



Configuring IPv6 NetFlow

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Prerequisites For IPv6 Netflow

The networking device must be running a Cisco IOSd release that supports Cisco IOS Flexible NetFlow.

IPv6 Traffic

- One of the following must be enabled on your router and on any interfaces on which you want to enable Flexible NetFlow:
 - Cisco Express Forwarding IPv6 or
 - Distributed Cisco Express Forwarding IPv6.

Restrictions For IPv6 Netflow

The following restrictions apply to IPv6 Netflow configurations:

- Locally generated traffic (traffic that is generated by the router, Cisco WLC 5760, on which the Flexible NetFlow Output Accounting feature is configured) is not counted as flow traffic for the Output Flexible NetFlow Accounting feature.

- The Flexible NetFlow Output Accounting feature counts CEF-switched packets only. Process switched transit packets are not counted.

Information About IPv6 Netflow

NetFlow is a monitoring feature used on customer applications for network monitoring, user monitoring and profiling, network planning, security analysis, billing and accounting, and data warehousing and mining. You can use Flexible NetFlow on uplink ports to monitor user-defined flows, collect flow statistics, and perform per-flow policing. It collects and exports flow statistics to a collector device.



Note

Flexible NetFlow is supported only on the Catalyst 3750-X and 3560-X switch running the IP base or IP services feature set and equipped with the network services module. It is not supported on switches running the NPE or the LAN base image.



Note

Not all of the Flexible NetFlow commands in the command reference are available on the switch. Unsupported commands are either not visible or generate an error message if entered.

Understanding Flexible Netflow

With Flexible NetFlow, 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.

Flexible NetFlow consists of the following components:

- Records— These are combinations of key and non-key fields assigned to monitor Flexible NetFlow monitors to define the cache used to store data.
- Flow monitors— These 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— These export the data in the flow monitor cache to a remote system, such as a server running NetFlow collector.
- Flow samplers— These reduce the load that Flexible NetFlow 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 flow aging. The following features are supported on the network services module:

- Configuring collection statistics for Layer 2-switched (non-routing) traffic, Layer 3 (CAPWAP) 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. Locally switched or routed traffic is forced through service module ports by configuring private VLANs or protected ports.

The following NetFlow characteristics are not supported:

- Netflow-5 protocol
- Predefined flow records
- ISL
- Policy-based NetFlow
- Cisco TrustSec monitoring

Though other modules that can be installed in the switch have 1-Gigabit and 10-Gigabit uplink interfaces, NetFlow is supported only on the network services module.

IPv6 Netflow

Flexible Netflow (FNF) allows the user to define a flow record (a particular set of key, non-key, counter and time-stamp fields of interest) that is optimal for a particular application by selecting the fields from a big collection of pre-defined fields, using CLI configuration commands.

The collection of the pre-defined fields includes the following fields:

- Data-link layer (L2) header fields
- IPv6 header fields
- Transport layer (L4) header fields
- Application layer (L5) header fields
- Routing attributes (generic, IPv4, IPv6)
- Interface fields
- Counter fields
- Timestamp fields

Related Topics

[Configuring a Customized Flow Record](#) , on page 4

[Configuring the Flow Exporters](#) , on page 6

[Configuring a Customized Flow Monitor](#) , on page 10

[Applying a Flow Monitor to an Interface](#) , on page 12

[Configuring and Enabling Flow Sampling](#) , on page 14

How To Configure IPv6 Netflow

Configuring a Customized Flow Record

You can match the following fields for the flow record:

- IPv4 or IPv6 destination address
- Datalink fields, to identify Layer 2 source and destination address and VLAN for traffic entering or leaving the interfaces, providing the MAC address of the directly connected host. Class of Service (CoS) and Ethertype datalink header fields are also available.
- Transport field source and destination ports, to identify the type of application: ICMP, IGMP, or TCP traffic.

You can collect the following fields for 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 or output interface. The interface for traffic entering or leaving 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 steps configure the customized flow record:

SUMMARY STEPS

1. **configure terminal**
2. **flow record** recordname
3. **description** description
4. **match** {ipv4 | ipv6} {destination | hop-limit | protocol | source | traffic-class| version} **address**
5. **match datalink** [dot1q | ethertype | mac | vlan]
6. **match transport** [destination-port | icmp | source-port]
7. **match interface** [input |output]
8. **match flow direction**
9. **collect counter** {bytes [layer2 | long] | packets [long]}
10. **collect timestamp absolute** [first | last]
11. **collect interface** [input | output]
12. **collect transport tcp flags** {ack | cwr | ece | fin | psh | rst | syn | urg}
13. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Switch# configure terminal	Enters global configuration mode.
Step 2	flow record recordname Example: Switch(config)# flow record TestRecordName	Creates a flow record and enters Flexible NetFlow flow record configuration mode. This command can also modify an existing flow record.
Step 3	description description Example: Switch(config-flow-record)# description SampleNetflowDescription	(Optional) Creates a description for the flow record.
Step 4	match {ipv4 ipv6} {destination hop-limit protocol source traffic-class version} address Example: Switch(config-flow-record)# match ipv6 destination address	Configures key ipv4 and ipv6 fields for the flow record.
Step 5	match datalink [dot1q ethertype mac vlan] Example: Switch(config-flow-record)# match datalink [dot1q ethertype mac vlan]	Configures key datalink (layer 2) fields for the flow record.
Step 6	match transport [destination-port icmp source-port] Example: Switch(config-flow-record)# match transport [destination-port icmp source-port]	Configures key transport layer fields for the flow record.
Step 7	match interface [input output] Example: Switch(config-flow-record)# match interface input	Configures key interface fields for the flow record.
Step 8	match flow direction Example: Switch(config-flow-record)# match flow direction	Configures key flow identity fields for the flow record.
Step 9	collect counter {bytes [layer2 long] packets [long]} Example: Switch(config-flow-record)# collect counter bytes layer2 long	Configures the counter key field for the flow record.

	Command or Action	Purpose
Step 10	collect timestamp absolute [first last] Example: Switch(config-flow-record)# collect timestamp absolute [first last]	Configures the timestamp key field for the flow record.
Step 11	collect interface [input output] Example: Switch(config-flow-record)# collect interface [input output]	Configures the interface key field for the flow record.
Step 12	collect transport tcp flags {ack cwr ece fin psh rst syn urg} Example: Switch(config-flow-record)# collect transport tcp flags ack	Configures transports tcp flag fields for the flow record.
Step 13	end Example: Switch(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

```
Switch(config)# flow record
Switch(config-flow-record)# description record to monitor network traffic
Switch(config-flow-record)# match ipv6 destination address
Switch(config-flow-record)# match datalink [dot1q | ethertype | mac | vlan]
Switch(config-flow-record)# match transport [destination-port | icmp | igmp | source-port]
Switch(config-flow-record)# match interface input
Switch(config-flow-record)# match flow direction
Switch(config-flow-record)#collect counter bytes layer2 long
Switch(config-flow-record)# collect timestamp absolute first
Switch(config-flow-record)# collect interface [input | output]
Switch(config-flow-record)# collect transport tcp flags ack
Switch(config-flow-record)# end
```

Related Topics

- [IPv6 Netflow, on page 3](#)
- [Configuring the Flow Exporters , on page 6](#)
- [Configuring a Customized Flow Monitor, on page 10](#)
- [Applying a Flow Monitor to an Interface, on page 12](#)
- [Configuring and Enabling Flow Sampling , on page 14](#)

Configuring the Flow Exporters

The following steps are used to configure the NetFlow exporter.

**Note**

The optional export-protocol flow exporter configuration command specifies the NetFlow export protocol used by the exporter. The switch supports only netflow-v9. Though visible in the CLI help, netflow-5 is not supported.

SUMMARY STEPS

1. **configure terminal**
2. **flow exporter** exporter-name
3. **description** description
4. **destination** {hostname | ip-address} **vrf** vrf-name
5. **dscp** <0-63>
6. **source** interface-id
7. **option** {exporter-stats | interface-table | sampler-table} **timeout** seconds]
8. **export-protocol**netflow-v9
9. **template data** timeout seconds
10. **transport udp** udp-port
11. **tfl** seconds
12. **end**

DETAILED STEPS

	Command or Action
Step 1	configure terminal Example: Switch# <code>configure terminal</code>
Step 2	flow exporter exporter-name Example: Switch(config)# <code>flow exporter TestNetFlowExporterName</code>
Step 3	description description Example: Switch(config-flow-exporter)# <code>description SampleNetFlowExporterDescription</code>

	Command or Action
Step 4	<p>destination {hostname ip-address} vrf vrf-name</p> <p>Example: Switch(config-flow-exporter)# destination 198.51.100.120 vrf SampleVrfName</p>
Step 5	<p>dscp <0-63></p> <p>Example: Switch(config-flow-exporter)# dscp 23</p>
Step 6	<p>source interface-id</p> <p>Example: Switch(config-flow-exporter)# source { Auto-Template Capwap GigabitEthernet GroupVI InternalInterface Loopback Null Port-channel TenGigabitEthernet Tunne</p>
Step 7	<p>option {exporter-stats interface-table sampler-table} timeout seconds]</p> <p>Example: Switch(config-flow-exporter)# option exporter-stats timeout 600</p>

	Command or Action
Step 8	export-protocol netflow-v9 Example: Switch(config-flow-exporter)# export-protocol netflow-v9
Step 9	template data timeout seconds Example: Switch(config-flow-exporter)# template data timeout 600 Switch(config-flow-exporter)#
Step 10	transport udp udp-port Example: Switch(config-flow-exporter)# transport udp 67
Step 11	ttl seconds Example: Switch(config-flow-exporter)# ttl 100
Step 12	end Example: Switch(config)# end

Command or Action

```
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
```

What to Do Next

Configuring a Customized Flow Monitor.

Related Topics

- [Configuring a Customized Flow Record , on page 4](#)
- [IPv6 Netflow, on page 3](#)
- [Configuring a Customized Flow Monitor, on page 10](#)
- [Applying a Flow Monitor to an Interface, on page 12](#)
- [Configuring and Enabling Flow Sampling , on page 14](#)

Configuring a Customized Flow Monitor

The following steps are used to configure a NetFlow monitor.

SUMMARY STEPS

1. **configure terminal**
2. **flow monitor** monitor -name
3. **description** description
4. **record** {TestNetflowRecordName|TestRecord}
5. **cache** {timeout [active| inactive|update] (seconds) | type (normal)}
6. **cache** {timeout [active| inactive|update] (seconds) | type (normal)}
7. **exporter** TestNetFlowExporterName
8. **cache** {timeout [active| inactive|update] (seconds) | type (normal)}
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>configure terminal</p> <p>Example: Switch# configure terminal</p>	Enters global configuration mode.
Step 2	<p>flow monitor monitor -name</p> <p>Example: Switch(config)# flow monitor SampleMonitorName</p>	Creates a flow monitor and enters Flexible NetFlow flow monitor configuration mode. You can also use this command to modify an existing flow monitor.
Step 3	<p>description description</p> <p>Example: Switch(config-flow-monitor)# Description SampleNetFlowMonitorName</p>	(Optional) Configures a description for the flow monitor.
Step 4	<p>record {TestNetflowRecordName TestRecord}</p> <p>Example: Switch(config-flow-monitor)#record TestNetflowRecordName</p>	Specifies the record for the flow monitor.
Step 5	<p>cache {timeout [active inactive update] (seconds) type (normal)}</p> <p>Example: Switch(config-flow-monitor)# cache type normal</p>	<p>(Optional) Modifies the flow monitor cache parameters such as timeout values, number of cache entries, and the cache type.</p> <ul style="list-style-type: none"> • timeout active seconds—Configures the active 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. See the Configuring Data Export for Cisco IOS Flexible NetFlow with Flow Exporters document for recommended values. • type normal—Configures normal flow removal from the flow cache. <p>Note Although visible in the command line help, the entries keyword and inactive and update timeouts are not supported.</p>
Step 6	<p>cache {timeout [active inactive update] (seconds) type (normal)}</p> <p>Example: Switch(config-flow-monitor)# cache type normal</p>	Repeat step 5 to configure additional cache parameters for the flow monitor.
Step 7	<p>exporter TestNetFlowExporterName</p> <p>Example: Switch(config-flow-monitor)# exporter TestNetFlowExporterName</p>	(Optional) Specifies the name of an exporter that was created previously.

	Command or Action	Purpose
Step 8	cache {timeout [active inactive update] (seconds) type (normal)} Example: Switch(config-flow-monitor)# cache type normal	Repeat step 5 to configure additional cache parameters for the flow monitor.
Step 9	end Example: Switch(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

```
Switch(config)# flow monitor FLOW-MONITOR-1
Switch(config-flow-monitor)# Used for ipv6 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
```

What to Do Next

Apply a flow monitor to an interface

Related Topics

- [Configuring a Customized Flow Record , on page 4](#)
- [Configuring the Flow Exporters , on page 6](#)
- [IPv6 Netflow, on page 3](#)
- [Applying a Flow Monitor to an Interface, on page 12](#)
- [Configuring and Enabling Flow Sampling , on page 14](#)

Applying a Flow Monitor to an Interface

The following are used to configure a NetFlow monitor to an interface.

SUMMARY STEPS

1. **configure terminal**
2. **interface** interface-id
3. **wlan** ssid
4. [ip | ipv6 | datalink] **flow monitor** monitor -name **sampler** [sampler | input | output]
5. **exit**
6. Repeat steps 2 and 3
7. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Switch# configure terminal	Enters global configuration mode.
Step 2	interface interface-id Example: Switch(config)# interface tengigabitEthernet 1/0/1	Identifies an interface and enters interface configuration mode. Flexible Net Flow is supported only on the service module 1-Gigabit or 10-Gigabit Ethernet interfaces. Note 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.
Step 3	wlan ssid Example: Switch (config)# wlan test 1 test	Configures the flow monitor on WLAN.
Step 4	[ip ipv6 datalink] flow monitor monitor -name sampler [sampler input output] Example: Switch(config-if)# ipv6 flow monitor SampleMonitorName input	Activates a previously created flow monitor by assigning it to the interface to analyze incoming or outgoing traffic. <ul style="list-style-type: none"> • ip—Enters record matching IPv4 IP addresses. • ipv6—Enters record matching IPv6 IP addresses. Note This keyword is visible only when the dual IPv4 and IPv6 Switch Database Management (SDM) template is configured on the switch. • input—Applies the flow monitor on input traffic. • output—Applies the flow monitor on output traffic. • sampler—(Optional) Applies the flow monitor sampler.
Step 5	exit Example: Switch(config-if)# exit Switch(config)#	Returns to global configuration mode.
Step 6	Repeat steps 2 and 3 Example:	Configures additional cache parameters for the flow monitor.
Step 7	end Example: Switch(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

```
Switch(config)# interface tengigabitethernet 1/0/1
Switch(config-if)# ip flow monitor FLOW-MONITOR-1 input
```

```
Switch(config-if)# ip flow monitor FLOW-MONITOR-2 output
Switch(config-if)# end
```

Related Topics

- [Configuring a Customized Flow Record , on page 4](#)
- [Configuring the Flow Exporters , on page 6](#)
- [Configuring a Customized Flow Monitor, on page 10](#)
- [IPv6 Netflow, on page 3](#)
- [Configuring and Enabling Flow Sampling , on page 14](#)

Configuring and Enabling Flow Sampling

The following steps are used to configure and enable flow sampling.

SUMMARY STEPS

1. **configure terminal**
2. **sampler sampler -name**
3. **description** description
4. **mode** {deterministic|random} (<1-1>)**out-of** <2-1024>
5. **end**
6. **interface** interface-id
7. **wlan** ssid
8. {ip | ipv6 | datalink} **flow monitor** monitor-name **sampler** sampler-name {input | output}
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Switch# configure terminal	Enters global configuration mode.
Step 2	sampler sampler -name Example: Switch(config)# sampler SampleNameForSAMPLER	Creates a flow monitor and enters Flexible NetFlow sampler configuration mode. You can also use this command to modify an existing sampler.
Step 3	description description Example: Switch(config-sampler)#description SamplerName_1	(Optional) Configures a description for the sampler.
Step 4	mode {deterministic random} (<1-1>) out-of <2-1024>	Specifies the mode and window size from which to select packets. The window size range is from 2 to 1024.

	Command or Action	Purpose
	Example: Switch(config-sampler)#mode random 1 out-of 2	Note Although visible in the CLI help, the mode deterministic keyword is not supported.
Step 5	end Example: Switch(config-sampler)# end	Returns to global configuration mode.
Step 6	interface interface-id Example: Switch(config)# interface tengigabitethernet 1/0/1	Identifies an interface and enters interface configuration mode.
Step 7	wlan ssid Example: Switch(config)# wlan test 1 test	Configures to apply flow sampler on WLAN.
Step 8	{ip ipv6 datalink] flow monitor monitor-name sampler sampler-name {input output} Example: Switch(config-if)# ip flow monitor FLOW-MONITOR-1 sampler SAMPLE-1 input	Activates a previously created IPv4 or IPv6 flow monitor by assigning it to the interface to analyze traffic.
Step 9	end Example: Switch(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

```
Switch(config)# sampler SAMPLER-1
Switch(config-sampler)# description Sample at 50
Switch(config-sampler)# mode random 1 out-of 2
Switch(config-sampler)# exit
Switch(config)# interface tengigabitethernet 1/0/1
Switch(config)# wlan test 1 test
Switch(config-if)# ip flow monitor FLOW-MONITOR-1 sampler SAMPLE-1 input
```

What to Do Next

How to configure netflow v9 for IPv6.

Related Topics

- [Configuring a Customized Flow Record , on page 4](#)
- [Configuring the Flow Exporters , on page 6](#)
- [Configuring a Customized Flow Monitor, on page 10](#)
- [Applying a Flow Monitor to an Interface, on page 12](#)
- [IPv6 Netflow, on page 3](#)

Verifying IPv6 Netflow

This section describes the Netflow related **show** commands for IPv6. The following commands can be used to verify Netflow on the switch.

Command	Purpose
show flow record	Displays the status of the flow records.
show flow ssid <ssid_name>	Displays SSID interface information.
show flow monitor {monitor name} {cache provisioning statistics}	Displays the flow monitor information.
show flow exporter exporter-name	Displays the status of a flow exporter.
show flow monitor monitor -name	Displays the current status of a flow monitor.
show flow interface interface-id	Verifies that the Flexible NetFlow is configured on the interface.
show flow monitor monitor -name cache format [csv record table]	Displays data in the flow monitor cache.
show sampler sampler -name	Displays the current status of a flow sampler.

Monitoring IPv6 Netflow

This section describes the Netflow commands for IPv6. The following commands can be used to monitor Netflow on the switch.

Command	Purpose
show running-config flow record	Displays the configured flow records.
show running-config flow exporter exporter-name	Verifies the configured flow exporter.
show running-config flow monitor monitor -name	Verifies the flow monitor configuration.

Additional References

Related Documents

Related Topic	Document Title
IPv6 command reference	<i>IPv6 Command Reference (Catalyst 3650 Switches)</i>
Flexible NetFlow command reference	<i>Cisco Flexible NetFlow Command Reference (Catalyst 3650 Switches)</i>
Flexible NetFlow configuration	<i>Cisco Flexible NetFlow Configuration Guide (Catalyst 3650 Switches)</i>

Error Message Decoder

Description	Link
To help you research and resolve system error messages in this release, use the Error Message Decoder tool.	https://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi

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: http://www.cisco.com/go/mibs

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>	<p>http://www.cisco.com/support</p>

Feature Information for IPv6 NetFlow

This table lists the features in this module and provides links to specific configuration information:

Feature	Release	Modification
IPv6 NetFlow Functionality	Cisco IOS XE 3.2SE Cisco IOS XE 3.3SE	This feature was introduced.