

Flexible NetFlow—IPv4 Unicast Flows

The Flexible Netflow-IPv4 Unicast Flows feature enables Flexible NetFlow to monitor IPv4 traffic.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see **Bug Search Tool** and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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

Information About Flexible NetFlow IPv4 Unicast Flows

Flexible NetFlow—IPv4 Unicast Flows Overview

This feature enables Flexible NetFlow to monitor IPv4 traffic.

How to Configure Flexible NetFlow IPv4 Unicast Flows

Configuring a Flow Record

Perform this task to configure a customized flow record.

Customized flow records are used to analyze traffic data for a specific purpose. A customized flow record must have at least one **match** criterion for use as the key field and typically has at least one **collect** criterion for use as a nonkey field.

There are hundreds of possible permutations of customized flow records. This task shows the steps that are used to create one of the possible permutations. Modify the steps in this task as appropriate to create a customized flow record for your requirements.

SUMMARY STEPS

- 1. enable
- 2. configure terminal
- 3. flow record record-name
- 4. description description
- 5. match {ipv4 | ipv6} {destination | source} address
- 6. Repeat Step 5 as required to configure additional key fields for the record.
- 7. collect interface {input | output}
- 8. Repeat Step 7 as required to configure additional nonkey fields for the record.
- 9. end
- **10. show flow record** record-name
- 11. show running-config flow record record-name

DETAILED STEPS

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

	Command or Action	Purpose	
Step 3	flow record record-name	Creates a flow record and enters Flexible NetFlow flow record configuration mode.	
	Example:	• This command also allows you to modify an existing	
	Device(config)# flow record FLOW-RECORD-1	flow record.	
Step 4	description description	(Optional) Creates a description for the flow record.	
	Example:		
	Device(config-flow-record)# description Used for basic traffic analysis		
Step 5	match {ipv4 ipv6} {destination source} address	Note This example configures the IPv4 destination address as a key field for the record. For information about	
	Example:	the other key fields available for the match ipv4	
	Device(config-flow-record) # match ipv4	command, and the other match commands that are	
	destination address	IOS Flexible NetFlow Command Reference.	
Step 6	Repeat Step 5 as required to configure additional key fields for the record.		
Step 7	collect interface {input output}	Configures the input interface as a nonkey field for the record.	
	Example:	Note This example configures the input interface as a non-low field for the record. For information on the	
	Dowice (config-flow-record) # collect interface	other collect commands that are available to configure	
	input	nonkey fields, refer to the <i>Cisco IOS Flexible NetFlow Command Reference</i> .	
Step 8	Repeat Step 7 as required to configure additional nonkey fields for the record.		
Step 9	end	Exits Flexible NetFlow flow record configuration mode and returns to privileged EXEC mode.	
	Example:		
	Device(config-flow-record)# end		
Step 10	show flow record record-name	(Optional) Displays the current status of the specified flow record.	
	Example:		
	Device# show flow record FLOW_RECORD-1		
Step 11	show running-config flow record record-name	(Optional) Displays the configuration of the specified flow record.	
	Example:		
	Device# show running-config flow record FLOW_RECORD-1		

Configuring the Flow Exporter

Perform this required task to configure the flow exporter.



Note

Each flow exporter supports only one destination. If you want to export the data to multiple destinations, you must configure multiple flow exporters and assign them to the flow monitor.

You can export to a destination using either an IPv4 or IPv6 address.

SUMMARY STEPS

- 1. enable
- 2. configure terminal
- **3.** flow exporter exporter-name
- 4. description description
- **5.** destination {*ip-address* | *hostname*} [vrf *vrf-name*]
- 6. export-protocol {netflow-v5 | netflow-v9 | ipfix}
- 7. dscp dscp
- 8. source interface-type interface-number
- 9. option {exporter-stats | interface-table | sampler-table | vrf-table} [timeout seconds]
- **10.** output-features
- **11. template data timeout** seconds
- **12. transport** udp udp-port
- **13. ttl** seconds
- 14. end
- **15. show flow exporter** *exporter-name*
- 16. show running-config flow exporter exporter-name

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Device> enable	

	Command or Action	Purpose
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	flow exporter exporter-name	Creates the flow exporter and enters Flexible NetFlow flow exporter configuration mode.
	Example:	This command also allows you to modify an existing flow
	Device(config)# flow exporter EXPORTER-1	exporter.
Step 4	description description	(Optional) Configures a description to the exporter that will appear in the configuration and the display of the show flow
	Example:	exporter command.
	<pre>Device(config-flow-exporter)# description Exports to the datacenter</pre>	
Step 5	destination { <i>ip-address</i> <i>hostname</i> } [vrf <i>vrf-name</i>]	Specifies the IP address or hostname of the destination system for the exporter.
	Example:	Note You can export to a destination using either an IPv4 or
	Device(config-flow-exporter)# destination 172.16.10.2	IPv6 address.
Step 6	export-protocol {netflow-v5 netflow-v9 ipfix}	Specifies the version of the NetFlow export protocol used by the exporter. The export of extracted fields from NBAR is supported
	Example:	only over IPFIX.
	<pre>Device(config-flow-exporter)# export-protocol netflow-v9</pre>	• Default: netflow-v9 .
Step 7	dscp dscp	(Optional) Configures differentiated services code point (DSCP) parameters for datagrams sent by the exporter.
	Example:	• The range for the <i>dscp</i> argument is from 0 to 63. Default:
	Device(config-flow-exporter)# dscp 63	0.
Step 8	source interface-type interface-number	(Optional) Specifies the local interface from which the exporter will use the IP address as the source IP address for exported
	Example:	datagrams.
	Device(config-flow-exporter)# source ethernet 0/0	
Step 9	option {exporter-stats interface-table sampler-table vrf-table} [timeout seconds]	(Optional) Configures options data parameters for the exporter.You can configure all three options concurrently.
	Example:	• The range for the <i>seconds</i> argument is 1 to 86,400. Default: 600.
	pevice(config-flow-exporter)# option exporter-stats timeout 120	

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Command or Action	Purpose
output-features	(Optional) Enables sending export packets using quality of service (QoS) and encryption.
Example:	
Device(config-flow-exporter)# output-features	
template data timeout seconds	(Optional) Configures resending of templates based on a timeout.
Example:	• The range for the <i>seconds</i> argument is 1 to 86400 (86400 seconds = 24 hours).
<pre>Device(config-flow-exporter)# template data timeout 120</pre>	
transport udp udp-port	Specifies the UDP port on which the destination system is listening for exported datagrams.
Example:	• The range for the <i>udp-port</i> argument is from 1 to 65536.
Device(config-flow-exporter)# transport udp 650	
ttl seconds	(Optional) Configures the time-to-live (TTL) value for datagrams sent by the exporter.
Example:	• The range for the <i>seconds</i> argument is from 1 to 255.
Device(config-flow-exporter)# ttl 15	
end	Exits flow exporter configuration mode and returns to privileged EXEC mode.
Example:	
Device(config-flow-exporter)# end	
show flow exporter exporter-name	(Optional) Displays the current status of the specified flow exporter.
Example:	
Device# show flow exporter FLOW_EXPORTER-1	
show running-config flow exporter exporter-name	(Optional) Displays the configuration of the specified flow exporter.
Example:	
Device# show running-config flow exporter FLOW_EXPORTER-1	
	Command or Action output-features Example: Device(config-flow-exporter)# output-features template data timeout seconds Example: Device(config-flow-exporter)# template data timeout 120 transport udp udp-port Example: Device(config-flow-exporter)# transport udp 650 ttl seconds Example: Device(config-flow-exporter)# transport udp 650 ttl seconds Example: Device(config-flow-exporter)# ttl 15 end Example: Device(config-flow-exporter)# end show flow exporter exporter-name Example: Device(config-flow-exporter)# end show running-config flow exporter exporter-name Example: Device# show flow exporter fLOW_EXPORTER-1 show running-config flow exporter exporter-name Example: Device# show running-config flow exporter exporter-name Example: Device# show running-config flow exporter flow exporter FLOW_EXPORTER-1

Creating a Flow Monitor

Perform this required task to create a customized flow monitor.

Each flow monitor has a separate cache assigned to it. Each flow monitor requires a record to define the contents and layout of its cache entries. These record formats can be a user-defined format. An advanced user can create a customized format using the **flow record** command.

Before You Begin

If you want to use a customized record, you must create the customized record before you can perform this task. If you want to add a flow exporter to the flow monitor for data export, you must create the exporter before you can complete this task.

Note

You must use the **no ip flow monitor** command to remove a flow monitor from all of the interfaces to which you have applied it before you can modify the parameters for the **record** command on the flow monitor. For information about the **ip flow monitor** command, refer to the *Cisco IOS Flexible NetFlow Command Reference*.

SUMMARY STEPS

- 1. enable
- 2. configure terminal
- 3. flow monitor monitor-name
- 4. description description
- **5.** record {*record-name*}
- 6. cache {timeout {active} seconds | type { normal }
- 7. Repeat Step 6 as required to finish modifying the cache parameters for this flow monitor.
- 8. exporter exporter-name
- 9. end
- 10. show flow monitor [[name] monitor-name [cache [format {csv | record | table}]]]]
- 11. show running-config flow monitor monitor-name

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example: > enable	• Enter your password if prompted.
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	<pre># configure terminal</pre>	

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	Command or Action	Purpose
Step 3	flow monitor monitor-name	Creates a flow monitor and enters Flexible NetFlow flow monitor configuration mode.
	Example:	• This command also allows you to modify an
	(config) # flow monitor FLOW-MONITOR-1	existing flow monitor.
Step 4	description description	(Optional) Creates a description for the flow monitor.
	Example:	
	<pre>(config-flow-monitor)# description Used for basic ipv4 traffic analysis</pre>	
Step 5	record {record-name}	Specifies the record for the flow monitor.
	Example:	
	(config-flow-monitor) # record FLOW-RECORD-1	
Step 6	<pre>cache {timeout {active} seconds type { normal }</pre>	
	Example:	
	Device(config-flow-monitor)# cache type normal	
Step 7	Repeat Step 6 as required to finish modifying the cache parameters for this flow monitor.	
Step 8	exporter exporter-name	(Optional) Specifies the name of an exporter that was created previously.
	Example:	
	<pre>(config-flow-monitor) # exporter EXPORTER-1</pre>	
Step 9	end	Exits Flexible NetFlow flow monitor configuration mode and returns to privileged EXEC mode.
	Example:	
	(config-flow-monitor)# end	
Step 10	show flow monitor [[name] monitor-name [cache [format {csv record table}]]]	(Optional) Displays the status for a Flexible NetFlow flow monitor.
	Example:	
	<pre># show flow monitor FLOW-MONITOR-2 cache</pre>	
Step 11	show running-config flow monitor monitor-name	(Optional) Displays the configuration of the specified flow monitor
	Example:	
	# show running-config flow monitor FLOW_MONITOR-1	
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Applying a Flow Monitor to an Interface

Before it can be activated, a flow monitor must be applied to at least one interface. Perform this required task to activate a flow monitor.

SUMMARY STEPS

- 1. enable
- 2. configure terminal
- 3. interface type number
- 4. {ip | ipv6} flow monitor *monitor-name* {input | output}
- **5.** Repeat Steps 3 and 4 to activate a flow monitor on any other interfaces in the device over which you want to monitor traffic.
- 6. end
- 7. show flow interface type number
- 8. show flow monitor name monitor-name cache format record

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	interface type number	Specifies an interface and enters interface configuration mode.
	Example:	
	<pre>Device(config)# interface GigabitEthernet 0/0/0</pre>	
Step 4	{ip ipv6} flow monitor monitor-name {input output}	Activates a flow monitor that was created previously by assigning it to the interface to analyze traffic.
	Example:	
	<pre>Device(config-if)# ip flow monitor FLOW-MONITOR-1 input</pre>	

DETAILED STEPS

	Command or Action	Purpose
Step 5	Repeat Steps 3 and 4 to activate a flow monitor on any other interfaces in the device over which you want to monitor traffic.	
Step 6	end	Exits interface configuration mode and returns to privileged EXEC mode.
	Example:	
	Device(config-if)# end	
Step 7	show flow interface type number	Displays the status of Flexible NetFlow (enabled or disabled) on the specified interface.
	Example:	
	Device# show flow interface GigabitEthernet 0/0/0	
Step 8	show flow monitor name monitor-name cache format record	Displays the status, statistics, and flow data in the cache for the specified flow monitor.
	Example:	
	Device# show flow monitor name FLOW_MONITOR-1 cache format record	

Configuring and Enabling Flexible NetFlow with Data Export

You must create a flow monitor to configure the types of traffic for which you want to export the cache data. You must enable the flow monitor by applying it to at least one interface to start exporting data. To configure and enable Flexible NetFlow with data export, perform this required task.

Each flow monitor has a separate cache assigned to it. Each flow monitor requires a record to define the contents and layout of its cache entries. The record format can be one of the predefined record formats, or an advanced user may create his or her own record format using the **collect** and **match**commands in Flexible NetFlow flow record configuration mode.

Note You must remove a flow monitor from all of the interfaces to which you have applied it before you can modify the **record** format of the flow monitor.

SUMMARY STEPS

- 1. enable
- 2. configure terminal
- 3. flow monitor monitor-name
- 4. record {record-name | netflow-original | netflow {ipv4 | ipv6 record [peer] }]
- **5.** exporter exporter-name
- 6. exit
- 7. interface type number
- 8. {ip | ipv6} flow monitor *monitor-name* {input | output}
- 9. end
- **10.** show flow monitor [[name] monitor-name [cache [format {csv | record | table}]][statistics]]

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	flow monitor monitor-name	Creates a flow monitor and enters Flexible NetFlow flow monitor configuration mode.
	Example:	This command also allows you to modify an existing
	Device(config)# flow monitor FLOW-MONITOR-1	flow monitor.
Step 4	record {record-name netflow-original netflow {ipv4 ipv6 record [peer] }]	Specifies the record for the flow monitor.
	Example:	
	<pre>Device(config-flow-monitor)# record netflow ipv4 original-input</pre>	
Step 5	exporter exporter-name	Specifies the name of an exporter that you created previously.
	Example:	
	Device(config-flow-monitor)# exporter EXPORTER-1	

	Command or Action	Purpose
Step 6	exit	Exits Flexible NetFlow flow monitor configuration mode and returns to global configuration mode.
	Example:	
	<pre>Device(config-flow-monitor)# exit</pre>	
Step 7	interface type number	Specifies an interface and enters interface configuration mode.
	Example:	
	Device(config)# interface GigabitEthernet 0/0/0	
Step 8	{ip ipv6} flow monitor monitor-name {input output}	Activates the flow monitor that you created previously by assigning it to the interface to analyze traffic.
	Example:	
	Device(config-if)# ip flow monitor FLOW-MONITOR-1 input	
Step 9	end	Exits interface configuration mode and returns to privileged EXEC mode.
	Example:	
	Device(config-if)# end	
Step 10	show flow monitor [[name] <i>monitor-name</i> [cache [format {csv record table}]][statistics]]	(Optional) Displays the status and statistics for a Flexible NetFlow flow monitor. This will verify data export is enabled for the flow monitor cache.
	Example:	
	Device# show flow monitor FLOW-MONITOR-2 cache	

Configuration Examples for Flexible NetFlow IPv4Unicast Flows

Example: Configuring Multiple Export Destinations

The following example shows how to configure multiple export destinations for Flexible NetFlow for IPv4 or IPv6 traffic.

This sample starts in global configuration mode:

```
!
flow exporter EXPORTER-1
destination 172.16.10.2
transport udp 90
exit
!
flow exporter EXPORTER-2
destination 172.16.10.3
```

```
transport udp 90
 exit
flow record v4 r1
match ipv4 tos
match ipv4 protocol
match ipv4 source address
match ipv4 destination address
match transport source-port
match transport destination-port
collect counter bytes long
collect counter packets long
flow record v6 r1
match ipv6 traffic-class
match ipv6 protocol
match ipv6 source address
match ipv6 destination address
match transport source-port
match transport destination-port
collect counter bytes long
collect counter packets long
flow monitor FLOW-MONITOR-1
 record v4 r1
 exporter EXPORTER-2
 exporter EXPORTER-1
flow monitor FLOW-MONITOR-2
record v6 r1
 exporter \overline{E}XPORTER-2
 exporter EXPORTER-1
ip cef
interface GigabitEthernet1/0/0
 ip address 172.16.6.2 255.255.255.0
 ipv6 address 2001:DB8:2:ABCD::2/48
 ip flow monitor FLOW-MONITOR-1 input
 ipv6 flow monitor FLOW-MONITOR-2 input
T
```

The following display output shows that the flow monitor is exporting data to the two exporters:

```
Device# show flow monitor FLOW-MONITOR-1
Flow Monitor FLOW-MONITOR-1:
               User defined
 Description:
  Flow Record:
                    v4 r1
 Flow Exporter:
                    EXPORTER-1
                    EXPORTER-2
 Cache:
                      normal (Platform cache)
   Type:
   Status:
                      allocated
                      4096 entries / 311316 bytes
   Size:
   Inactive Timeout: 15 secs
                      1800 secs
    Active Timeout:
   Update Timeout:
                      1800 secs
```

Example: Configuring Flexible NetFlow Egress Accounting for IPv4 and IPv6 Traffic

The following example shows how to configure Flexible NetFlow egress accounting for IPv4 and IPv6 traffic. This example starts in global configuration mode.

!

```
flow record v4 r1
match ipv4 tos
match ipv4 protocol
match ipv4 source address
match ipv4 destination address
match transport source-port
match transport destination-port
collect counter bytes long
collect counter packets long
flow record v6 r1
match ipv6 traffic-class
match ipv6 protocol
match ipv6 source address
match ipv6 destination address
match transport source-port
match transport destination-port
collect counter bytes long
collect counter packets long
flow monitor FLOW-MONITOR-1
record v4 r1
 exit
flow monitor FLOW-MONITOR-2
record v6 r1
exit
ip cef
ipv6 cef
interface GigabitEthernet0/0/0
 ip address 172.16.6.2 255.255.255.0
 ipv6 address 2001:DB8:2:ABCD::2/48
 ip flow monitor FLOW-MONITOR-1 output
ipv6 flow monitor FLOW-MONITOR-2 output
t
```

Feature Information for Flexible NetFlow - IPv4 Unicast Flows

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

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

Feature Name	Releases	Feature Information
Flexible NetFlow - IPv4 Unicast	12.2(33)SRC	Enables Flexible NetFlow to
Flows	12.2(50)SY	monitor IPv4 traffic.
	12.4(9)T	Support for this feature was added
	15.0(1)SY	Cisco IOS Release 12.2(33)SRC.
	15.0(1)SY1	The following commands were
	Cisco IOS XE Release 3.1S	introduced or modified: collect
	Cisco IOS XE Release 3.2SE	collect ipv4, collect ipv4
		destination, collect ipv4
		fragmentation, collect ipv4 section_collect ipv4 source_in
		flow monitor, match ipv4, match
		ipv4 destination, match ipv4
		section, match ipv4 source,
		match routing, record, show flow
		monitor, show flow record.

Table 1: Feature Information for Flexible NetFlow - IPv4 Unicast Flow

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