



Preface

The *Cisco IOS XR Netflow Configuration Guide for the Cisco CRS Router* preface contains the following sections:

- [Changes to This Document](#), page NFC-v
- [Obtaining Documentation and Submitting a Service Request](#), page NFC-v

Changes to This Document

[Table 1](#) lists the technical changes made to this document since it was first printed.

Table 1 *Changes to This Document*

Revision	Date	Change Summary
OL-24711-01	April 2011	Initial release of this document.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

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Configuring NetFlow on Cisco IOS XR Software

This module describes the configuration of NetFlow on the Cisco CRS-1 Router.

A NetFlow flow is a unidirectional sequence of packets that arrive on a single interface (or subinterface), and have the same values for key fields.

NetFlow is useful for the following:

- Accounting/Billing—NetFlow data provides fine grained metering for highly flexible and detailed resource utilization accounting.
- Network Planning and Analysis—NetFlow data provides key information for strategic network planning.
- Network Monitoring—NetFlow data enables near real-time network monitoring capabilities.

Feature History for Configuring NetFlow on Cisco IOS XR Software

Release	Modification
Release 3.2	This feature was introduced.
Release 3.3.0	<ul style="list-style-type: none">• Information was added about using the bgp attribute-download command to enable the NetFlow BGP data export function.• NetFlow support for subinterfaces was introduced.
Release 3.3.1	<ul style="list-style-type: none">• Support for Multiprotocol Label Switching (MPLS)-aware NetFlow was introduced.• The mpls keyword was added to the flow command to support MPLS-aware NetFlow.• The mpls keyword was added to the record command to support MPLS-aware NetFlow.

Release 3.4.0	<ul style="list-style-type: none"> The following commands were moved to flow exporter map configuration mode: <ul style="list-style-type: none"> destination dscp source transport udp NetFlow was updated so that a single flow monitor map supports up to 8 exporters. NetFlow was updated so that users could specify the number of MPLS labels to use as keys.
Release 3.4.1	<ul style="list-style-type: none"> The record mpls field was introduced in the show command output from the Cisco CRS-1 Router.
Release 3.5.0	<ul style="list-style-type: none"> The record ipv6 command was introduced. Support for IPv6 aware NetFlow.
Release 4.0.1	<p>The following features were added:</p> <ul style="list-style-type: none"> Destination-based NetFlow Accounting. Reporting BGP attributes for VRF prefixes in Sampled Netflow.

Contents

This module includes the following sections:

- [Prerequisites for Configuring NetFlow, page RC-2](#)
- [Restrictions for Configuring NetFlow, page RC-2](#)
- [Information About Configuring NetFlow, page RC-3](#)
- [How to Configure NetFlow on Cisco IOS XR Software, page RC-10](#)
- [Additional References, page RC-29](#)
- [RFCs, page RC-30](#)

Prerequisites for Configuring NetFlow

To perform these configuration tasks, your Cisco IOS XR software system administrator must assign you to a user group associated with a task group that includes the corresponding command task IDs. If you need assistance with your task group assignment, contact your system administrator.

Restrictions for Configuring NetFlow

Consider the following restrictions when configuring NetFlow in Cisco IOS XR software:

- When the Netflow router is configured at the tail-end of the PW tunnel, the Netflow ingress is unable to record the PW traffic in the cache. This behavior is because of the egress microcode limitation for L2VPN which cannot handle the Netflow start offset packets. The egress microcode disables the ingress Netflow processing for the SNF ingress start offset packets and hence these packets are not included in the Netflow statistics.



Note In IOS XR, Netflow implementation happens using fast path.

- You must configure a source interface. If you do not configure a source interface, the exporter will remain in a disabled state.
- Cisco IOS XR software supports export format Version 9 only.
- You must configure a valid record map name for every flow monitor map.



Tip

We recommend that you do not use the management interface to export NetFlow packets. Exporting the management interface does not work efficiently.

Information About Configuring NetFlow

To implement NetFlow, you must understand the following concepts:

- [NetFlow Overview, page RC-3](#)
- [Monitor Map Overview, page RC-4](#)
- [Sampler Map Overview, page RC-4](#)
- [Exporter Map Overview, page RC-4](#)
- [NetFlow Configuration Submodes, page RC-5](#)
- [MPLS Flow Monitor with IPv4 and IPv6 Support, page RC-8](#)
- [Destination-based NetFlow Accounting, page RC-9](#)

NetFlow Overview

A flow is exported as part of a NetFlow export User Datagram Protocol (UDP) datagram under the following circumstances:

- The flow has been inactive or active for too long.
- The flow cache is getting full.
- One of the counters (packets and or bytes) has wrapped.
- The user forces the flow to export.

NetFlow export UDP datagrams are sent to an external flow collector device that provides NetFlow export data filtering and aggregation. The export of data consists of expired flows and control information.

The NetFlow infrastructure is based on the configuration and use of the following maps:

- Monitor map
- Sampler map

- Exporter map

These maps are described in the sections that follow.

Monitor Map Overview

A monitor map contains name references to the flow record map and flow exporter map. Monitor maps are applied to an interface. You can configure the following monitor map attributes:

- Number of entries in the flow cache
- Type of cache (permanent or normal). Permanent caches do not have their entries removed from the cache unless they are explicitly cleared by the user
- Active flow timeout
- Inactive flow timeout
- Update timeout
- Default timeouts
- Record type of packets sampled and collected



Note The record name specifies the type of packets that NetFlow samples as they pass through the router. Currently, MPLS, IPv4, and IPv6 packet sampling is supported.



Note

The active flow and inactive flow timeouts are associated with a normal cache type. The update timeout is associated with the permanent cache type.

Sampler Map Overview

The sampler map specifies the rate at which packets (one out of n packets) are sampled. On high bandwidth interfaces, applying NetFlow processing to every single packet can result in significant CPU utilization. Sampler map configuration is typically geared towards such high speed interfaces.

If NetFlow is applied in both directions, then the flow record packets are policed at the rate of 35,000 packets per second per direction on the Cisco CRS-1 Router. If NetFlow is applied in one direction only, then the flow record packets are policed at the rate of 70,000 packets per second per direction on the Cisco CRS-1 Router.



Note

These values are for MSC-Rev. A line cards. MSC-Rev. B line cards for a Cisco CRS-1 Router have a higher policing rate of 62,500 packets per second per direction, with 125,000 packets per second applied in a single direction.

Exporter Map Overview

An exporter map contains user network specification and transport layer details for the NetFlow export packet. The **flow exporter-map** command allows you to configure collector and version attributes. You can configure the following collector information:

- Export destination IP address
- DSCP value for export packet
- Source interface
- UDP port number (This is where the collector is listening for NetFlow packets.)
- Transport protocol for export packets

**Note**

In Cisco IOS XR software, UDP is the only supported transport protocol for export packets.

**Note**

NetFlow export packets use the IP address that is assigned to the source interface. If the source interface does not have an IP address assigned to it, the exporter will be inactive.

You can also configure the following export version attributes:

- Template timeout
- Template data timeout
- Template options timeout
- Interface table timeout
- Sampler table timeout

**Note**

A single flow monitor map can support up to eight exporters.

NetFlow Configuration Submodes

In Cisco IOS XR, NetFlow map configuration takes place in map-specific submodes. Cisco IOS XR supports the following NetFlow map configuration submodes:

- [Flow Exporter Map Configuration Submode, page RC-6](#)
- [Flow Exporter Map Version Configuration Submode, page RC-6](#)
- [Flow Monitor Map Configuration Submode, page RC-7](#)
- [Sampler Map Configuration Submode, page RC-7](#)

**Tip**

The Cisco IOS XR software allows you to issue most commands available under submodes as one single command string from global configuration mode. For example, you can issue the **record ipv4** command from the flow monitor map configuration submode as follows:

```
RP/0/RP0/CPU0:router(config)# flow monitor-map fmm
RP/0/RP0/CPU0:router(config-fmm)# record ipv4
```

Alternatively, you can issue the same command from global configuration mode, as shown in the following example:

```
RP/0/RP0/CPU0:router(config)# flow monitor-map fmm record ipv4
```

Flow Exporter Map Configuration Submode

When you issue the **flow exporter-map** *fem-name* command in global configuration mode, the command-line interface (CLI) prompt changes to “config-fem,” indicating that you have entered the flow exporter map configuration submode.

In the following sample output, the question mark (?) online help function displays all the commands available under the flow exporter map configuration submode:

```
RP/0/RP0/CPU0:router(config)# flow exporter-map fem

RP/0/RP0/CPU0:router(config-fem)# ?

clear          Clear the uncommitted configuration
clear          Clear the configuration
commit         Commit the configuration changes to running
describe       Describe a command without taking real actions
destination    Export destination configuration
do             Run an exec command
dscp           Specify DSCP value for export packets
exit           Exit from this submode
no             Negate a command or set its defaults
pwd           Commands used to reach current submode
root           Exit to the global configuration mode
show           Show contents of configuration
source         Source interface
transport      Specify the transport protocol for export packets
version        Specify export version parameters
```



Note

If you enter the **version** command, you enter the flow exporter map version configuration submode.



Note

A single flow monitor map can support up to eight exporters.

Flow Exporter Map Version Configuration Submode

When you issue the **version v9** command in the flow exporter map configuration submode, the CLI prompt changes to “config-fem-ver,” indicating that you have entered the flow exporter map version configuration submode.

In the following sample output, the question mark (?) online help function displays all the commands available under the flow exporter map version configuration submode:

```
RP/0/RP0/CPU0:router(config-fem)# version v9

RP/0/RP0/CPU0:router(config-fem-ver)# ?

commit         Commit the configuration changes to running
describe       Describe a command without taking real actions
do             Run an exec command
exit           Exit from this submode
no             Negate a command or set its defaults
options        Specify export of options template
show           Show contents of configuration
template       Specify template export parameters
```


Flow Monitor Map Configuration Submode

When you issue the **flow monitor-map** *map_name* command in global configuration mode, the CLI prompt changes to “config-fmm,” indicating that you have entered the flow monitor map configuration submode.

In the following sample output, the question mark (?) online help function displays all the commands available under the flow monitor map configuration submode:

```
RP/0/RP0/CPU0:router(config)# flow monitor-map fmm

RP/0/RP0/CPU0:router(config-fmm)# ?

cache      Specify flow cache attributes
commit     Commit the configuration changes to running
describe   Describe a command without taking real actions
do         Run an exec command
exit       Exit from this submode
exporter   Specify flow exporter map name
no         Negate a command or set its defaults
record     Specify a flow record map name
show       Show contents of configuration

RP/0/RP0/CPU0:router(config-fmm)#
```

Sampler Map Configuration Submode

When you issue the **sampler-map** *map_name* command in global configuration mode, the CLI prompt changes to “config-sm,” indicating that you have entered the sampler map configuration submode.

In the following sample output, the question mark (?) online help function displays all the commands available under the sampler map configuration submode:

```
RP/0/RP0/CPU0(config)# sampler-map fmm

RP/0/RP0/CPU0:router(config-sm)# ?

clear      Clear the uncommitted configuration
clear      Clear the configuration
commit     Commit the configuration changes to running
describe   Describe a command without taking real actions
do         Run an exec command
exit       Exit from this submode
no         Negate a command or set its defaults
pwd        Commands used to reach current submode
random     Use random mode for sampling packets
root       Exit to the global configuration mode
show       Show contents of configuration

RP/0/RP0/CPU0(config-sm)#RP/0/RP0/CP0:router(config-sm)#
```

Enabling the NetFlow BGP Data Export Function

Use the **bgp attribute-download** command to enable NetFlow BGP routing attribute collection. The routing attributes are then exported. When no routing attributes are collected, zeroes (0) are exported.

When BGP attribute download is enabled, BGP downloads the attribute information for prefixes (community, extended community, and as-path) to the Routing Information Base (RIB) and Forwarding Information Base (FIB). This enables FIB to associate the prefixes with attributes and send the NetFlow statistics along with the associated attributes.

MPLS Flow Monitor with IPv4 and IPv6 Support

Cisco IOS XR Software Release supports the NetFlow collection of MPLS packets. It also supports the NetFlow collection of MPLS packets carrying IPv4, IPv6, or both IPv4 and IPv6 payloads.

MPLS Cache Reorganization to Support Both IPv4 and IPv6

In Cisco IOS XR Software Release , at a time, you can have only one MPLS flow monitor running on an interface. If you apply an additional MPLS flow monitor to the interface, the new flow monitor overwrites the existing one.

At a time, you can apply only one flow monitor on an interface per direction. You can apply either the same flow monitor to an interface in both directions, or each direction can have its own flow monitor.

You can configure the MPLS flow monitor to collect IPv4 fields, IPv6 fields, or IPv4-IPv6 fields. IPv4-IPv6 configuration collects both IPv4 and IPv6 addresses using one MPLS flow monitor. IPv4 configuration collects only IPv4 addresses. IPv6 configuration collects only IPv6 addresses.

The MPLS flow monitor supports up to 1,000,000 cache entries. NetFlow entries include the following types of fields:

- IPv4 fields
- IPv6 fields
- MPLS with IPv4 fields
- MPLS with IPv6 fields

The maximum number of bytes per NetFlow cache entry is as follows:

- IPv4–88 bytes per entry
- MPLS–88 bytes per entry
- IPv6–108 bytes per entry
- MPLS with IPv4 fields–108 bytes per entry
- MPLS with IPv6 fields–128 bytes per entry

**Note**

The different types of NetFlow entries are stored in separate caches. Consequently, the number of NetFlow entries on a line card can significantly impact the amount of available memory on the line card. Also, even though the sampling rate for IPv6 is the same as the sampling rate for IPv4, the CPU utilization for IPv6 is higher due to the longer keys used by the IPv6 fields.

MPLS Packets with IPv6 Flows

The collection of IPv6 flows in MPLS packets is an option. The CPU uses 128 bytes for each IPv6 field. IPv6 flows may contain the following types of information:

- Source IP address
- Destination IP address
- Traffic class value
- Layer 4 protocol number
- Layer 4 source port number

- Layer 4 destination port number
- Flow ID
- Header option mask

To collect the IPv6 fields in MPLS packets, you must activate the MPLS record type, `ipv6-fields` by running the **`record mpls ipv6-fields`** command. You can also specify the number of labels to be used for aggregation with this command.

Destination-based NetFlow Accounting

Destination-based NetFlow accounting is a usage-based billing application that tracks and records traffic according to its destination and enables service providers to do destination-specific accounting and billing. The destination-based NetFlow accounting record includes the destination peer autonomous system (AS) number and the BGP next-hop IP address.

In destination-based NetFlow accounting, the following fields are collected and exported:

- Destination peer AS number
- BGP next-hop IP address
- Ingress interface
- Egress interface
- Forwarding status
- EXP bits of the top label that is pushed in
- Direction of the flow (always ingress in this case)

Destination-based NetFlow accounting supports the following features on the Cisco IOS XR Software Release :

- Supports only IPv4 addresses
- Supports configuration on physical interfaces, bundle interfaces, and logical subinterfaces
- Supports IPv4 unicast and multicast traffic
- Supports only ingress traffic
- Supports only full mode NetFlow
- Supports NetFlow export format Version 9 over User Datagram Protocols (UDPs)

Destination-based NetFlow accounting does not support the following features Cisco IOS XR Software Release :

- Does not support IPv6 addresses
- Does not support MPLS IPv6
- Does not support configuration for individual Modular QoS Command-Line Interface (MQC) classes
- Does not support the simultaneous configuration of destination-based NetFlow accounting with IPv4 sampled NetFlow on the same interface, in the same direction.
- Does not support Layer 2 switched MPLS traffic
- Does not support egress traffic
- Does not support sampled mode NetFlow

- Does not support NetFlow export formats version 5, version 8, IP Flow Information Export (IPFIX), or Stream Control Transmission Protocol (SCTP).

How to Configure NetFlow on Cisco IOS XR Software

The steps that follow provide a general overview of NetFlow configuration:

-
- Step 1** Create and configure an exporter map.
 - Step 2** Create and configure a monitor map and a sampler map.



Note The monitor map must reference the exporter map you created in Step 1. If you do not apply an exporter-map to the monitor-map, the flow records are not exported, and aging is done according to the cache parameters specified in the monitor-map.

- Step 3** Apply the monitor map and sampler map to an interface.

These steps are described in detail in the following sections:

- [Configuring an Exporter Map, page RC-10](#)
- [Configuring a Sampler Map, page RC-13](#)
- [Configuring a Monitor Map, page RC-14](#)
- [Applying a Monitor Map and a Sampler Map to an Interface, page RC-18](#)
- [Clearing NetFlow Data, page RC-19](#)
- [Configuring NetFlow Collection of MPLS Packets with IPv6 Fields, page RC-20](#)
- [Configuring Destination-based NetFlow Accounting, page RC-25](#)

Configuring an Exporter Map

Configure an exporter map and apply it to the monitor map with the **flow monitor-map** *map_name* **exporter** *map_name* command. You can configure the exporter map prior to configuring the monitor map, or you can configure the monitor map first and then configure and apply an exporter map later on.



Note Cisco IOS XR software supports the configuration of a single collector only in the exporter map.

The steps that follow describe how to create and configure an exporter map.

SUMMARY STEPS

1. **configure**
2. **flow exporter-map** *map_name*
3. **destination** *hostname_or_IP_address*
4. **dscp** *dscp_value*
5. **source** *type interface-path-id*
6. **transport udp** *port*

7. **version v9**
8. **options {interface-table | sampler-table} [timeout seconds]**
9. **template [data | options] timeout seconds**
10. **end**
or
commit
11. **exit**
12. **exit**
13. **show flow exporter-map map_name**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RP0/CPU0:router# configure	Enters global configuration mode.
Step 2	flow exporter-map map_name Example: RP/0/RP0/CPU0:router(config)# flow exporter-map fem	Creates an exporter map, configures the exporter map name, and enters flow exporter map configuration mode.
Step 3	destination hostname_or_IP_address Example: RP/0/RP0/CPU0:router(config-fem)# destination nnn.nnn.nnn.nnn	Configures the export destination for the flow exporter map. The destination can be a hostname or an IP address.
Step 4	dscp dscp_value Example: RP/0/RP0/CPU0:router(config-fem)# dscp 55	(Optional) Specifies the differentiated services codepoint (DSCP) value for export packets. Replace the <i>dscp_value</i> argument with a value in the range from 0 through 63.
Step 5	source type interface-path-id Example: RP/0/RP0/CPU0:router(config-fem)# source gigabitEthernet 0/0/0/0	Specifies a source interface, in the format <i>type interface-path-id</i> .
Step 6	transport udp port Example: RP/0/RP0/CPU0:router(config-fem)# transport udp 9991	(Optional) Specifies the destination port for UDP packets. Replace <i>port</i> with the destination UDP port value, in the range from 1024 through 65535.

	Command or Action	Purpose
Step 7	<p>version v9</p> <p>Example: RP/0/RP0/CPU0:router(config-fem-ver)# version v9</p>	(Optional) Enters flow exporter map version configuration submode.
Step 8	<p>options {interface-table sampler-table} [timeout seconds]</p> <p>Example: RP/0/RP0/CPU0:router(config-fem-ver)# options sampler-table timeout 2000</p>	(Optional) Configures the export timeout value for the sampler table. Replace <i>seconds</i> with the export timeout value, in the range from 1 through 604800 seconds. Default is 1800 seconds.
Step 9	<p>template [data options] timeout seconds</p> <p>Example: RP/0/RP0/CPU0:router(config-fem-ver)# template data timeout 10000</p>	(Optional) Configures the export period for data packets. Replace <i>seconds</i> with the export timeout value, in the range from 1 through 604800 seconds.
Step 10	<p>end OR commit</p> <p>Example: RP/0/RP0/CPU0:router (config-fem-ver)# end OR RP/0/RP0/CPU0:router(config-fem-ver)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: Uncommitted changes found, commit them before exiting (yes/no/cancel)? [cancel]: <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.
Step 11	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-fem-ver)# exit</p>	Exits flow exporter map version configuration submode.

	Command or Action	Purpose
Step 12	exit Example: RP/0/RP0/CPU0:router(config)# exit	Enters EXEC mode.
Step 13	show flow exporter-map <i>map_name</i> Example: RP/0/RP0/CPU0:router# show flow exporter-map fem	Displays exporter map data.

Configuring a Sampler Map

The steps that follow describe how to create and configure a sampler map.

SUMMARY STEPS

1. **configure**
2. **sampler-map** *map_name*
3. **random 1 out-of** *sampling_interval*
4. **end**
or
commit
5. **exit**
6. **exit**
7. **show sampler-map** *map_name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RP0/CPU0:router# configure	Enters global configuration mode.
Step 2	sampler-map <i>map_name</i> Example: RP/0/RP0/CPU0:router(config)# sampler-map fsm RP/0/RP0/CPU0:router(config-sm)#f	Creates a sampler map and enters sampler map configuration mode. Keep the following in mind when configuring a sampler map: <ul style="list-style-type: none"> • On the Cisco CRS-1 Router, NetFlow supports policing at a rate of 35,000 packets per second per direction for each individual line card. •

	Command or Action	Purpose
Step 3	<p>random 1 out-of <i>sampling_interval</i></p> <p>Example: RP/0/RP0/CPU0:router(config-sm)# random 1 out-of 65535</p>	Configures the sampling interval to use random mode for sampling packets. Replace the <i>sampling_interval</i> argument with a number, in the range from 1 through 65535 units.
Step 4	<p>end OR commit</p> <p>Example: RP/0/RP0/CPU0:router (config-sm)# end OR RP/0/RP0/CPU0:router (config-sm)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting (yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.
Step 5	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-sm)# exit</p>	Exits sampler map configuration mode and enters global configuration mode.
Step 6	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config)# exit</p>	Exits global configuration mode and enters EXEC mode.
Step 7	<p>show sampler-map <i>map_name</i></p> <p>Example: RP/0/RP0/CPU0:router# show sampler-map fsm</p>	Displays sampler map data.

Configuring a Monitor Map

The steps that follow describe how to create and configure a monitor map.

SUMMARY STEPS

1. **configure**
2. **flow monitor-map** *map_name*

3. **record ipv4**
or
record ipv4 [peer as]
or
record ipv6
or
record mpls
or
record mpls [ipv4-fields] [labels number]
or
record mpls [ipv6-fields] [labels number]
or
record mpls [ipv4-ipv6-fields] [labels number]
4. **cache entries number**
5. **cache permanent**
6. **cache timeout { active | inactive | upate } timeout_value**
7. **exporter map_name**
8. **end**
or
commit
9. **exit**
10. **exit**
11. **show flow monitor-map map_name**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RP0/CPU0:router# configure	Enters global configuration mode.
Step 2	flow monitor-map map_name Example: RP/0/RP0/CPU0:router(config)# flow monitor-map fmm RP/0/RP0/CPU0:router(config-fmm)#	Creates a monitor map and configures a monitor map name and enters flow monitor map configuration submenu.

	Command or Action	Purpose
Step 3	<pre>record ipv4 or record ipv4 [peer as] or record ipv6 or record mpls [labels number] or record mpls [ipv4-fields] [labels number] or record mpls [ipv6-fields] [labels number] or record mpls [ipv4-ipv6-fields] [labels number]</pre> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# record ipv4</p>	<p>Configures the flow record map name for IPv4, IPv6, or MPLS.</p> <ul style="list-style-type: none"> Use the record ipv4 command to configure the flow record map name for IPv4. By default, you collect and export the originating autonomous system (AS) numbers. Use the record ipv4 [peer as] command to record peer AS. Here, you collect and export the peer AS numbers. <p>Note Ensure that the bgp attribute-download command is configured. Else, no AS is collected when the record ipv4 [peer-as] command is configured.</p> <ul style="list-style-type: none"> Use the record ipv6 command to configure the flow record map name for IPv6. Use the record mpls labels command with the <i>number</i> argument to specify the number of labels that you want to aggregate. By default, MPLS-aware NetFlow aggregates the top six labels of the MPLS label stack. The maximum value is 6. Use the record mpls ipv4-fields command to collect IPv4 fields in the MPLS-aware NetFlow. Use the record mpls ipv6-fields command to collect IPv6 fields in the MPLS-aware NetFlow. Use the record mpls ipv4-ipv6-fields command to collect IPv4 and IPv6 fields in the MPLS-aware NetFlow.
Step 4	<pre>cache entries number</pre> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# cache entries 10000</p>	<p>(Optional) Configures the number of entries in the flow cache. Replace the <i>number</i> argument with the number of flow entries allowed in the flow cache, in the range from 4096 through 1000000.</p> <p>The default number of cache entries is 65535.</p>
Step 5	<pre>cache permanent</pre> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# flow monitor-map fmm cache permanent</p>	<p>(Optional) Disables removal of entries from flow cache.</p>

	Command or Action	Purpose
Step 6	<p>cache timeout {active <i>timeout_value</i> inactive <i>timeout_value</i> update <i>timeout_value</i>}</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# cache timeout inactive 1000</p>	<p>(Optional) Configures the active, inactive, or update flow cache timeout value.</p> <ul style="list-style-type: none"> The default timeout value for the inactive flow cache is 15 seconds. The default timeout value for the active flow cache is 1800 seconds. The default timeout value for the update flow cache is 1800 seconds. <p>Note The update <i>timeout_value</i> keyword argument is used for permanent caches only. It specifies the timeout value that is used to export entries from permanent caches. In this case, the entries are exported but remain the cache.</p>
Step 7	<p>exporter <i>map_name</i></p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# exporter fem</p>	<p>Associates an exporter map with a monitor map.</p> <p>Note A single flow monitor map can support up to eight exporters.</p>
Step 8	<p>end OR commit</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# end OR RP/0/RP0/CPU0:router(config-fmm)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]: <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.
Step 9	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# exit</p>	<p>Exits flow monitor map configuration submenu.</p>

	Command or Action	Purpose
Step 10	exit Example: RP/0/RP0/CPU0:router(config)# exit	Exits global configuration mode.
Step 11	show flow monitor-map <i>map_name</i> Example: RP/0/RP0/CPU0:router# show flow monitor-map fmm	Displays flow monitor map data.

Applying a Monitor Map and a Sampler Map to an Interface

SUMMARY STEPS

The steps that follow describe how to apply a monitor map and a sampler map to an interface.

1. **configure**
2. **interface** *type number*
3. **flow [ipv4 | ipv6 | mpls] monitor** *monitor_map* **sampler** *sampler_map* { **egress** | **ingress** }
4. **end**
or
commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RP0/CPU0:router# configure	Enters global configuration mode.
Step 2	interface <i>type number</i> Example: RP/0/RP0/CPU0:router(config)# interface gigabitEthernet 0/0/0/0 RP/0/RP0/CPU0:router(config-if)#	Enters interface configuration mode.

	Command or Action	Purpose
Step 3	<pre>flow [ipv4 ipv6 mpls] monitor monitor_map sampler sampler_map {egress ingress}</pre> <p>Example: RP/0/RP0/CPU0:router(config-if)# flow ipv4 monitor fmm sampler fsm egress</p>	<p>Associates a monitor map and a sampler map with an interface.</p> <p>Enter ipv4 to enable IPV4 NetFlow on the specified interface. Enter ipv6 to enable IPV6 NetFlow on the specified interface. Enter mpls to enable MPLS-aware NetFlow on the specified interface.</p>
Step 4	<pre>end or commit</pre> <p>Example: RP/0/RP0/CPU0:router(config-if)# end or RP/0/RP0/CPU0:router(config-if)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.

Clearing NetFlow Data

The steps that follow describe how to clear flow exporter map and flow monitor map data.

SUMMARY STEPS

- clear flow exporter** [*exporter_name*] {**restart** | **statistics**} **location** *node-id*
- clear flow monitor** [*monitor_name*] **cache** [**force-export** | **statistics**] **location** *node-id*

DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>clear flow exporter [exporter_name] {restart statistics} location node-id</pre> <p>Example: RP/0/RP0/CPU0:router# clear flow exporter statistics location 0/0/CPU0</p>	<p>Clears the flow exporter data.</p> <p>Specify the statistics option to clear exporter statistics. Specify the restart option to export all of the templates that are currently configured on the specified node.</p>
Step 2	<pre>clear flow monitor [monitor_name] cache [force-export statistics] location node-id</pre> <p>Example: RP/0/RP0/CPU0:router# clear flow monitor cache force-export location 0/0/CPU0</p>	<p>Clears the flow monitor data.</p> <p>Specify the statistics option to clear cache statistics. Specify the force-export option to export the data from cache to server first and then clear the entries from cache.</p>

Configuring NetFlow Collection of MPLS Packets with IPv6 Fields

The following steps show how to configure NetFlow collection of MPLS packets with IPv6 fields.

SUMMARY STEPS

1. **configure**
2. **flow exporter-map** *map_name*
3. **version v9**
4. **options** {**interface-table** | **sampler-table**} [**timeout** *seconds*]
5. **template** [**data** | **options**] **timeout** *seconds*
6. **exit**
7. **transport udp** *port*
8. **source** *type interface-path-id*
9. **destination** *hostname_or_IP_address*
10. **exit**
11. **flow monitor-map** *map_name*
12. **record mpls** [**ipv4-ipv6-fields**] [**labels** *number*]
13. **exporter** *map_name*
14. **cache entries** *number*
15. **cache timeout** {**active** *timeout_value* | **inactive** *timeout_value* | **update** *timeout_value*}
16. **cache permanent**
17. **sampler-map** *map_name*
18. **random 1 out-of** *sampling_interval*
19. **interface** *type number*
20. **flow** [**ipv4** | **ipv6** | **mpls**] **monitor** *monitor_map* **sampler** *sampler_map* {**egress** | **ingress**}

21. **end**
or
commit
22. **exit**
23. **exit**
24. **show flow monitor-map** *map_name*
25. **show flow exporter-map** *map_name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure Example: RP/0/RP0/CPU0:router# config	Enters global configuration mode.
Step 2	flow exporter-map <i>map_name</i> Example: RP/0/RP0/CPU0:router(config)# flow exporter-map expl	Creates an exporter map, configures the exporter map name, and enters flow exporter map configuration mode.
Step 3	version v9 Example: RP/0/RP0/CPU0:router(config-fem)# version v9	(Optional) Enters flow exporter map version configuration submenu.
Step 4	options {interface-table sampler-table} [timeout seconds] Example: RP/0/RP0/CPU0:router(config-fem-ver)# options interface-table timeout 300	(Optional) Configures the export timeout value for the interface table or the sampler table. Replace <i>seconds</i> with the export timeout value, in the range from 1 through 604800 seconds. The default is 1800 seconds for both the interface table and the sample table. You must perform this step twice to configure the export timeout value for both an interface table and a sample table.
Step 5	template [data options] timeout seconds Example: RP/0/RP0/CPU0:router(config-fem-ver)# template data timeout 300	(Optional) Configures the export period for data packets or options packets. Replace <i>seconds</i> with the export timeout value, in the range from 1 through 604800 seconds. You must perform this step twice to configure the export period for both data packets and options packets.
Step 6	exit Example: RP/0/RP0/CPU0:router(config-fem-ver)# exit	Exits flow exporter map version configuration mode, and enters flow exporter map configuration mode.

	Command or Action	Purpose
Step 7	<p>transport udp <i>port</i></p> <p>Example: RP/0/RP0/CPU0:router(config-fem)# transport udp 12515</p>	(Optional) Specifies the destination port for UDP packets. Replace <i>port</i> with the destination UDP port value, in the range from 1024 through 65535.
Step 8	<p>source type interface-path-id</p> <p>Example: RP/0/RP0/CPU0:router(config-fem)# source Loopback0</p>	Specifies a source interface, in the format <i>type interface-path-id</i> . For example: POS 0/1/0/1 or Loopback0
Step 9	<p>destination hostname_or_IP_address</p> <p>Example: RP/0/RP0/CPU0:router(config-fem)# destination 170.1.1.11</p>	Configures the export destination for the flow exporter map. The destination can be a hostname or an IP address.
Step 10	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-fem)# exit</p>	Exits flow exporter map configuration mode, and enters flow exporter map configuration mode.
Step 11	<p>flow monitor-map <i>map_name</i></p> <p>Example: RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-IPv6-fmm</p>	Creates a monitor map and configures a monitor map name and enters flow monitor map configuration submode.
Step 12	<p>record mpls [ipv4-ipv6-fields] [labels number]</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# record mpls ipv6-fields labels 3</p>	Configures the flow record map name for IPv4, IPv6, or MPLS. Use the ipv4-ipv6-fields keyword to collect IPv4 and IPv6 fields in an MPLS-aware NetFlow.
Step 13	<p>exporter map_name</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# exporter exp1</p>	Associates an exporter map with a monitor map. Note A single flow monitor map can support up to eight exporters.
Step 14	<p>cache entries number</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# cache entries 10000</p>	(Optional) Configures the number of entries in the flow cache. Replace the <i>number</i> argument with the number of flow entries allowed in the flow cache, in the range from 4096 through 1000000. The default number of cache entries is 65535.

	Command or Action	Purpose
Step 15	<p>cache timeout {active <i>timeout_value</i> inactive <i>timeout_value</i> update <i>timeout_value</i>}</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# cache timeout inactive 1800</p>	<p>(Optional) Configures the active, inactive, or update flow cache timeout value.</p> <ul style="list-style-type: none"> The default timeout value for the inactive flow cache is 15 seconds. The default timeout value for the active flow cache is 1800 seconds. The default timeout value for the update flow cache is 1800 seconds. <p>Note The inactive and active keywords are not applicable to permanent caches.</p> <p>Note The update keyword is used for permanent caches only. It specifies the timeout value that is used to export entries from permanent caches. In this case, the entries are exported but remain the cache.</p>
Step 16	<p>cache permanent</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# flow monitor-map fmm cache permanent</p>	<p>(Optional) Disables the removal of entries from flow cache.</p>
Step 17	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# exit</p>	<p>Exits flow monitor map configuration submenu.</p>
Step 18	<p>sampler-map <i>map_name</i></p> <p>Example: RP/0/RP0/CPU0:router(config)# sampler-map fsm RP/0/RP0/CPU0:router(config-sm)#</p>	<p>Creates a sampler map and enters sampler map configuration mode.</p> <p>Keep the following in mind when configuring a sampler map:</p> <ul style="list-style-type: none"> On the Cisco CRS-1 Router, NetFlow supports policing at a rate of 35,000 packets per second per direction for each individual line card.
Step 19	<p>random 1 out-of <i>sampling_interval</i></p> <p>Example: RP/0/RP0/CPU0:router(config-sm)# random 1 out-of 65535</p>	<p>Configures the sampling interval to use random mode for sampling packets. Replace the <i>sampling_interval</i> argument with a number, in the range from 1 through 65535 units.</p>
Step 20	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-sm)# exit</p>	<p>Exits sampler map configuration mode and enters global configuration mode.</p>

	Command or Action	Purpose
Step 21	<p>interface <i>type number</i></p> <p>Example: RP/0/RP0/CPU0:router(config)# interface POS 0/0/0/0 RP/0/RP0/CPU0:router(config-if)#</p>	Enters interface configuration mode.
Step 22	<p>flow [ipv4 ipv6 mpls] monitor <i>monitor_map</i> sampler <i>sampler_map</i> {egress ingress}</p> <p>Example: RP/0/RP0/CPU0:router(config-if)# flow ipv4 monitor MPLS-IPv6-fmm sampler fsm egress</p>	<p>Associates a monitor map and a sampler map with an interface.</p> <p>Enter ipv4 to enable IPV4 NetFlow on the specified interface. Enter ipv6 to enable IPV6 NetFlow on the specified interface. Enter mpls to enable MPLS-aware NetFlow on the specified interface.</p>
Step 23	<p>end OR commit</p> <p>Example: RP/0/RP0/CPU0:router (config-fem-ver)# end OR RP/0/RP0/CPU0:router(config-fem-ver)# commit</p>	<p>Saves configuration changes.</p> <ul style="list-style-type: none"> When you issue the end command, the system prompts you to commit changes: <pre>Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:</pre> <ul style="list-style-type: none"> Entering yes saves configuration changes to the running configuration file, exits the configuration session, and returns the router to EXEC mode. Entering no exits the configuration session and returns the router to EXEC mode without committing the configuration changes. Entering cancel leaves the router in the current configuration session without exiting or committing the configuration changes. Use the commit command to save the configuration changes to the running configuration file and remain within the configuration session.
Step 24	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-if)# exit</p>	Exits interface configuration submode for the Ethernet interface.
Step 25	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config)# exit</p>	Exits global configuration mode.

	Command or Action	Purpose
Step 26	<code>show flow monitor-map map_name</code> Example: RP/0/RP0/CPU0:router# show flow monitor-map fmm	Displays flow monitor map data.
Step 27	<code>show flow exporter-map map_name</code> Example: RP/0/RP0/CPU0:router# show flow exporter-map fem	Displays exporter map data.

Configuring Destination-based NetFlow Accounting

You configure destination-based NetFlow accounting by configuring the flow monitor map, flow record, and flow monitor as described in the following steps.

SUMMARY STEPS

1. `configure`
2. `flow monitor-map map_name`
3. `record ipv4 destination`
4. `exit`
5. `interface type interface-path-id`
6. `flow ipv4 monitor name ingress`
7. `end`
or
`commit`
8. `show flow exporter-map map_name`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>configure</code> Example: RP/0/RP0/CPU0:router# configure	Enters global configuration mode.
Step 2	<code>flow monitor-map map_name</code> Example: RP/0/RP0/CPU0:router(config)# flow monitor-map map1 RP/0/RP0/CPU0:router(config-fmm)#	Creates a monitor map and configures a monitor map name and enters flow monitor map configuration submenu.

	Command or Action	Purpose
Step 3	<p>record ipv4 destination</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# record ipv4 destination.</p>	Configures the flow record for an IPv4 destination-based NetFlow accounting record. The destination keyword specifies that the record is for IPv4 destination-based NetFlow accounting.
Step 4	<p>exit</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# exit</p>	Exits flow monitor map mode to global configuration mode.
Step 5	<p>interface type interface-path-id</p> <p>Example: RP/0/RP0/CPU0:router# interface POS 0/1/0/0</p>	<p>Interface <i>type</i> and physical <i>interface-path-id</i> in the format <i>type rack/slot/module/port</i>.</p> <p><i>type</i>—POS, Ethernet, ATM, etc.</p> <p><i>rack</i>—Chassis number of the rack.</p> <p><i>slot</i>—Physical slot number of the line card or modular services card.</p> <p><i>module</i>—Module number. A physical layer interface module (PLIM) is always 0.</p> <p><i>port</i>—Physical port number of the interface.</p>
Step 6	<p>flow ipv4 monitor name ingress</p> <p>Example: RP/0/RP0/CPU0:router# flow ipv4 monitor monitor1 ingress</p>	Configures an IPv4 flow monitor for the ingress direction and assigns the name of the monitor.
Step 7	<p>end OR commit</p> <p>Example: RP/0/RP0/CPU0:router(config-fmm)# end OR RP/0/RP0/CPU0:router(config-fmm)# commit</p>	Saves the current configuration changes.
Step 8	<p>show flow exporter-map map_name</p> <p>Example: RP/0/RP0/CPU0:router# show flow exporter-map fem</p>	Verifies exporter map data.

Configuration Examples for NetFlow

The following examples show NetFlow configurations:

- [Sampler Map: Example, page RC-27](#)
- [Exporter Map: Example, page RC-27](#)
- [Flow Monitor Map: Examples, page RC-27](#)

- [MPLS Flow Monitor with IPv4 and IPv6 Support, page RC-8](#)
- [Destination-based NetFlow Accounting: Example, page RC-29](#)

Sampler Map: Example

The following example shows how to create a new sampler map called “fsm1,” which samples 1 out of 65535 packets:

```
RP/0/RP0/CPU0:router(config)# sampler-map fsm1
RP/0/RP0/CPU0:router(config-sm)# random 1 out-of 65535
RP/0/RP0/CPU0:router(config)# exit
```

Exporter Map: Example

The following example shows how to create a new flow exporter map called “fem1,” which uses the version 9 (V9) export format for NetFlow export packets. The data template flow-set is inserted into the V9 export packets once every 10 minutes, and the options interface table flow-set is inserted into the V9 export packet. The export packets are sent to the flow collector destination 10.1.1.1, where the source address is identical to the interface IP address of Loopback 0. The UDP destination port is 1024, and the DSCP value is 10:

```
RP/0/RP0/CPU0:router(config)# flow exporter-map fem1
RP/0/RP0/CPU0:router(config-fem)# destination 10.1.1.1
RP/0/RP0/CPU0:router(config-fem)# source Loopback 0
RP/0/RP0/CPU0:router(config-fem)# transport udp 1024
RP/0/RP0/CPU0:router(config-fem)# dscp 10
RP/0/RP0/CPU0:router(config-fem)# exit
RP/0/RP0/CPU0:router(config-fem)# version v9
RP/0/RP0/CPU0:router(config-fem-ver)# template data timeout 600
RP/0/RP0/CPU0:router(config-fem-ver)# options interface-table
RP/0/RP0/CPU0:router(config-fem-ver)# exit
```

Flow Monitor Map: Examples

The following example shows how to create a new flow monitor map with name “fmm1”. This flow monitor map references the flow exporter map “fem1,” and sets the flow cache attributes to 10000 cache entries. The active entries from the cache are aged every 30 seconds, while the inactive entries from the cache are aged every 15 seconds. The record map for this monitor map is IPv4:

```
RP/0/RP0/CPU0:router(config)# flow monitor-map fmm1
RP/0/RP0/CPU0:router(config-fmm)# record ipv4
RP/0/RP0/CPU0:router(config-fmm)# exporter fem1
RP/0/RP0/CPU0:router(config-fmm)# cache entries 10000
RP/0/RP0/CPU0:router(config-fmm)# cache timeout active 30
RP/0/RP0/CPU0:router(config-fmm)# cache timeout inactive 15
RP/0/RP0/CPU0:router(config-fmm)# exit
```

The following example shows how to apply the flow monitor “fmm1” and the sampler “fsm1” to the TenGigE 0/0/0/0 interface in the ingress direction:

```
RP/0/RP0/CPU0:router(config)# interface TenGigE 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# flow ipv4 monitor fmm1 sampler fsm1 ingress
RP/0/RP0/CPU0:router(config-if)# exit
```

The following example shows how to configure the NetFlow monitor to collect MPLS packets with IPv6 fields:

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# flow exporter-map exp1
RP/0/RP0/CPU0:router(config-fem)# version v9
RP/0/RP0/CPU0:router(config-fem-ver)# options interface-table timeout 300
RP/0/RP0/CPU0:router(config-fem-ver)# options sampler-table timeout 300
RP/0/RP0/CPU0:router(config-fem-ver)# template data timeout 300
RP/0/RP0/CPU0:router(config-fem-ver)# template options timeout 300
RP/0/RP0/CPU0:router(config-fem-ver)# exit
RP/0/RP0/CPU0:router(config-fem)# transport udp 12515
RP/0/RP0/CPU0:router(config-fem)# source Loopback0
RP/0/RP0/CPU0:router(config-fem)# destination 170.1.1.11
RP/0/RP0/CPU0:router(config-fem)# exit
RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-IPv6-fmm
RP/0/RP0/CPU0:router(config-fmm)# record mpls ipv6-fields labels 3
RP/0/RP0/CPU0:router(config-fmm)# exporter exp1
RP/0/RP0/CPU0:router(config-fmm)# cache entries 10000
RP/0/RP0/CPU0:router(config-fmm)# cache permanent
RP/0/RP0/CPU0:router(config-fmm)# exit

RP/0/RP0/CPU0:router(config)# sampler-map FSM
RP/0/RP0/CPU0:router(config-sm)# random 1 out-of 65535
RP/0/RP0/CPU0:router(config-sm)# exit
RP/0/RP0/CPU0:router(config)# interface gigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# flow mpls monitor MPLS-IPv6-fmm sampler FSM ingress
```

MPLS Flow Monitor with IPv4 and IPv6 Support: Examples

The following configuration collects MPLS traffic, but no payload information is collected.

```
RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-fmm
RP/0/RP0/CPU0:router(config-fmm)# record mpls labels 3
RP/0/RP0/CPU0:router(config-fmm)# cache permanent
RP/0/RP0/CPU0:router(config)# exit
RP/0/RP0/CPU0:router(config)# interface gigabitEthernet 0/0/0/0

RP/0/RP0/CPU0:router(config-if)# flow mpls monitor MPLS-fmm sampler fsm ingress
```

The following configuration collects MPLS traffic with IPv4 payloads. It also collects MPLS traffic without IPv4 payloads, but it populates the IPv4 fields with zeros (0).

```
RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-IPv4-fmm
RP/0/RP0/CPU0:router(config-fmm)# record mpls IPv4-fields labels 3
RP/0/RP0/CPU0:router(config-fmm)# cache permanent
RP/0/RP0/CPU0:router(config-fmm)# exit
RP/0/RP0/CPU0:router:router(config)# interface gigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# flow mpls monitor MPLS-IPv4-fmm sampler fsm ingress
```

The following configuration collects MPLS traffic with IPv6 payloads. It also collects MPLS traffic without IPv6 payloads, but it populates the IPv6 fields with zeros (0).

```
RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-IPv6-fmm
RP/0/RP0/CPU0:router(config-fmm)# record mpls IPv6-fields labels 3
RP/0/RP0/CPU0:router(config-fmm)# cache permanent
RP/0/RP0/CPU0:router(config-fmm)# exit
RP/0/RP0/CPU0:router(config)# interface gigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# flow mpls monitor MPLS-IPv6-fmm sampler fsm ingress
```

The following configuration collects MPLS traffic with both IPv6 and IPv4 fields. It also collects MPLS traffic without IPv4 or IPv6 payloads, but it populates the IPv6 and IPv4 fields with zeros (0).

```
RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-IPv4-IPv6-fmm
RP/0/RP0/CPU0:router(config-fmm)# record mpls IPv4-IPv6-fields labels 3
RP/0/RP0/CPU0:router(config-fmm)# cache permanent
RP/0/RP0/CPU0:router(config-fmm)# exit
RP/0/RP0/CPU0:router(config)# interface gigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# flow mpls monitor MPLS-IPv4-IPv6-fmm sampler fsm ingress
```

The following example configuration sets IPv6 field collection on a Packet-over-SONET (POS) interface:

```
RP/0/RP0/CPU0:router(config)# flow monitor-map MPLS-IPv6-fmm
RP/0/RP0/CPU0:router(config-fmm)# record mpls ipv6-fields labels <n>
RP/0/RP0/CPU0:router(config-fmm)# exporter <exporter-name>
RP/0/RP0/CPU0:router(config-fmm)# cache entries <number>
RP/0/RP0/CPU0:router(config-fmm)# cache timeout {active | inactive | update} <timeout>
RP/0/RP0/CPU0:router(config-fmm)# cache permanent
RP/0/RP0/CPU0:router(config-fmm)# exit
RP/0/RP0/CPU0:router(config)# interface pos 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# flow MPLS monitor <MPLS-IPv6-fields> sampler <name>
<direction>
```


Note

Flow records are exported using the Version 9 format.

Destination-based NetFlow Accounting: Example

The following example shows how to configure an IPv4 flow record for destination-based NetFlow accounting:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# flow monitor-map map1
RP/0/RP0/CPU0:router(config-fmm)# record ipv4 destination
RP/0/RP0/CPU0:router(config-fmm)# exporter fem
RP/0/RP0/CPU0:router(config-fmm)# exit
RP/0/RP0/CPU0:router(config)# interface pos 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# flow ipv4 monitor map1 ingress
RP/0/RP0/CPU0:router(config-if)# end
RP/0/RP0/CPU0:router# show flow exporter-map fem
RP/0/RP0/CPU0:router# show flow monitor-map map1
```

Additional References

The following sections provide references related to interface configuration.

Related Documents

Related Topic	Document Title
Cisco IOS XR master command reference	<i>Cisco IOS XR Master Commands List</i>
Cisco IOS XR interface configuration commands	<i>Cisco IOS XR Interface and Hardware Component Command Reference</i>

Additional References

Related Topic	Document Title
Initial system bootup and configuration information for a router using the Cisco IOS XR software.	<i>Cisco IOS XR Getting Started Guide</i>
Information about user groups and task IDs	<i>Cisco IOS XR Interface and Hardware Component Command Reference</i>
Information about configuring interfaces and other components on the Cisco CRS-1 Router from a remote Craft Works Interface (CWI) client management application.	<i>Cisco Craft Works Interface User Guide</i>

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
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

RFCs	Title
3954	NetFlow services export protocol Version 9.

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

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