entering the **ip flow-export** or **no ip flow-export** command on the Cisco 12000 Series Internet routers and specifying any version format other than version 1 (in other words, entering the **ip flow-export** or **no ip flow-export** command and specifying either the **version 5** or **version 9** keyword) causes packet forwarding to stop for a few seconds while NetFlow reloads the route processor and line card CEF tables. To avoid interruption of service to a live network, apply this command during a change window, or include it in the startup-config file to be executed during a router reboot.

For more information on version 1 and version 5 data format, see the “NetFlow Data Format” section in the “Configuring NetFlow Switching” chapter of the *Cisco IOS Switching Services Configuration Guide*. For more information on version 9 data format, see the *Cisco IOS NetFlow Version 9 Flow-Record Format* white paper.

Examples

The following example shows how to configure the router to export the NetFlow cache entry to UDP port 125 on the workstation at 134.22.23.7 when the flow expires using version 1 format:

```
Router(config)# ip flow-export 134.22.23.7 125
```

The following example shows how to configure the router to export the NetFlow cache entry to UDP port 2048 on the workstation at 134.22.23.7 when the flow expires using version 5 format and includes the peer AS information:

```
Router(config)# ip flow-export 134.22.23.7 2048 version 5 peer-as
```

Related Commands	Command	Description
	debug ip flow export	Enables debugging output for NetFlow data export.
	export destination	Enables the exporting of information from NetFlow aggregation caches.
	ip route-cache flow	Enables NetFlow switching for IP routing.
	show ip flow export	Displays the statistics for the NetFlow data export.

show ip cache flow aggregation

To display the NetFlow accounting aggregation cache statistics, use the **show ip cache flow aggregation** command in user EXEC or privileged EXEC mode.

```
show ip cache [prefix mask] [type number] [verbose] flow aggregation {as | as-tos |
bgp-nexthop-tos | destination-prefix | destination-prefix-tos | prefix | prefix-port |
prefix-tos | protocol-port | protocol-port-tos | source-prefix | source-prefix-tos}
```

Syntax Description		
<i>prefix mask</i>	(Optional)	Displays only the entries in the cache that match the prefix and mask combination.
<i>type number</i>	(Optional)	Displays only the entries in the cache that match the interface type and number combination.
verbose	(Optional)	Displays additional information from the aggregation cache.
as		Displays the configuration of the autonomous system aggregation cache scheme.
as-tos		Displays the configuration of the autonomous system type of service (ToS) aggregation cache scheme.
bgp-nexthop-tos		Displays the BGP next hop and ToS aggregation cache scheme.
destination-prefix		Displays the configuration of the destination prefix aggregation cache scheme.
destination-prefix-tos		Displays the configuration of the destination prefix ToS aggregation cache scheme.
prefix		Displays the configuration of the prefix aggregation cache scheme.
prefix-port		Displays the configuration of the prefix port aggregation cache scheme.
prefix-tos		Displays the configuration of the prefix ToS aggregation cache scheme.
protocol-port		Displays the configuration of the protocol port aggregation cache scheme.
protocol-port-tos		Displays the configuration of the protocol port ToS aggregation cache scheme.
source-prefix		Displays the configuration of the source prefix aggregation cache scheme.
source-prefix-tos		Displays the configuration of the source prefix ToS aggregation cache scheme.

Command Modes	
	User EXEC Privileged EXEC

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.0(15)S	This command was modified to include new show output for ToS aggregation schemes.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(1)	The bgp-nexthop-tos keyword was added.
12.2(18)S	The bgp-nexthop-tos aggregation cache keyword was added.
12.0(26)S	The bgp-nexthop-tos aggregation cache keyword was added.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.

Examples

The following is a sample display of an autonomous system aggregation cache with the **show ip cache flow aggregation as** command:

```
Router# show ip cache flow aggregation as
```

```
IP Flow Switching Cache, 278544 bytes
 2 active, 4094 inactive, 13 added
 178 ager polls, 0 flow alloc failures
```

Src If	Src AS	Dst If	Dst AS	Flows	Pkts	B/Pk	Active
Fa1/0	0	Null	0	1	2	49	10.2
Fa1/0	0	Se2/0	20	1	5	100	0.0

The following is a sample display of an autonomous system aggregation cache for the prefix mask 10.0.0.1 255.0.0.0 with the **show ip cache flow aggregation as** command:

```
Router# show ip cache 10.0.0.1 255.0.0.0 flow aggregation as
```

```
IP Flow Switching Cache, 278544 bytes
 2 active, 4094 inactive, 13 added
 178 ager polls, 0 flow alloc failures
```

Src If	Src AS	Dst If	Dst AS	Flows	Pkts	B/Pk	Active
e1/2	0	Null	0	1	2	49	10.2
e1/2	0	e1/2	20	1	5	100	0.0

The following is a sample display of an autonomous system aggregation cache for 10.0.0.1 255.0.0.0 Ethernet1/2 with the **show ip cache verbose flow aggregation as** command:

```
Router# show ip cache 10.0.0.1 255.0.0.0 e1/2 verbose flow aggregation as
```

```
IP Flow Switching Cache, 278544 bytes
 2 active, 4094 inactive, 13 added
 178 ager polls, 0 flow alloc failures
```

Src If	Src AS	Dst If	Dst AS	Flows	Pkts	B/Pk	Active
e1/2	0	Null	0	1	2	49	10.2
e1/2	0	e1/2	20	1	5	100	0.0

The following is a sample display of an autonomous system ToS aggregation cache with the **show ip cache verbose flow aggregation as-tos** command:

```
Router# show ip cache verbose flow aggregation as-tos
```

```
IP Flow Switching Cache, 278544 bytes
 4 active, 4092 inactive, 103 added
 1609 ager polls, 0 flow alloc failures
```

Src If	Src AS	Dst If	Dst AS	TOS	Flows	Pkts	B/Pk	Active
Etl1/2	50	Fd4/0	40	CC	1	3568	28	17.8
Etl1/2	0	Fd4/0	40	C0	15	17K	28	17.8
Etl1/1	50	Fd4/0	40	55	1	3748	28	17.8
Fd4/0	0	Null	0	C0	1	2	49	0.9

The following is a sample display of a protocol port ToS aggregation cache with the **show ip cache verbose flow aggregation protocol-port-tos** command:

```
Router# show ip cache verbose flow aggregation protocol-port-tos
```

```
IP Flow Switching Cache, 278544 bytes
 4 active, 4092 inactive, 102 added
 1584 ager polls, 0 flow alloc failures
```

Prot	Src If	SrcPort	Dst If	DstPort	TOS	Flows	Pkts	B/Pk	Active
0x01	Etl1/2	0000	Fd4/0	0000	C0	15	17K	28	17.8
0x01	Etl1/2	0000	Fd4/0	0000	CC	1	3568	28	17.8
0x01	Etl1/1	0000	Fd4/0	0000	55	1	3748	28	17.8
0x06	Fd4/0	00B3	Null	2AF9	C0	1	2	49	0.9

The following is a sample display of a source prefix ToS aggregation cache with the **show ip cache verbose flow aggregation source-prefix-tos** command:

```
Router# show ip cache verbose flow aggregation source-prefix-tos
```

```
IP Flow Switching Cache, 278544 bytes
 4 active, 4092 inactive, 105 added
 1683 ager polls, 0 flow alloc failures
```

Src If	Src Prefix	Msk	AS	TOS	Flows	Pkts	B/Pk	Active
Etl1/1	52.0.0.0	/8	50	55	1	3748	28	17.8
Etl1/2	52.0.0.0	/8	50	CC	1	3568	28	17.8
Etl1/2	0.0.0.0	/0	0	C0	15	17K	28	17.8
Fd4/0	20.20.20.1	/32	0	C0	1	2	49	0.9

The following is a sample display of a destination prefix ToS aggregation cache with the **show ip cache verbose flow aggregation destination-prefix-tos** command:

```
Router# show ip cache verbose flow aggregation destination-prefix-tos
```

```
IP Flow Switching Cache, 278544 bytes
 4 active, 4092 inactive, 86 added
 1480 ager polls, 0 flow alloc failures
```

Dst If	Dst Prefix	Msk	AS	TOS	Flows	Pkts	B/Pk	Active
Local	31.31.31.1	/32	0	C0	1	2	49	0.9
Fd4/0	42.0.0.0	/8	40	55	1	3748	28	17.8
Fd4/0	42.0.0.0	/8	40	CC	1	3568	28	17.8
Fd4/0	42.0.0.0	/8	40	C0	15	17K	28	17.8

The following is a sample display of a prefix ToS aggregation cache with the **show ip cache verbose flow aggregation prefix-tos** command:

```
Router# show ip cache verbose flow aggregation prefix-tos
```

```
IP Flow Switching Cache, 278544 bytes
 4 active, 4092 inactive, 4 added
 14 ager polls, 0 flow alloc failures
```

Src If	Src Prefix	Dst If	Dst Prefix	TOS	Flows	Pkts
	Msk AS		Msk AS		B/Pk	Active
Etl1/2	0.0.0.0	Fd4/0	42.0.0.0	C0	15	3933

show ip cache flow aggregation

```

Et1/1          /0 0          /8 40          28 3.9
52.0.0.0      Fd4/0        42.0.0.0      55 1 826
              /8 50          /8 40          28 3.9
Et1/2          52.0.0.0      Fd4/0        42.0.0.0      CC 1 787
              /8 50          /8 40          28 3.9

```

The following is a sample display of a prefix port aggregation cache with the **show ip cache verbose flow aggregation prefix-port** command:

```
Router# show ip cache verbose flow aggregation prefix-port
```

```

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 105 added
  1679 ager polls, 0 flow alloc failures

```

Src If	Src Prefix		Dst If	Dst Prefix		TOS Flows		Pkts Active
	Port	Msk		Port	Msk	Pr	B/Pk	
Fd4/0	20.20.20.1	00B3 /32	Local	31.31.31.1	2AF9 /32	C0	1	2
Et1/2	0.0.0.0	0000 /0	Fd4/0	42.0.0.0	0000 /8	C0	15	17K
Et1/1	52.0.0.0	0000 /8	Fd4/0	42.0.0.0	0000 /8	55	1	3748
Et1/2	52.0.0.0	0000 /8	Fd4/0	42.0.0.0	0000 /8	CC	1	3568

[Table 3](#) describes the significant fields shown in the output of the **show ip cache verbose flow aggregation** command.

Table 3 Field Descriptions for the show ip cache verbose flow aggregation command

Field	Description
bytes	Number of bytes of memory used by the NetFlow cache.
active	Number of active flows in the NetFlow cache at the time this command was entered.
inactive	Number of flow buffers that are allocated in the NetFlow cache, but are not currently assigned to a specific flow at the time this command is entered.
added	Number of flows created since the start of the summary period.
ager polls	Number of times the NetFlow code looked at the cache to cause entries to expire. (Used by Cisco for diagnostics only.)
flow alloc failures	Number of times the NetFlow code tried to allocate a flow but could not.
Src If	Specifies the source interface.
Src AS	Specifies the source autonomous system.
Dst If	Specifies the destination interface.
Dst AS	Specifies the destination autonomous system.
Flows	Number of flows.
Pkts	Number of packets.
B/Pk	Average number of bytes observed for the packets seen for this protocol (total bytes for this protocol or the total number of flows for this protocol for this summary period).
Active	Number of active flows in the NetFlow cache at the time this command was entered.

Related Commands	Command	Description
	cache	Defines operational parameters for NetFlow accounting aggregation caches.
	enabled (aggregation cache)	Enables a NetFlow accounting aggregation cache.
	export destination (aggregation cache)	Enables the exporting of NetFlow accounting information from NetFlow aggregation caches.
	ip flow-aggregation cache	Enables NetFlow accounting aggregation cache schemes.
	mask (IPv4)	Specifies the source or destination prefix mask for a NetFlow accounting prefix aggregation cache.
	show ip cache flow	Displays a summary of the NetFlow accounting statistics.
	show ip cache verbose flow	Displays a detailed summary of the NetFlow accounting statistics.
	show ip flow interface	Displays NetFlow accounting configuration for interfaces.

show ip cache verbose flow

To display a detailed summary of the NetFlow accounting statistics, use the **show ip cache verbose flow** command in user EXEC or privileged EXEC mode.

show ip cache verbose flow

Syntax Description This command has no keywords or arguments.

Command Modes User EXEC
Privileged EXEC

Command History	Release	Modification
	11.1	This command was introduced.
	11.1CA	The information display for the command was updated.
	12.3(1)	The command output was updated to display additional NetFlow fields.
	12.0(24)S	MPLS flow records were added to the command output.
	12.3(4)T, 12.3(6), 12.2(20)S	The execute-on command was modified on the Cisco 7500 platforms to include the remote execution of the show ip cache verbose flow command.
	12.3(8)T	MPLS flow records were added to the command output for Cisco IOS Release 12.3(8)T.
	12.3(11)T	Support for egress flow accounting was added, and the [<i>prefix mask</i>] and [<i>type number</i>] arguments were removed.
	12.3(14)T	Support for NetFlow Layer 2 and Security Monitoring Exports was added.
	12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
	12.2(18)SXF	This command was integrated into Cisco IOS Release 12.2(18)SXF

Usage Guidelines Use the **show ip cache verbose flow** command to display flow record fields in the NetFlow cache in addition to the fields that are displayed with the **show ip cache flow** command. The values in the additional fields that are shown depend on the NetFlow features that are enabled and the flags that are set in the flow.



Note The flags, and therefore the fields, might vary from flow to flow.

Some of the content in the display of the **show ip cache verbose flow** command uses multiline headings and multiline data fields. [Figure 1](#) shows how to associate the headings with the correct data fields when there are two lines of headings and two lines of data fields. The first line of the headings is associated with the first line of data fields. The second line of the headings is associated with the second line of data fields.

When other features such as IP Multicast are configured, the number of lines in the headings and data fields increases. The method for associating the headings with the correct data fields remains the same.

Figure 1 How to Use the Multiline Headings and Multiline Data Fields in the Display Output from the show ip cache verbose flow Command

```
R3#show ip cache verbose flow
IP packet size distribution (16022 total packets):
  1-32  64  96 128 160 192 224 256 288 320 352 384 416 448 480
  .000 .001 .001 .111 .002 .002 .001 .001 .001 .001 .001 .001 .001 .001 .001

  512 544 576 1024 1536 2048 2560 3072 3584 4096 4608
  .001 .001 .001 .027 .827 .000 .000 .000 .000 .000 .000

IP Flow Switching Cache, 278544 bytes
  6 active, 4090 inactive, 10 added
  213 ager polls, 0 flow alloc failures
  Active flows timeout in 30 minutes
  Inactive flows timeout in 15 seconds
IP Sub Flow Cache, 17416 bytes
  0 active, 1024 inactive, 0 added, 0 added to flow
  0 alloc failures, 0 force free
  1 chunk, 1 chunk added
  last clearing of statistics never

Protocol      Total      Flows      Packets  Bytes  Packets  Active(Sec)  Idle(Sec)
-----      -
              Flows      /Sec      /Flow   /Pkt    /Sec        /Flow        /Flow
UDP-other          4      0.0          1    162      0.0         0.0         15.5
Total:             4      0.0          1    162      0.0         0.0         15.5
```

SrcIf	SrcIPAddress	DstIf	DstIPAddress	Pr	TOS	Flgs	Pkts
Port Msk AS		Port Msk AS	NextHop			B/Pk	Active
Se3/0	10.10.0.7	Local	10.0.0.3	01	00	10	1543
0000 /0 0		0800 /0 0	0.0.0.0			1500	34.3
Se3/0	10.1.0.1	Local	10.0.0.3	01	00	10	1297
0000 /0 0		0800 /0 0	0.0.0.0			1500	34.3
Se3/0	10.5.0.2	Local	10.0.0.3	01	00	10	1845
0000 /0 0		0800 /0 0	0.0.0.0			100	34.3
Se3/0	10.10.0.7	Local	10.0.0.3	01	00	00	12K
0000 /0 0		0000 /0 0	0.0.0.0			1408	34.4
Se1/0	10.2.0.2	Null	255.255.255.255	11	C0	10	1
0208 /0 0		0208 /0 0	0.0.0.0			152	0.0

R3#

NetFlow Multicast Support

When the NetFlow Multicast Support feature is enabled, the **show ip cache verbose flow** command displays the number of replicated packets and the packet byte count for NetFlow multicast accounting. When you configure the NetFlow Version 9 Export Format feature, this command displays additional NetFlow fields in the header.

MPLS-aware NetFlow

When you configure the MPLS-aware NetFlow feature, you can use the **show ip cache verbose flow** command to display both the IP and MPLS portions of MPLS flows in the NetFlow cache on a router line card. To display only the IP portion of the flow record in the NetFlow cache when MPLS-aware NetFlow is configured, use the **show ip cache flow** command.

NetFlow BGP Nexthop

The NetFlow **bgp-nexthop** command can be configured when either the Version 5 export format or the Version 9 export format is configured. The following caveats apply to the **bgp-nexthop** command:

- The values for the BGP nexthop IP address are exported to a NetFlow collector only when the Version 9 export format is configured.
- In order for the BGP information to be populated in the main cache you must either have a NetFlow export destination configured or NetFlow aggregation configured.

Displaying Detailed NetFlow Cache Information on Platforms Running Distributed Cisco Express Forwarding

On platforms running Distributed Cisco Express Forwarding (dCEF), NetFlow cache information is maintained on each line card or Versatile Interface Processor. If you want to use the **show ip cache verbose flow** command to display this information on a distributed platform, you must enter the command at a line card prompt.

Cisco 7500 Series Platform

To display detailed NetFlow cache information on a Cisco 7500 series router that is running distributed dCEF, enter the following sequence of commands:

```
Router# if-con slot-number
LC-slot-number# show ip cache verbose flow
```

For Cisco IOS Releases 12.3(4)T, 12.3(6), and 12.2(20)S and later, enter the following command to display detailed NetFlow cache information:

```
Router# execute-on slot-number show ip cache verbose flow
```

Cisco 12000 Series Platform

To display detailed NetFlow cache information on a Cisco 12000 Series Internet Router, enter the following sequence of commands:

```
Router# attach slot-number
LC-slot-number# show ip cache verbose flow
```

For Cisco IOS Releases 12.3(4)T, 12.3(6), and 12.2(20)S and later, enter the following command to display detailed NetFlow cache information:

```
Router# execute-on slot-number show ip cache verbose flow
```

Examples

The following example shows output from the **show ip cache verbose flow** command:

```
Router# show ip cache verbose flow

IP packet size distribution (25229 total packets):
  1-32  64   96  128  160  192  224  256  288  320  352  384  416  448  480
  .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000

      512  544  576 1024 1536 2048 2560 3072 3584 4096 4608
      .000 .000 .000 .206 .793 .000 .000 .000 .000 .000 .000
```

The preceding output shows the percentage distribution of packets by size. In this display, 20.6 percent of the packets fall in the 1024-byte size range and 79.3 percent fall in the 1536-byte range.

The next section of the output can be divided into three sections. The section and the table corresponding to each are as follows:

- Field Descriptions in the NetFlow Cache Section of the Output ([Table 4 on page 38](#))

- Field Descriptions in the Activity by Protocol Section of the Output (Table 5 on page 38)
- Field Descriptions in the NetFlow Record Section of the Output (Table 6 on page 39)

IP Flow Switching Cache, 278544 bytes
 6 active, 4090 inactive, 17 added
 505 aged polls, 0 flow alloc failures
 Active flows timeout in 1 minutes
 Inactive flows timeout in 10 seconds

IP Sub Flow Cache, 25736 bytes
 12 active, 1012 inactive, 39 added, 17 added to flow
 0 alloc failures, 0 force free
 1 chunk, 1 chunk added
 last clearing of statistics never

Protocol	Total Flows	Flows /Sec	Packets /Flow	Bytes /Pkt	Packets /Sec	Active(Sec) /Flow	Idle(Sec) /Flow
TCP-Telnet	1	0.0	362	940	2.7	60.2	0.0
TCP-FTP	1	0.0	362	840	2.7	60.2	0.0
TCP-FTPD	1	0.0	362	840	2.7	60.1	0.1
TCP-SMTP	1	0.0	361	1040	2.7	60.0	0.1
UDP-other	5	0.0	1	66	0.0	1.0	10.6
ICMP	2	0.0	8829	1378	135.8	60.7	0.0
Total:	11	0.0	1737	1343	147.0	33.4	4.8

SrcIf	SrcIPAddress	DstIf	DstIPAddress	Pr	TOS	Flgs	Pkts
Port Msk AS		Port Msk AS	NextHop			B/Pk	Active
Et0/0.1	10.251.138.218	Et1/0.1	172.16.10.2	06	80	00	65
0015 /0 0		0015 /0 0	0.0.0.0			840	10.8
MAC: (VLAN id)	aaaa.bbbb.cc03	(005)	aaaa.bbbb.cc06	(006)			
Min plen:	840		Max plen:	840			
Min TTL:	59		Max TTL:	59			
IP id:	0						

Et0/0.1	172.16.6.1	Et1/0.1	172.16.10.2	01	00	00	4880
0000 /0 0		0000 /0 0	0.0.0.0			1354	20.1
MAC: (VLAN id)	aaaa.bbbb.cc03	(005)	aaaa.bbbb.cc06	(006)			
Min plen:	772		Max plen:	1500			
Min TTL:	255		Max TTL:	255			
ICMP type:	0		ICMP code:	0			
IP id:	2943		FO:	185			

Et0/0.1	10.10.13.1	Et1/0.1	172.16.10.2	06	80	00	65
0017 /0 0		0017 /0 0	0.0.0.0			940	10.8
MAC: (VLAN id)	aaaa.bbbb.cc03	(005)	aaaa.bbbb.cc06	(006)			
Min plen:	940		Max plen:	940			
Min TTL:	59		Max TTL:	59			
IP id:	0						

Et0/0.1	10.89.38.215	Et1/0.1	172.16.10.2	06	80	00	65
0014 /0 0		0014 /0 0	0.0.0.0			840	10.8
MAC: (VLAN id)	aaaa.bbbb.cc03	(005)	aaaa.bbbb.cc06	(006)			
Min plen:	840		Max plen:	840			
Min TTL:	59		Max TTL:	59			
IP id:	0						

Et0/0.1	10.10.14.1	Et1/0.1	172.16.10.2	06	80	00	66
0019 /0 0		0019 /0 0	0.0.0.0			1040	11.0
MAC: (VLAN id)	aaaa.bbbb.cc03	(005)	aaaa.bbbb.cc06	(006)			
Min plen:	1040		Max plen:	1040			
Min TTL:	59		Max TTL:	59			
IP id:	0						

Et0/0.1	172.16.6.1	Et1/0.1	172.16.10.2	01	00	10	975
0000 /0 0		0800 /0 0	0.0.0.0			1500	20.1

```
show ip cache verbose flow
```

```

MAC: (VLAN id) aaaa.bbbb.cc03 (005)          aaaa.bbbb.cc06 (006)
Min plen:      1500                          Max plen:      1500
Min TTL:       255                           Max TTL:       255
ICMP type:     8                             ICMP code:     0
IP id:         2944
Et0/0.1       10.106.1.1      Et1/0.1     172.16.10.2    01 00 00    1950
0000 /0 0     0000 /0 0     0.0.0.0     1354      8.6
MAC: (VLAN id) aaaa.bbbb.cc03 (005)          aaaa.bbbb.cc06 (006)
Min plen:      772                          Max plen:      1500
Min TTL:       59                           Max TTL:       59
ICMP type:     0                             ICMP code:     0
IP id:         13499                        FO:           185

```

```
R3#
```

Table 4 describes the significant fields shown in the NetFlow cache section of the output.

Table 4 Field Descriptions in the NetFlow Cache Section of the Output

Field	Description
bytes	Number of bytes of memory used by the NetFlow cache.
active	Number of active flows in the NetFlow cache at the time this command was entered.
inactive	Number of flow buffers that are allocated in the NetFlow cache but that were not assigned to a specific flow at the time this command was entered.
added	Number of flows created since the start of the summary period.
ager polls	Number of times the NetFlow code caused entries to expire (used by Cisco for diagnostics only).
flow alloc failures	Number of times the NetFlow code tried to allocate a flow but could not.
last clearing of statistics	The period of time that has passed since the clear ip flow stats privileged EXEC command was last executed. The standard time output format of hours, minutes, and seconds (hh:mm:ss) is used for a period of time less than 24 hours. This time output changes to hours and days after the time exceeds 24 hours.

Table 5 describes the significant fields shown in the activity by protocol section of the output.

Table 5 Field Descriptions in the Activity by Protocol Section of the Output

Field	Description
Protocol	IP protocol and the well-known port number. (Refer to http://www.iana.org/Protocol Assignment Number Services , for the latest RFC values.) Note Only a small subset of all protocols is displayed.
Total Flows	Number of flows in the cache for this protocol since the last time the statistics were cleared.
Flows/Sec	Average number of flows for this protocol per second; equal to the total flows divided by the number of seconds for this summary period.
Packets/Flow	Average number of packets for the flows for this protocol; equal to the total packets for this protocol divided by the number of flows for this protocol for this summary period.

Table 5 *Field Descriptions in the Activity by Protocol Section of the Output (continued)*

Field	Description
Bytes/Pkt	Average number of bytes for the packets for this protocol; equal to the total bytes for this protocol divided by the total number of packets for this protocol for this summary period.
Packets/Sec	Average number of packets for this protocol per second; equal to the total packets for this protocol divided by the total number of seconds for this summary period.
Active(Sec)/Flow	Number of seconds from the first packet to the last packet of an expired flow divided by the number of total flows for this protocol for this summary period.
Idle(Sec)/Flow	Number of seconds observed from the last packet in each nonexpired flow for this protocol until the time at which the show ip cache verbose flow command was entered divided by the total number of flows for this protocol for this summary period.

Table 6 describes the significant fields in the NetFlow record section of the output.

Table 6 *Field Descriptions for the NetFlow Record Section of the Output*

Field	Description
SrcIf	Interface on which the packet was received.
Port Msk AS	Source port number (displayed in hexadecimal format), IP address mask, and autonomous system number. The value of this field is always set to 0 in MPLS flows.
SrcIPAddress	IP address of the device that transmitted the packet.
DstIf	Interface from which the packet was transmitted. Note If an asterisk (*) immediately follows the DstIf field, the flow being shown is an egress flow.
Port Msk AS	Destination port number (displayed in hexadecimal format), IP address mask, and autonomous system. This is always set to 0 in MPLS flows.
DstIPAddress	IP address of the destination device.
NextHop	The BGP next-hop address. This is always set to 0 in MPLS flows.
Pr	IP protocol “well-known” port number, displayed in hexadecimal format. (Refer to http://www.iana.org , <i>Protocol Assignment Number Services</i> , for the latest RFC values.)
ToS	Type of service, displayed in hexadecimal format.
B/Pk	Average number of bytes observed for the packets seen for this protocol.
Flgs	TCP flags, shown in hexadecimal format (result of bitwise OR of TCP flags from all packets in the flow).
Pkts	Number of packets in this flow.
Active	Time the flow has been active.
MAC	Source and destination MAC addresses from the Layer 2 frames in the flow.
VLAN id	Source and destination VLAN IDs from the Layer 2 frames in the flow.

Table 6 Field Descriptions for the NetFlow Record Section of the Output (continued)

Field	Description
Min plen	Minimum packet length for the packets in the flows. Note This value is updated when a datagram with a lower value is received.
Max plen	Maximum packet length for the packets in the flows. Note This value is updated when a datagram with a higher value is received.
Min TTL	Minimum Time-To-Live (TTL) for the packets in the flows. Note This value is updated when a datagram with a lower value is received.
Max TTL	Maximum TTL for the packets in the flows. Note This value is updated when a datagram with a higher value is received.
IP id	IP identifier field for the packets in the flow.
ICMP type	Internet Control Message Protocol (ICMP) type field from the ICMP datagram in the flow.
ICMP code	ICMP code field from the ICMP datagram in the flow.
FO	This is the value of the fragment offset field from the first fragmented datagram in the second flow. The value is: 185

The following example shows the NetFlow output of the **show ip cache verbose flow** command in which the sampler, class-id, and general flags are set. What is displayed for a flow depends on what flags are set in the flow. If the flow was captured by a sampler, the output shows the sampler ID. If the flow was marked by Modular QoS CLI (MQC), the display includes the class ID. If any general flags are set, the output includes the flags.

```
Router# show ip cache verbose flow
SrcIf          SrcIPaddress  DstIf          DstIPaddress  Pr TOS Flgs Pkts
Port Msk AS          Port Msk AS    NextHop        B/Pk Active
BGP: BGP NextHop
Et1/0          10.8.8.8      Et0/0*         10.9.9.9      01 00 10     3
0000 /8 302          0800 /8 300    10.3.3.3      100     0.1
BGP: 2.2.2.2          Sampler: 1 Class: 1 FFlags: 01
```

[Table 7](#) describes the significant fields shown in the NetFlow output for a sampler, for an MQC policy class, and for general flags.

Table 7 show ip cache verbose flow Field Descriptions for a NetFlow Sampler, an MQC Policy Class, and General Flags

Field (with Sample Values)	Description
Sampler: 1	Shows the ID of the sampler that captured the flow. The sampler ID in this example is 1.

Table 7 *show ip cache verbose flow Field Descriptions for a NetFlow Sampler, an MCQ Policy Class, and General Flags (continued)*

Field (with Sample Values)	Description
Class: 1	Shows the ID of the Modular QoS CLI (MQC) traffic class. The class ID in this example is 1.
FFlags: 01	Shows the general flow flag (shown in hexadecimal format), which is the bitwise OR of one or more of the following: <ul style="list-style-type: none"> 01 indicates an output (or egress) flow. (If this bit is not set, the flow is an input [or ingress] flow.) 02 indicates a flow that was dropped (for example, by an access control list [ACL]). 04 indicates a Multiprotocol Label Switching (MPLS) flow. 08 indicates an IP version 6 (IPv6) flow. The flow flag in this example is 01 (an egress flow).

The following example shows the NetFlow output for the **show ip cache verbose flow** command when NetFlow BGP next-hop accounting is enabled:

```
Router# show ip cache verbose flow
...
SrcIf          SrcIPAddress  DstIf          DstIPAddress  Pr TOS Flgs  Pkts
Port Msk AS    Port Msk AS   NextHop        B/Pk  Active
BGP:BGP_NextHop
Et0/0/2       10.0.0.2      Et0/0/4       10.0.0.5      01 00 10     20
0000 /8  0          0800 /8  0          10.0.0.6      100    0.0
BGP:26.0.0.6
Et0/0/2       10.0.0.2      Et0/0/4       10.0.0.7      01 00 10     20
0000 /8  0          0800 /8  0          10.0.0.6      100    0.0
BGP:26.0.0.6
Et0/0/2       10.0.0.2      Et0/0/4       10.0.0.7      01 00 10     20
0000 /8  0          0000 /8  0          10.0.0.6      100    0.0
BGP:26.0.0.6
```

[Table 8](#) describes the significant fields shown in the NetFlow BGP next-hop accounting lines of the output.

Table 8 *show ip cache verbose flow Field Descriptions in NetFlow BGP Next-Hop Accounting Output*

Field	Description
BGP:BGP_NextHop	Destination address for the BGP next hop

The following example shows the NetFlow output for the **show ip cache verbose flow** command when NetFlow multicast accounting is configured:

```
Router# show ip cache verbose flow
...
SrcIf          SrcIPAddress  DstIf          DstIPAddress  Pr TOS Flgs  Pkts
Port Msk AS    Port Msk AS   NextHop        B/Pk  Active
IPM:OPkts     OBytes
IPM:          0           0
```

show ip cache verbose flow

```

Et1/1/1      10.0.0.1      Null      192.168.1.1      01 55 10      100
0000 /8  0      2800      0000 /0  0      0.0.0.0      28      0.0
IPM: 100
Et1/1/1      10.0.0.1      Se2/1/1.16  192.168.1.1      01 55 10      100
0000 /8  0      0000 /0  0      0.0.0.0      28      0.0
IPM: 0
Et1/1/2      10.0.0.1      Et1/1/4      192.168.2.2      01 55 10      100
0000 /8  0      0000 /0  0      0.0.0.0      28      0.1
Et1/1/2      10.0.0.1      Null      192.168.2.2      01 55 10      100
0000 /8  0      0000 /0  0      0.0.0.0      28      0.1
IPM: 100      2800

```

Table 9 describes the significant fields shown in the NetFlow multicast accounting lines of the output.

Table 9 *show ip cache verbose flow Field Descriptions in NetFlow Multicast Accounting Output*

Field	Description
OPkts	Displays the number of IP multicast (IPM) output packets
OBytes	Displays the number of IPM output bytes
DstIPAddress	Displays the destination IP address for the IPM output packets

The following example shows the output for both the IP and MPLS sections of the flow record in the NetFlow cache when MPLS-aware NetFlow is enabled:

```

Router# show ip cache verbose flow

...
SrcIf      SrcIPAddress  DstIf      DstIPAddress  Pr TOS Flgs Pkts
Port Msk AS      Port Msk AS  NextHop      B/Pk Active
PO3/0      10.1.1.1      PO5/1      10.2.1.1      01 00 10      9
0100 /0  0      0200 /0  0      0.0.0.0      100 0.0
Pos:Lbl-Exp-S 1:12305-6-0 (LDP/10.10.10.10) 2:12312-6-1

```

Table 10 describes the significant fields for the IP and MPLS sections of the flow record in the output.

Table 10 *show ip cache verbose flow Field Descriptions for the IP and MPLS Sections of the Flow Record in the Output*

Field	Description
Pos	Position of the MPLS label in the label stack, starting with 1 as the top label.
Lbl	Value given to the MPLS label by the router.
Exp	Value of the experimental bit.
S	Value of the end-of-stack bit. Set to 1 for the oldest entry in the stack and to 0 for all other entries.
LDP/10.10.10.10	Type of MPLS label and associated IP address for the top label in the MPLS label stack.

Related Commands

Command	Description
clear ip flow stats	Clears the NetFlow accounting statistics.
show ip cache flow	Displays a summary of the NetFlow accounting statistics.

Command	Description
show ip flow interface	Displays NetFlow accounting configuration for interfaces.
show ip interface	Displays the usability status of interfaces configured for IP.

Glossary

BGP—Border Gateway Protocol. Interdomain routing protocol that replaces exterior border gateway protocol (EBGP). BGP exchanges reachability information with other BGP systems. It is defined by RFC 1163.

BGP next hop—IP address of the next hop to be used to reach a specific destination.

CEF—Cisco Express Forwarding. Layer 3 IP switching technology that optimizes network performance and scalability for networks with large and dynamic traffic patterns.

dCEF—distributed Cisco Express Forwarding. Type of CEF switching in which line cards (such as VIP line cards) maintain an identical copy of the forwarding information base (FIB) and adjacency tables. The line cards perform the express forwarding between port adapters; this relieves the route/switch processor of involvement in switching.

fast switching—Cisco feature in which a route cache expedites packet switching through a router.

FIB—forwarding information base. Table containing the information needed to forward IP datagrams. At a minimum, this table contains the interface identifier and next hop information for each reachable destination network prefix. The FIB is distinct from the routing table (also called the routing information base), which holds all routing information received from routing peers.

flow—Set of packets with the same source IP address, destination IP address, source and destination ports, and type of service, and the same interface on which flow is monitored. Ingress flows are associated with the input interface, and egress flows are associated with the output interface.

NetFlow—Cisco IOS acceleration and accounting feature that maintains per-flow information.

NetFlow Aggregation—A NetFlow feature that lets you summarize NetFlow export data on an IOS router before the data is exported to a NetFlow data collection system such as the NetFlow FlowCollector. This feature lowers bandwidth requirements for NetFlow export data and reduces platform requirements for NetFlow data collection devices.

NetFlow Collection Engine (formerly NetFlow FlowCollector)—Cisco application that is used with NetFlow on Cisco routers and Catalyst 5000 series switches. The NetFlow Collection Engine collects packets from the router that is running NetFlow and decodes, aggregates, and stores them. You can generate reports on various aggregations that can be set up on the NetFlow Collection Engine.

NetFlow v9—NetFlow export format Version 9. A flexible and extensible means to carry NetFlow records from a network node to a collector. NetFlow Version 9 has definable record types and is self-describing for easier NetFlow Collection Engine configuration.

ToS—type of service byte. Second byte in the IP header that indicates the desired quality of service for a particular datagram.

**Note**

Refer to the [Internetworking Terms and Acronyms](#) for terms not included in this glossary.

CCVP, the Cisco logo, and Welcome to the Human Network are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networkers, Networking Academy, Network Registrar, PIX, ProConnect, ScriptShare, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0711R)

© 2003– 2005 Cisco Systems, Inc. All rights reserved.

