



## **Catalyst 2960-XR Switch NetFlow Lite Configuration Guide, Cisco IOS Release 15.0(2)EX1**

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## Preface

This book describes configuration information and examples for NetFlow Lite on the switch.

- [Document Conventions, page v](#)
- [Related Documentation, page vii](#)
- [Obtaining Documentation and Submitting a Service Request, page vii](#)

## Document Conventions

This document uses the following conventions:

Convention	Description
<code>^</code> or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination <b>^D</b> or <b>Ctrl-D</b> means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
<b>bold font</b>	Commands and keywords and user-entered text appear in <b>bold font</b> .
<i>Italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
<code>Courier font</code>	Terminal sessions and information the system displays appear in <code>courier font</code> .
<b>Bold Courier font</b>	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.

Convention	Description
[x   y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x   y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y   z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

### Reader Alert Conventions

This document uses the following conventions for reader alerts:



#### Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.



#### Tip

Means *the following information will help you solve a problem*.



#### Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



#### Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.



#### Warning

Means *reader be warned*. In this situation, you might perform an action that could result in bodily injury.

## Related Documentation

**Note**

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Before installing or upgrading the switch, refer to the switch release notes.

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- Catalyst 2960-XR Switch documentation, located at:  
[http://www.cisco.com/go/cat2960xr\\_docs](http://www.cisco.com/go/cat2960xr_docs)
- Cisco SFP and SFP+ modules documentation, including compatibility matrixes, located at:  
[http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html)
- Cisco Validated Designs documents, located at:  
<http://www.cisco.com/go/designzone>

## 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:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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# Using the Command-Line Interface

This chapter contains the following topics:

- [Information About Using the Command-Line Interface, page 1](#)
- [How to Use the CLI to Configure Features, page 5](#)

## Information About Using the Command-Line Interface

This section describes the Cisco IOS command-line interface (CLI) and how to use it to configure your switch.

### Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

You can start a CLI session through a console connection, through Telnet, a SSH, or by using the browser.

When you start a session, you begin in user mode, often called user EXEC mode. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The user EXEC commands are not saved when the switch reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you can enter any privileged EXEC command or enter global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the switch reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

This table describes the main command modes, how to access each one, the prompt you see in that mode, and how to exit the mode.

Table 1: Command Mode Summary

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session using Telnet, SSH, or console.	Switch>	Enter <b>logout</b> or <b>quit</b> .	Use this mode to <ul style="list-style-type: none"> <li>• Change terminal settings.</li> <li>• Perform basic tests.</li> <li>• Display system information.</li> </ul>
Privileged EXEC	While in user EXEC mode, enter the <b>enable</b> command.	Switch#	Enter <b>disable</b> to exit.	Use this mode to verify commands that you have entered. Use a password to protect access to this mode.
Global configuration	While in privileged EXEC mode, enter the <b>configure</b> command.	Switch(config)#	To exit to privileged EXEC mode, enter <b>exit</b> or <b>end</b> , or press <b>Ctrl-Z</b> .	Use this mode to configure parameters that apply to the entire switch.
VLAN configuration	While in global configuration mode, enter the <b>vlan</b> <i>vlan-id</i> command.	Switch(config-vlan)#	To exit to global configuration mode, enter the <b>exit</b> command.  To return to privileged EXEC mode, press <b>Ctrl-Z</b> or enter <b>end</b> .	Use this mode to configure VLAN parameters. When VTP mode is transparent, you can create extended-range VLANs (VLAN IDs greater than 1005) and save configurations in the switch startup configuration file.
Interface configuration	While in global configuration mode, enter the <b>interface</b> command (with a specific interface).	Switch(config-if)#	To exit to global configuration mode, enter <b>exit</b> .  To return to privileged EXEC mode, press <b>Ctrl-Z</b> or enter <b>end</b> .	Use this mode to configure parameters for the Ethernet ports.

Mode	Access Method	Prompt	Exit Method	About This Mode
Line configuration	While in global configuration mode, specify a line with the <b>line vty</b> or <b>line console</b> command.	Switch(config-line)#	To exit to global configuration mode, enter <b>exit</b> .  To return to privileged EXEC mode, press <b>Ctrl-Z</b> or enter <b>end</b> .	Use this mode to configure parameters for the terminal line.

## Using the Help System

You can enter a question mark (?) at the system prompt to display a list of commands available for each command mode. You can also obtain a list of associated keywords and arguments for any command.

### SUMMARY STEPS

1. **help**
2. *abbreviated-command-entry ?*
3. *abbreviated-command-entry <Tab>*
4. **?**
5. *command ?*
6. *command keyword ?*

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>help</b>  <b>Example:</b> Switch# <b>help</b>	Obtains a brief description of the help system in any command mode.
<b>Step 2</b>	<i>abbreviated-command-entry ?</i>  <b>Example:</b> Switch# <b>di?</b> dir disable disconnect	Obtains a list of commands that begin with a particular character string.
<b>Step 3</b>	<i>abbreviated-command-entry &lt;Tab&gt;</i>  <b>Example:</b> Switch# <b>sh conf</b> <tab> Switch# <b>show configuration</b>	Completes a partial command name.

	Command or Action	Purpose
<b>Step 4</b>	<p>?</p> <p><b>Example:</b> Switch&gt; ?</p>	Lists all commands available for a particular command mode.
<b>Step 5</b>	<p><i>command</i> ?</p> <p><b>Example:</b> Switch&gt; <b>show</b> ?</p>	Lists the associated keywords for a command.
<b>Step 6</b>	<p><i>command keyword</i> ?</p> <p><b>Example:</b> Switch(config)# <b>cdp holdtime</b> ? &lt;10-255&gt; Length of time (in sec) that receiver must keep this packet</p>	Lists the associated arguments for a keyword.

## Understanding Abbreviated Commands

You need to enter only enough characters for the switch to recognize the command as unique.

This example shows how to enter the **show configuration** privileged EXEC command in an abbreviated form:

```
Switch# show conf
```

## No and default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values.

## CLI Error Messages

This table lists some error messages that you might encounter while using the CLI to configure your switch.

**Table 2: Common CLI Error Messages**

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for your switch to recognize the command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark.  The possible keywords that you can enter with the command appear.
% Incomplete command.	You did not enter all the keywords or values required by this command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark.  The possible keywords that you can enter with the command appear.
% Invalid input detected at '^' marker.	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all the commands that are available in this command mode.  The possible keywords that you can enter with the command appear.

## Configuration Logging

You can log and view changes to the switch configuration. You can use the Configuration Change Logging and Notification feature to track changes on a per-session and per-user basis. The logger tracks each configuration command that is applied, the user who entered the command, the time that the command was entered, and the parser return code for the command. This feature includes a mechanism for asynchronous notification to registered applications whenever the configuration changes. You can choose to have the notifications sent to the syslog.


**Note**

Only CLI or HTTP changes are logged.

## How to Use the CLI to Configure Features

### Configuring the Command History

The software provides a history or record of commands that you have entered. The command history feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize this feature to suit your needs.

## Changing the Command History Buffer Size

By default, the switch records ten command lines in its history buffer. You can alter this number for a current terminal session or for all sessions on a particular line. This procedure is optional.

### SUMMARY STEPS

1. **terminal history** [*size number-of-lines*]

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>terminal history</b> [ <i>size number-of-lines</i> ]  <b>Example:</b> Switch# <b>terminal history size 200</b>	Changes the number of command lines that the switch records during the current terminal session in the privileged EXEC mode. You can configure the size from 0 through 256.

## Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in this table. These actions are optional.



#### Note

The arrow keys function only on ANSI-compatible terminals such as VT100s.

### SUMMARY STEPS

1. **Ctrl-P** or use the **up arrow** key
2. **Ctrl-N** or use the **down arrow** key
3. **show history**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>Ctrl-P</b> or use the <b>up arrow</b> key	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
<b>Step 2</b>	<b>Ctrl-N</b> or use the <b>down arrow</b> key	Returns to more recent commands in the history buffer after recalling commands with <b>Ctrl-P</b> or the up arrow key. Repeat the key sequence to recall successively more recent commands.

	Command or Action	Purpose
<b>Step 3</b>	<b>show history</b>  <b>Example:</b> Switch# <b>show history</b>	Lists the last several commands that you just entered in privileged EXEC mode. The number of commands that appear is controlled by the setting of the <b>terminal history</b> global configuration command and the <b>history</b> line configuration command.

## Disabling the Command History Feature

The command history feature is automatically enabled. You can disable it for the current terminal session or for the command line. This procedure is optional.

### SUMMARY STEPS

1. **terminal no history**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>terminal no history</b>  <b>Example:</b> Switch# <b>terminal no history</b>	Disables the feature during the current terminal session in the privileged EXEC mode.

## Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it, and reenable it.

### SUMMARY STEPS

1. **terminal editing**
2. **terminal no editing**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>terminal editing</b>  <b>Example:</b> Switch# <b>terminal editing</b>	Reenables the enhanced editing mode for the current terminal session in the privileged EXEC mode.

	Command or Action	Purpose
<b>Step 2</b>	<b>terminal no editing</b>  <b>Example:</b> Switch# <b>terminal no editing</b>	Disables the enhanced editing mode for the current terminal session in the privileged EXEC mode.

## Editing Commands through Keystrokes

The keystrokes help you to edit the command lines. These keystrokes are optional.



### Note

The arrow keys function only on ANSI-compatible terminals such as VT100s.

**Table 3: Editing Commands**

Editing Commands	Description
<b>Ctrl-B</b> or use the <b>left arrow</b> key	Moves the cursor back one character.
<b>Ctrl-F</b> or use the <b>right arrow</b> key	Moves the cursor forward one character.
<b>Ctrl-A</b>	Moves the cursor to the beginning of the command line.
<b>Ctrl-E</b>	Moves the cursor to the end of the command line.
<b>Esc B</b>	Moves the cursor back one word.
<b>Esc F</b>	Moves the cursor forward one word.
<b>Ctrl-T</b>	Transposes the character to the left of the cursor with the character located at the cursor.
<b>Delete</b> or <b>Backspace</b> key	Erases the character to the left of the cursor.
<b>Ctrl-D</b>	Deletes the character at the cursor.
<b>Ctrl-K</b>	Deletes all characters from the cursor to the end of the command line.
<b>Ctrl-U</b> or <b>Ctrl-X</b>	Deletes all characters from the cursor to the beginning of the command line.
<b>Ctrl-W</b>	Deletes the word to the left of the cursor.



<b>Esc D</b>	Deletes from the cursor to the end of the word.
<b>Esc C</b>	Capitalizes at the cursor.
<b>Esc L</b>	Changes the word at the cursor to lowercase.
<b>Esc U</b>	Capitalizes letters from the cursor to the end of the word.
<b>Ctrl-V</b> or <b>Esc Q</b>	Designates a particular keystroke as an executable command, perhaps as a shortcut.
<b>Return</b> key	<p>Scrolls down a line or screen on displays that are longer than the terminal screen can display.</p> <p><b>Note</b> The More prompt is used for any output that has more lines than can be displayed on the terminal screen, including <b>show</b> command output. You can use the <b>Return</b> and <b>Space</b> bar keystrokes whenever you see the More prompt.</p>
<b>Space</b> bar	Scrolls down one screen.
<b>Ctrl-L</b> or <b>Ctrl-R</b>	Redisplays the current command line if the switch suddenly sends a message to your screen.

## Editing Command Lines That Wrap

You can use a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. The keystroke actions are optional.

To scroll back to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.



### Note

The arrow keys function only on ANSI-compatible terminals such as VT100s.

The following example shows how to wrap a command line that extend beyond a single line on the screen.

## SUMMARY STEPS

1. **access-list**
2. **Ctrl-A**
3. **Return** key

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>access-list</b>  <b>Example:</b> <pre>Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 Switch(config)# \$ 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 255.25 Switch(config)# \$t tcp 10.15.22.25 255.255.255.0 131.108.1.20 255.255.255.0 eq Switch(config)# \$15.22.25 255.255.255.0 10.15.22.35 255.255.255.0 eq 45</pre>	<p>Displays the global configuration command entry that extends beyond one line.</p> <p>When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign (\$) shows that the line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.</p>
<b>Step 2</b>	<b>Ctrl-A</b>  <b>Example:</b> <pre>Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.2\$</pre>	<p>Checks the complete syntax.</p> <p>The dollar sign (\$) appears at the end of the line to show that the line has been scrolled to the right.</p>
<b>Step 3</b>	<b>Return key</b>	<p>Execute the commands.</p> <p>The software assumes that you have a terminal screen that is 80 columns wide. If you have a different width, use the <b>terminal width</b> privileged EXEC command to set the width of your terminal.</p> <p>Use line wrapping with the command history feature to recall and modify previous complex command entries.</p>

## Searching and Filtering Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This is useful when you need to sort through large amounts of output or if you want to exclude output that you do not need to see. Using these commands is optional.

## SUMMARY STEPS

1. **{show | more} command | {begin | include | exclude} regular-expression**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>{show   more} command   {begin   include   exclude} regular-expression</b>	Searches and filters the output.

	Command or Action	Purpose
	<b>Example:</b> Switch# <b>show interfaces   include protocol</b> Vlan1 is up, line protocol is up Vlan10 is up, line protocol is down GigabitEthernet1/0/1 is up, line protocol is down GigabitEthernet1/0/2 is up, line protocol is up	Expressions are case sensitive. For example, if you enter <b>  exclude output</b> , the lines that contain <b>output</b> are not displayed, but the lines that contain <b>output</b> appear.

## Accessing the CLI through a Console Connection or through Telnet

Before you can access the CLI, you must connect a terminal or a PC to the switch console or connect a PC to the Ethernet management port and then power on the switch, as described in the hardware installation guide that shipped with your switch.

If your switch is already configured, you can access the CLI through a local console connection or through a remote Telnet session, but your switch must first be configured for this type of access.

You can use one of these methods to establish a connection with the switch:

- Connect the switch console port to a management station or dial-up modem, or connect the Ethernet management port to a PC. For information about connecting to the console or Ethernet management port, see the switch hardware installation guide.
- Use any Telnet TCP/IP or encrypted Secure Shell (SSH) package from a remote management station. The switch must have network connectivity with the Telnet or SSH client, and the switch must have an enable secret password configured.
  - The switch supports up to 16 simultaneous Telnet sessions. Changes made by one Telnet user are reflected in all other Telnet sessions.
  - The switch supports up to five simultaneous secure SSH sessions.

After you connect through the console port, through the Ethernet management port, through a Telnet session or through an SSH session, the user EXEC prompt appears on the management station.





## Configuring NetFlow Lite

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### Prerequisites for NetFlow Lite

NetFlow Lite is only supported on a Catalyst 2960-X Switch with a LAN Base license and on a Catalyst 2960-XR Switch with an IP Lite license. Catalyst 2960-XR is not stackable with the Catalyst 2960-X platform.

The following two targets for attaching a NetFlow Lite monitor are supported:

- Port—Monitor attachment is only supported on physical interfaces and not on logical interfaces, such as EtherChannels. The physical interface could be a routed port or a switched port.
- VLAN—Monitor attachment is supported on VLAN interfaces only (SVI) and not on a Layer 2 VLAN.

### Restrictions for NetFlow Lite

The following are restrictions for NetFlow Lite:

- Monitor restrictions:
  - Monitor attachment is only supported in the ingress direction.
  - One monitor per interface is supported, although multiple exporters per interface are supported.
  - Only permanent and normal cache is supported for the monitor; immediate cache is not supported.

- Changing any monitor parameter will not be supported when it is applied on any of the interfaces or VLANs.
  - When both the port and VLANs have monitors attached, then VLAN monitor will overwrite the port monitor for traffic coming on the port.
  - Flow monitor type and traffic type (type means IPv4, IPv6, and data link) should be same for the flows to be created.
  - You cannot attach an IP and port-based monitor to an interface at the same time on the switch. A 48-port switch supports a maximum of 48 monitors (IP or port-based) and for 256 SVIs, you can configure up to 256 monitors (IP or port-based).
  - When running the **show flow monitor *flow\_name* cache** command, the switch displays cache information from an earlier switch software version (Catalyst 2960-S) with all fields entered as zero. Ignore these fields, as they are inapplicable to the switch.
- Sampler restrictions:
    - Only sampled NetFlow is supported.
    - For both port and VLANs, a total of only 4 samplers (random or deterministic) are supported on the switch.
    - The sampling minimum rate for both modes is 1 out of 32 flows, and the sampling maximum rate for both modes is 1 out of 1022 flows.
    - You must associate a sampler with a monitor while attaching it to an interface. Otherwise, the command will be rejected. Use the **ip flow monitor *monitor\_name* sampler *sampler\_name* input** interface configuration command to perform this task.
    - When you attach a monitor using a deterministic sampler, every attachment with the same sampler uses one new free sampler from the switch (hardware) out of 4 available samplers. You are not allowed to attach a monitor with any sampler, beyond 4 attachments.

When you attach a monitor using a random sampler, only the first attachment uses a new sampler from the switch (hardware). The remainder of all of the attachments using the same sampler, share the same sampler.

Because of this behavior, when using a deterministic sampler, you can always make sure that the correct number of flows are sampled by comparing the sampling rate and what the switch sends. If the same random sampler is used with multiple interfaces, flows from any interface can always be sampled, and flows from other interfaces can always be skipped.
  - Network flows and statistics are collected at the line rate.
  - ACL-based NetFlow is not supported.
  - Only NetFlow Version 9 is supported for Flexible NetFlow exporter using the *export-protocol* command option. If you configure NetFlow Version 5, this version will be accepted, but the NetFlow Version 5 export functionality is neither currently available nor supported.
  - Each switch in a stack (hardware) can support the creation of a maximum of 16,000 flows at any time. But as the flows are periodically pushed to the software cache, the software cache can hold a much larger amount of flows (1048 Kb flows). From the hardware flow cache, every 20 seconds (termed as poll timer), 200 flows (termed as poll entries) are pushed to software.
  - The switch supports homogeneous stacking, but does not support mixed stacking.

# Information About NetFlow Lite

## NetFlow Lite Overview

With NetFlow Lite, traffic is processed and packets are classified into flows. New flows are inserted in the NetFlow table, and statistics are automatically updated. You must configure both ingress and egress NetFlow monitoring. The network services module supports one monitor per interface per direction.

NetFlow Lite has these components:

- Records are combinations of key and nonkey fields assigned to monitor NetFlow Lite monitors to define the cache used to store data.
- Flow monitors are applied to interfaces to perform network traffic monitoring. A flow monitor includes a user-defined record, an optional flow exporter, and a cache that is automatically created when the monitor is applied to the first interface. The switch supports normal caches that age out according to settings.
- Flow exporters export the data in the flow monitor cache to a remote system, such as a server running NetFlow collector.
- Flow samplers reduce the load that NetFlow Lite puts on the networking device to monitor traffic by limiting the number of packets that are analyzed.

You can configure unidirectional flow (destination or source-address based flows), and you can also configure flow aging. These features are supported on the network services module:

- You can configure collection statistics for Layer 2-switched (nonrouting) traffic, Layer 3 IPv4 and IPv6 traffic, and Layer 4 TCP, IGMP, and ICMP traffic.
- NetFlow counting, maintenance, troubleshooting (debugging commands).
- NetFlow analysis is performed on traffic crossing the physical interfaces on the network services module. The switch processes egress (outbound) traffic after forwarding decisions are performed. You can force locally switched or routed traffic through service module ports by configuring private VLANs or protected ports.

## Flow Records

A flow record defines the keys that NetFlow Lite uses to identify packets in the flow, as well as other fields of interest that NetFlow Lite gathers for the flow. You can define a flow record with any combination of keys and fields of interest.

A flow record also defines the types of counters gathered per flow. You can configure 64-bit packet or byte counters.

### Related Topics

[Configuring a Customized Flow Record, on page 21](#)

[Example: Configuring a Flow Record, on page 32](#)

## NetFlow Lite Match Parameters

You can match these key fields for the flow record:

- IPv4 or IPv6 destination address
- Datalink fields (source and destination MAC address, and MAC ethertype (type of networking protocol)).
- Transport field source and destination ports to identify the type of application: ICMP, IGMP, or TCP traffic.

The following table describes NetFlow Lite match parameters. You must configure at least one of the following match parameters for the flow records.

**Table 4: Match Parameters**

Command	Purpose
<b>match datalink</b> { <b>ethertype</b>   <b>mac</b> { <b>destination address input</b>   <b>source address input</b> }}	<p>Specifies a match to datalink or Layer 2 fields. The following command options are available:</p> <ul style="list-style-type: none"> <li>• <b>ethertype</b>—Matches to the ethertype of the packet.</li> <li>• <b>mac</b>—Matches the source or destination MAC address from packets at input.</li> </ul> <p><b>Note</b> When a datalink flow monitor is assigned to an interface or VLAN, it only creates flows for non-IPv6 or non-IPv4 traffic.</p>
<b>match ipv4</b> { <b>destination</b> { <b>address</b> }   <b>protocol</b>   <b>source</b> { <b>address</b> }   <b>tos</b> }	<p>Specifies a match to the IPv4 fields. The following command options are available:</p> <ul style="list-style-type: none"> <li>• <b>destination</b>—Matches to the IPv4 destination address-based fields.</li> <li>• <b>protocol</b>—Matches to the IPv4 protocols.</li> <li>• <b>source</b>—Matches to the IPv4 source address based fields.</li> <li>• <b>tos</b>—Matches to the IPv4 Type of Service fields.</li> </ul>



Command	Purpose
<b>match ipv6</b> { <b>destination</b> { <b>address</b> }   <b>flow-label</b>   <b>protocol</b>   <b>source</b> { <b>address</b> } }	Specifies a match to the IPv6 fields. The following command options are available: <ul style="list-style-type: none"> <li>• <b>destination</b>—Matches to the IPv6 destination address-based fields.</li> <li>• <b>flow-label</b>—Matches to the IPv6 flow-label fields.</li> <li>• <b>protocol</b>—Matches to the IPv6 payload protocol fields.</li> <li>• <b>source</b>—Matches to the IPv6 source address based fields.</li> </ul>
<b>match transport</b> { <b>destination-port</b>   <b>source-port</b> }	Specifies a match to the Transport Layer fields. The following command options are available: <ul style="list-style-type: none"> <li>• <b>destination-port</b>—Matches to the transport destination port.</li> <li>• <b>source-port</b>—Matches to the transport source port.</li> </ul>

## NetFlow Lite Collect Parameters

You can collect these key fields in the flow record:

- The total number of bytes, flows or packets sent by the exporter (exporter) or the number of bytes or packets in a 64-bit counter (long).
- The timestamp based on system uptime from the time the first packet was sent or from the time the most recent (last) packet was seen.
- The SNMP index of the input interface. The interface for traffic entering the service module is based on the switch forwarding cache. This field is typically used in conjunction with datalink, IPv4, and IPv6 addresses, and provides the actual first-hop interface for directly connected hosts.
  - A value of 0 means that interface information is not available in the cache.
  - Some NetFlow collectors require this information in the flow record.

The following table describes NetFlow Lite collect parameters.

**Table 5: Collect Parameters**

Command	Purpose
<b>collect counter</b> { <b>bytes</b> { <b>long</b>   <b>permanent</b> }   <b>packets</b> { <b>long</b>   <b>permanent</b> }}	Collects the counter fields total bytes and total packets.

Command	Purpose
<b>collect flow</b> {sampler}	Collects the flow sampler identifier (ID).
<b>collect interface</b> {input}	Collects the fields from the input interface.
<b>collect timestamp sys-uptime</b> {first   last}	Collects the fields for the time the first packet was seen or the time the most recent packet was last seen (in milliseconds).
<b>collect transport tcp flags</b>	Collects the following transport TCP flags: <ul style="list-style-type: none"> <li>• <b>ack</b>—TCP acknowledgement flag</li> <li>• <b>cwr</b>—TCP congestion window reduced flag</li> <li>• <b>ece</b>—TCP ECN echo flag</li> <li>• <b>fin</b>—TCP finish flag</li> <li>• <b>psh</b>—TCP push flag</li> <li>• <b>rst</b>—TCP reset flag</li> <li>• <b>syn</b>—TCP synchronize flag</li> <li>• <b>urg</b>—TCP urgent flag</li> </ul>

## Exporters

An exporter contains network layer and transport layer details for the NetFlow Lite export packet. The following table lists the configuration options for an exporter.

**Table 6: NetFlow Lite Exporter Configuration Options**

Exporter Configuration	Description
default	Sets a command to its default values.
description	Provides a description for the flow exporter.
destination	Export destination.
dscp	Optional DSCP value.
exit	Exits from the flow exporter configuration mode.
export-protocol	Export protocol version.
no	Negates the command or its default.

Exporter Configuration	Description
option	Selects option for exporting.
source	Originating interface for the net flow.
template	Flow exporter template configuration.
transport	Transport protocol.
ttl	Optional TTL or hop limit.

The switch exports data to the collector whenever a timeout occurs or when the flow is terminated (TCP Fin or Rst received, for example). You can configure the following timers to force a flow export:

- Active timeout—The flow continues to have the packets for the past  $m$  seconds since the flow was created.
- Inactive timeout—The flow does not have any packets for the past  $n$  seconds.

Active timeout and Inactive timeout are applied for normal cache type. After the timer expires, the counters are reset to '0'. For permanent cache type, there is 'update timeout'. After 'update timeout' expires, the data is exported to collected and the counter continues to increase based on the traffic.

#### Related Topics

[Configuring the Flow Exporter, on page 23](#)

[Example: Configuring a Flow Exporter, on page 33](#)

## Export Formats

The switch supports only NetFlow Version 9 export formats. NetFlow Version 9 export format provides the following features and functionality:

- Variable field specification format
- Support for IPv6, Layer 2, and MPLS fields
- More efficient network utilization



#### Note

For information about the Version 9 export format, see RFC 3954.

## Monitors

A monitor references the flow record and flow exporter. You apply a monitor to an interface on the switch.

#### Related Topics

[Configuring a Customized Flow Monitor, on page 25](#)

[Example: Configuring a Flow Monitor, on page 34](#)

## Samplers

You use a NetFlow Lite sampler to specify the rate at which packets are being sampled. The switch supports both deterministic and random modes of sampling.

### Related Topics

[Configuring and Enabling Flow Sampling, on page 30](#)

[Example: Configuring and Enabling a Flow Sampler, on page 35](#)

## Stacking

The switch supports homogeneous stacking, but does not support mixed stacking.

Each stack member has NetFlow information that operates as if they are a standalone switch. After entering a **show** CLI EXEC command, the master switch queries stack members to obtain their information. During an export, the member switches send the flow packets to the master switch, since member switches cannot route packets. Therefore, export always occurs from the master switch.

During a switchover, previous monitor configurations are not applied, and the new master switch synchronizes the configuration to all stack members. Member switches reapply the configuration on the respective stack members.

## Default Settings

The following table lists the NetFlow Lite default settings for the switch.

**Table 7: Default NetFlow Lite Settings**

Setting	Default
Flow active timeout	1800 seconds  <b>Note</b> The default value for this setting may be too high for your specific NetFlow Lite configuration. You may want to consider changing it to a lower value of 180 or 300 seconds.
Flow timeout inactive	Enabled, 30 seconds
Flow update timeout	1800 seconds
Default cache size	16640 bits

# How to Configure NetFlow Lite

To configure NetFlow Lite, follow these general steps:

- 1 Create a flow record by specifying keys and non-key fields to the flow.
- 2 Create an optional flow exporter by specifying the protocol and transport destination port, destination, and other parameters.
- 3 Create a flow monitor based on the flow record and flow exporter.
- 4 Create a sampler (either deterministic or random).
- 5 Apply the flow monitor to a Layer 2 port or VLAN.

## Configuring a Customized Flow Record

Beginning in privileged EXEC mode, follow these steps to configure the customized flow record.

### SUMMARY STEPS

1. **configure terminal**
2. **flow record** *name*
3. **description** *string*
4. **match** *type*
5. **collect** *type*
6. **end**
7. **show running-config**
8. **show flow record** [*name record-name*]
9. **copy running-config startup-config**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Switch# <b>configure terminal</b>	Enters the global configuration mode.
<b>Step 2</b>	<b>flow record</b> <i>name</i>  <b>Example:</b> Switch(config)# <b>flow record test</b> Switch(config-flow-record) #	Creates a flow record and enters flow record configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<b>description</b> <i>string</i>  <b>Example:</b> Switch(config-flow-record) # <b>description</b> Ipv4Flow	(Optional) Describes this flow record as a maximum 63-character string.
<b>Step 4</b>	<b>match</b> <i>type</i>  <b>Example:</b> Switch(config-flow-record) # <b>match</b> ipv4 <b>source</b> <b>address</b> Switch(config-flow-record) # <b>match</b> ipv4 <b>destination</b> <b>address</b> Switch(config-flow-record) # <b>match</b> ipv4 <b>protocol</b>	Configures a key field for the flow record.  For information about possible match key values, see <a href="#">NetFlow Lite Match Parameters, on page 16</a> .  <b>Note</b> Repeat step 4 to configure additional files for the record.
<b>Step 5</b>	<b>collect</b> <i>type</i>  <b>Example:</b> Switch(config-flow-record) # <b>collect</b> <b>counter</b> <b>bytes</b> <b>long</b> Switch(config-flow-record) # <b>collect</b> <b>timestamp</b> <b>sys-uptime</b> <b>first</b> Switch(config-flow-record) # <b>collect</b> <b>transport</b> <b>tcp</b> <b>flags</b>	Configures one or more source fields in the flow as counter fields, timestamp fields, or interface fields.  For information about possible collection field values, see <a href="#">NetFlow Lite Collect Parameters, on page 17</a> .  <b>Note</b> Repeat Step 5 as required to configure additional fields for the record.
<b>Step 6</b>	<b>end</b>  <b>Example:</b> Switch(config-flow-record) # <b>end</b>	Returns to privileged EXEC mode.
<b>Step 7</b>	<b>show running-config</b>  <b>Example:</b> Switch# <b>show running-config</b>	(Optional) Displays the configured flow records.
<b>Step 8</b>	<b>show flow record</b> [ <b>name</b> <i>record-name</i> ]  <b>Example:</b> Switch <b>show flow record</b> <b>test</b>	(Optional) Displays information about NetFlow flow records.
<b>Step 9</b>	<b>copy running-config startup-config</b>  <b>Example:</b> Switch# <b>copy running-config</b> <b>startup-config</b>	(Optional) Saves your entries in the configuration file.

**What to Do Next**

Proceed to configure the Flow Exporter.

**Related Topics**

[Flow Records, on page 15](#)

[Example: Configuring a Flow Record, on page 32](#)

## Configuring the Flow Exporter

Beginning in privileged EXEC mode, follow these steps to configure the NetFlow exporter.

**SUMMARY STEPS**

1. **configure terminal**
2. **flow exporter** *name*
3. **description** *string*
4. **destination** { *hostname* | *ipv4-address* } [**vrf** *vrf-name*]
5. **dscp** *value*
6. **source** { *source type* }
7. **option** (exporter-stats | interface-table | sampler-table) [**timeout** *seconds*]
8. **template data** **timeout** *seconds*
9. **transport** **udp** *number*
10. **end**
11. **show running-config** **flow exporter** *exporter-name*
12. **show flow exporter** [ *exporter-name* ]
13. **copy running-config** **startup-config**

**DETAILED STEPS**

	Command or Action	Purpose
Step 1	<b>configure terminal</b>	Enters the global configuration mode.
	<b>Example:</b> Switch# <b>configure terminal</b>	
Step 2	<b>flow exporter</b> <i>name</i>	Creates a flow exporter and enters flow exporter configuration mode.
	<b>Example:</b> Switch(config)# <b>flow exporter</b> ExportTest	

	Command or Action	Purpose
	<code>Switch (config-flow-exporter) #</code>	
<b>Step 3</b>	<b>description</b> <i>string</i>  <b>Example:</b>  <code>Switch(config-flow-exporter) # description ExportV9</code>	(Optional) Configures a description for the exporter that appears in the configuration and in the display of the <b>show flow exporter</b> command.
<b>Step 4</b>	<b>destination</b> { <i>hostname</i>   <i>ipv4-address</i> } [ <b>vrf</b> <i>vrf-name</i> ]  <b>Example:</b>  <code>Switch(config-flow-exporter) # destination 192.0.2.1</code>	Sets the IPv4 address or hostname of the destination system for the exporter.
<b>Step 5</b>	<b>dscp</b> <i>value</i>  <b>Example:</b>  <code>Switch(config-flow-exporter) # dscp 0</code>	(Optional) Specifies the differentiated services codepoint value for datagrams sent by the exporter. The range is from 0 to 63. The default is 0.
<b>Step 6</b>	<b>source</b> { <i>source type</i> }  <b>Example:</b>  <code>Switch(config-flow-exporter) # source gigabitEthernet1/0/1</code>	Specifies the local interface from which the exporter uses the IP address as the source IP address for exported datagrams.
<b>Step 7</b>	<b>option</b> (exporter-stats   interface-table   sampler-table) [timeout <i>seconds</i> ]  <b>Example:</b>  <code>Switch(config-flow-exporter) # option exporter-stats</code>	(Optional) Configures options data parameters for the exporter. You can configure all three options concurrently. The range for the timeout is 1 to 86400 seconds. The default is 600.
<b>Step 8</b>	<b>template data</b> timeout <i>seconds</i>  <b>Example:</b>  <code>Switch(config-flow-exporter) # template data timeout 300</code>	(Optional) Configures resending of templates based on a timeout. The range is 1 to 86400 seconds (86400 seconds equals 24 hours). The default is 600.
<b>Step 9</b>	<b>transport udp</b> <i>number</i>  <b>Example:</b>  <code>Switch(config-flow-exporter) # transport udp 200</code>	(Optional) Specifies the UDP port to use to reach the NetFlow collector. The range is from 1 to 65535.



	Command or Action	Purpose
<b>Step 10</b>	<b>end</b>  <b>Example:</b> Switch(config-flow-record)# <b>end</b>	Returns to privileged EXEC mode.
<b>Step 11</b>	<b>show running-config flow exporter <i>exporter-name</i></b>  <b>Example:</b> Switch# <b>show running-config flow exporter ExportTest</b>	(Optional) Displays the configured flow exporter.
<b>Step 12</b>	<b>show flow exporter [ <i>exporter-name</i> ]</b>  <b>Example:</b> Switch <b>show flow exporter ExportTest</b>	(Optional) Displays status of flow exporter.
<b>Step 13</b>	<b>copy running-config startup-config</b>  <b>Example:</b> Switch# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file.

### What to Do Next

Proceed to configure a customized flow monitor.

### Related Topics

[Exporters, on page 18](#)

[Example: Configuring a Flow Exporter, on page 33](#)

## Configuring a Customized Flow Monitor

Beginning in privileged EXEC mode, follow these steps to configure a NetFlow monitor.

## SUMMARY STEPS

1. **configure terminal**
2. **flow monitor** *name*
3. **description** *string*
4. **record** *name*
5. **cache** {*entries number\_of\_cache\_entries* | *timeout {active | inactive | update} seconds* | **type** {**normal** | **permanent**} }
6. **exporter** *name*
7. **end**
8. **show running-config flow monitor** *flow-monitor name*
9. **show flow monitor** [*name record-name*]
10. **copy running-config startup-config**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Switch# <b>configure terminal</b>	Enters the global configuration mode.
<b>Step 2</b>	<b>flow monitor</b> <i>name</i>  <b>Example:</b> Switch(config)# <b>flow monitor MonitorTest</b> Switch (config-flow-monitor)#	Creates a flow monitor and enters flow monitor configuration mode.
<b>Step 3</b>	<b>description</b> <i>string</i>  <b>Example:</b> Switch(config-flow-monitor)# <b>description</b> <b>Ipv4Monitor</b>	(Optional) Configures a description for the flow monitor..
<b>Step 4</b>	<b>record</b> <i>name</i>  <b>Example:</b> Switch(config-flow-monitor)# <b>record test</b>	Associates a flow record with the specified flow monitor.
<b>Step 5</b>	<b>cache</b> { <i>entries number_of_cache_entries</i>   <i>timeout {active   inactive   update} seconds</i>   <b>type</b> { <b>normal</b>   <b>permanent</b> } }	(Optional) Modifies the flow monitor cache parameters such as timeout values, number of cache entries, and the cache type. <ul style="list-style-type: none"> <li>• <b>entries</b>—Configures the number of cache entries. Enter a value between 16 and 1048576.</li> </ul>

	Command or Action	Purpose
	<b>Example:</b> <pre>Switch(config-flow-monitor)# cache timeout active 100 type normal</pre>	<ul style="list-style-type: none"> <li>• <b>timeout seconds</b>—Configures the active, inactive, or update flow timeout. This defines the granularity of the traffic analysis. The range is from 1 to 604800 seconds. The default is 1800. Typical values are 60 or 300 seconds.</li> <li>• <b>type normal</b>—Configures the normal flow removal from the flow cache or disables the flow removal from the flow cache.</li> </ul> <p>Repeat step 5 to configure additional cache parameters for the flow monitor.</p>
<b>Step 6</b>	<b>exporter name</b>  <b>Example:</b> <pre>Switch(config-flow-monitor)# exporter ExportTest</pre>	<p>(Optional) Specifies the name of an exporter that was created previously.</p> <p><b>Note</b> Repeat step 6 to configure additional exporters.</p>
<b>Step 7</b>	<b>end</b>  <b>Example:</b> <pre>Switch(config-flow-monitor)# end</pre>	Returns to privileged EXEC mode.
<b>Step 8</b>	<b>show running-config flow monitor <i>flow-monitor name</i></b>  <b>Example:</b> <pre>Switch# show running-config flow monitor MonitorTest</pre>	Optional) Verifies the flow monitor configuration.
<b>Step 9</b>	<b>show flow monitor [name <i>record-name</i>]</b>  <b>Example:</b> <pre>Switch show flow monitor name MonitorTest</pre>	(Optional) Displays information about NetFlow flow monitor (shows sampler mode and sampling rate).
<b>Step 10</b>	<b>copy running-config startup-config</b>  <b>Example:</b> <pre>Switch# copy running-config startup-config</pre>	(Optional) Saves your entries in the configuration file.

### What to Do Next

Proceed to apply a flow monitor to an interface.

**Related Topics**

[Monitors, on page 19](#)

[Example: Configuring a Flow Monitor, on page 34](#)

## Applying a Flow Monitor to an Interface

Beginning in privileged EXEC mode, follow these steps to apply a NetFlow monitor to an interface.

### SUMMARY STEPS

1. **configure terminal**
2. **interface** *type*
3. **{ip | ipv6} flow monitor** *monitor -name { input | sampler {sampler\_name input } }*
4. **exit**
5. **end**
6. **show flow interface** [*interface-type number*]
7. **show flow monitor** [*name record-name*]
8. **copy running-config startup-config**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Switch# <b>configure terminal</b>	Enters the global configuration mode.
<b>Step 2</b>	<b>interface</b> <i>type</i>  <b>Example:</b> Switch(config)# <b>interface</b> <b>GigabitEthernet1/0/1</b> Switch(config-if)#	Identifies an interface and enters interface configuration mode. NetFlow is supported only on the service module 1-Gigabit or 10-Gigabit Ethernet interfaces.  <b>Note</b> You cannot attach a NetFlow monitor to a port channel interface. If both service module interfaces are part of an EtherChannel, you should attach the monitor to both physical interfaces.
<b>Step 3</b>	<b>{ip   ipv6} flow monitor</b> <i>monitor -name { input   sampler {sampler_name input } }</i>  <b>Example:</b> Switch(config-if) #	Activates a previously created flow monitor by assigning it to the interface to analyze incoming traffic. <ul style="list-style-type: none"> <li>• <b>ip</b>—Enter in records matching IPv4 IP addresses.</li> <li>• <b>ipv6</b>—Enter in records matching IPv6 IP addresses.</li> <li>• <b>input</b>—Apply the flow monitor on input traffic.</li> <li>• <b>sampler</b>— Apply the flow monitor sampler on input traffic.</li> </ul>

	Command or Action	Purpose
		<p>Repeat steps 2 and 3 to configure additional cache parameters for the flow monitor.</p> <p><b>Note</b> You can also configure a datalink flow monitor to the interface. Use the <b>datalink flow monitor</b> <i>monitor_name</i> {<b>input</b>   <b>sampler</b>} command to configure a datalink flow monitor.</p>
<b>Step 4</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Switch(config-if)# exit</pre>	Returns to global configuration mode.
<b>Step 5</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Switch(config-flow-monitor)# end</pre>	Returns to privileged EXEC mode.
<b>Step 6</b>	<p><b>show flow interface</b> [<i>interface-type number</i>]</p> <p><b>Example:</b></p> <pre>Switch# show flow interface</pre>	(Optional) Displays information about NetFlow on an interface.
<b>Step 7</b>	<p><b>show flow monitor</b> [<i>name record-name</i>]</p> <p><b>Example:</b></p> <pre>Switch show flow monitor name MonitorTest</pre>	(Optional) Displays information about NetFlow flow monitor.
<b>Step 8</b>	<p><b>copy running-config startup-config</b></p> <p><b>Example:</b></p> <pre>Switch# copy running-config startup-config</pre>	(Optional) Saves your entries in the configuration file.

### What to Do Next

Proceed to configure and enable a flow sampler.

### Related Topics

[Example: Applying a Flow Monitor to an Interface, on page 35](#)

## Configuring and Enabling Flow Sampling

Beginning in privileged EXEC mode, follow these steps to configure and enable flow sampling.

### SUMMARY STEPS

1. **configure terminal**
2. **sampler** *name*
3. **description** *string*
4. **mode random out of** *window-size*
5. **exit**
6. **interface** *type*
7. **{ip | ipv6} flow monitor** *monitor -name* **sampler** *sampler-name* [**input** | **output**]
8. **end**
9. **show flow sampler** *sampler-name*
10. **copy running-config startup-config**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Switch# <b>configure terminal</b>	Enters the global configuration mode.
<b>Step 2</b>	<b>sampler</b> <i>name</i>  <b>Example:</b> Switch(config)# <b>sampler SampleTest</b> Switch(config-flow-sampler)#	Creates a sampler and enters flow sampler configuration mode.
<b>Step 3</b>	<b>description</b> <i>string</i>  <b>Example:</b> Switch(config-flow-sampler)# <b>description samples</b>	(Optional) Describes this flow record as a maximum 63-character string.
<b>Step 4</b>	<b>mode random out of</b> <i>window-size</i>  <b>Example:</b> Switch(config-flow-sampler)# <b>mode random 1 out-of 1022</b>	Specifies the mode and window size from which to select packets. The window size range is from 32 to 1022.

	Command or Action	Purpose
<b>Step 5</b>	<b>exit</b>  <b>Example:</b> Switch(config-flow-sampler) # <b>exit</b>	Returns to global configuration mode.
<b>Step 6</b>	<b>interface type</b>  <b>Example:</b> Switch(config) # <b>interface GigabitEthernet1/0/1</b> Switch(config-if) #	Identifies an interface and enters interface configuration mode. NetFlow is supported only on the service module 1-Gigabit or 10-Gigabit Ethernet interfaces.  <b>Note</b> You cannot attach a NetFlow monitor to a port channel interface. If both service module interfaces are part of an EtherChannel, you should attach the monitor to both physical interfaces.
<b>Step 7</b>	<b>{ip   ipv6} flow monitor monitor -name sampler sampler-name[input   output]</b>  <b>Example:</b> Switch(config-if) #	Activates a previously created flow monitor by assigning it to the interface to analyze incoming or outgoing traffic.
<b>Step 8</b>	<b>end</b>  <b>Example:</b> Switch(config-flow-monitor) # <b>end</b>	Returns to privileged EXEC mode.
<b>Step 9</b>	<b>show flow sampler sampler-name</b>  <b>Example:</b> Switch <b>show flow monitor name MonitorTest</b>	(Optional) Displays information about NetFlow sampler.
<b>Step 10</b>	<b>copy running-config startup-config</b>  <b>Example:</b> Switch# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file.

## What to Do Next

### Related Topics

[Samplers, on page 20](#)

[Example: Configuring and Enabling a Flow Sampler, on page 35](#)

# Monitoring NetFlow Lite

The commands in the following table can be used to monitor NetFlow Lite.

**Table 8: NetFlow Lite Monitoring Commands**

Command	Purpose
<b>show flow record</b>	Displays the status of the flow records.
<b>show flow exporter</b> <i>exporter-name</i>	Displays the status of a flow exporter.
<b>show flow monitor</b> <i>monitor -name</i>	Displays the current status of a flow monitor.
<b>show flow interface</b> <i>interface-id</i>	Verifies that the NetFlow Lite is configured on the interface.
<b>show flow monitor name</b> <i>monitor -name</i> <b>cache</b>	Displays data in the flow monitor cache.
<b>show sampler</b> <i>sampler -name</i>	Displays the current status of a flow sampler.

## Configuration Examples for NetFlow Lite

### Example: Configuring a Flow Record

This example shows how to configure a flow record:

```
Switch(config)# flow record
Switch(config-flow-record)# description record to monitor network traffic
Switch(config-flow-record)# match ipv4 destination address
Switch(config-flow-record)# collect counter packets
Switch(config-flow-record)# collect counter bytes
Switch(config-flow-record)# end
```

#### Related Topics

[Configuring a Customized Flow Record, on page 21](#)

[Flow Records, on page 15](#)

### Example: Showing a Flow Record

This is an example of output from the **show flow record** command:

```
Switch# show flow record
flow record L2L4ipv4:
```



```
Description: User defined
No. of users: 1
Total field space: 56 bytes
Fields:
match datalink dot1q priority
match datalink mac source-address
match datalink mac destination-address
match ipv4 tos
match ipv4 ttl
match ipv4 protocol
match ipv4 source address
match ipv4 destination address
match transport source-port
match transport destination-port
collect interface input snmp
collect interface output snmp
collect counter flows
collect counter bytes
collect counter packets
collect timestamp sys-uptime first
collect timestamp sys-uptime last
```

```
flow record L2L4ipv6:
Description: User defined
No. of users: 1
Total field space: 81 bytes
Fields:
match datalink mac source-address
match datalink mac destination-address
match ipv6 traffic-class
match ipv6 protocol
match ipv6 source address
match ipv6 destination address
match ipv6 fragmentation flags
match transport source-port
match transport destination-port
match transport icmp ipv6 type
match transport icmp ipv6 code
collect interface input snmp
collect interface output snmp
collect counter flows
collect counter bytes
collect counter packets
collect timestamp sys-uptime first
collect timestamp sys-uptime last
```

## Example: Configuring a Flow Exporter

This example shows how to configure the flow exporter:

```
Switch(config)# flow exporter QoS-Collector
Switch(config-flow-exporter)# description QoS Collector Bldg 19
Switch(config-flow-exporter)# destination 172.20.244.28
Switch(config-flow-exporter)# source vlan 1
Switch(config-flow-exporter)# dscp 3
Switch(config-flow-exporter)# transport udp 2055
Switch(config-flow-exporter)# end
```

### Related Topics

[Configuring the Flow Exporter, on page 23](#)

[Exporters, on page 18](#)

## Example: Show Flow Exporter

This is an example of output from the **show flow exporter** command:

```
Switch# show flow exporter EXPORTER-1
Flow Exporter QoS-Collector:
Description: QoS Collector Bldg 19
Export protocol: NetFlow Version 9
Transport Configuration:
Destination IP address: 172.20.244.28
Source IP address: 10.30.0.234
Source Interface: Vlan1
Transport Protocol: UDP
Destination Port: 2055
Source Port: 62401
DSCP: 0x3
TTL: 255
Output Features: Not Used
```

## Example: Configuring a Flow Monitor

This example shows how to configure a flow monitor:

```
Switch(config)# flow monitor FLOW-MONITOR-1
Switch(config-flow-monitor)# Used for ipv4 traffic analysis
Switch(config-flow-monitor)# record FLOW-RECORD-1
Switch(config-flow-monitor)# cache timeout active 300
Switch(config-flow-monitor)# cache type normal
Switch(config-flow-monitor)# exporter EXPORTER-1
Switch(config-flow-monitor)# exit
```

### Related Topics

[Configuring a Customized Flow Monitor, on page 25](#)

[Monitors, on page 19](#)

## Example: Showing a Flow Monitor

This is an example of output from the **show flow monitor** command:

```
Switch# show flow monitor FLOW-MONITOR-1
Flow Monitor FLOW-MONITOR-1:
Description: Used for basic ipv4 traffic analysis
Flow Record: FLOW-RECORD-1
Flow Exporter: EXPORTER-1
Cache:
Type: normal (Platform cache)
Status: allocated
Size: Unknown
Inactive Timeout: 15 secs
Active Timeout: 1800 secs
Update Timeout: 1800 secs
```

## Example: Applying a Flow Monitor to an Interface

This example shows how to apply a flow monitor to an interface:

```
Switch(config)# interface gigabitethernet 1/1/2
Switch(config-if)# ip flow monitor FLOW-MONITOR-1 input
Switch(config-if)# end
```

### Related Topics

[Applying a Flow Monitor to an Interface, on page 28](#)

## Example: Showing Monitor Information for an Interface

This is an example of output from the **show flow interface** command:

```
Switch# show flow interface gigabitethernet 1/1/2
Interface Gigabit Ethernet1/1/2
FNF: monitor: FLOW-MONITOR-1
direction: Input
traffic(ip): on
```

## Example: Configuring and Enabling a Flow Sampler

This example shows how to configure and enable a flow sampler:

```
Switch(config)# sampler SAMPLER-1
Switch(config-sampler)# description Sample at 50
Switch(config-sampler)# mode random 1 out-of 50
Switch(config-sampler)# exit
Switch(config)# interface gigabitethernet 1/1/2
Switch(config-if)# ip flow monitor FLOW-MONITOR-1 sampler SAMPLE-1 input
```

### Related Topics

[Configuring and Enabling Flow Sampling, on page 30](#)

[Samplers, on page 20](#)

## Example: Show Sampler

This is an example of output from the **show sampler** command:

```
Switch# show sampler SAMPLER-1
Sampler SAMPLER-1:
ID: 2
Description: Sample at 50%
Type: random
Rate: 1 out of 2
Samples: 2482
Requests: 4964
Users (1):
```

```
flow monitor FLOW-MONITOR-1 (ip,Et0/0,I 2482 out of 4964
```

## Additional References

### Related Documents

Related Topic	Document Title
For complete syntax and usage information for the commands used in this book.	<i>Catalyst 2960-XR Switch NetFlow Lite Command Reference</i>

### Standards and RFCs

Standard/RFC	Title
RFC 3954	Cisco Systems NetFlow Services Export Version 9

### MIBs

MIB	MIBs Link
All supported MIBs for this release.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

### Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/support">http://www.cisco.com/support</a>

## Feature History and Information for NetFlow Lite

Release	Modification
Cisco IOS 15.0(2)EX1	This feature was introduced.





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