Configuring NetFlow

This chapter contains the following sections:

Information About NetFlow

NetFlow allows you to evaluate IP and Ethernet traffic and understand how and where it flows. NetFlow gives you visibility into traffic that transits the virtual switch by characterizing traffic based on its source, destination, timing, and application information. You can use this information to assess network availability and performance, assist in meeting regulatory requirements (compliance), and help with troubleshooting. NetFlow gathers data that you can use for accounting, network monitoring, and network planning.

What is a Flow

A flow is a one-directional stream of packets that arrives on a source interface (or subinterface), matching a set of criteria. Typically, packets with the same source/destination IP address, source/destination ports, protocol, interface, and class of service are grouped into a flow and then packets and bytes are tallied. However, a new default record only matches the input interface, output interface, and direction. The large amount of network information is condensed into a database called the NetFlow cache.

You create a flow using a flow record to define the criteria for your flow. All criteria must match for the packet to count in the given flow. Flows are stored in the NetFlow cache. Flow information tells you the following:

- Source address tells you who is originating the traffic.

- Destination address tells who is receiving the traffic

- Ports characterize the application that uses the traffic

- Class of service examines the priority of the traffic
- The device interface tells how traffic is being used by the network device
- Tallied packets and bytes show the amount of traffic

Flow Record Definition

A flow record defines the information that NetFlow gathers, such as the packets in the flow and the types of counters gathered per flow. You can define new flow records or use the predefined Cisco Nexus 1000V flow record.

Predefined flow records use 32-bit counters and are not recommended for data rates above 1 Gbps. For data rates that are higher than 1 Gbps, Cisco recommends that you manually configure the records to use 64-bit counters.

The following table describes the criteria defined in a flow record.

Table 1: Flow Record Criteria

Flow Record Criteria	Description

Match	Defines the information that is matched for collection in the flow record.
	
	• ip—Data collected in the flow record matches one of the following IP options:
	
	    • Protocol
	
	    • tos (type of service)
	
	• IPv4—Data collected in the flow record matches one of the following IPv4 address options:
	
	    • Source address
	
	    • Destination address
	
	• Transport—Data collected in the flow record matches one of the following transport options:
	
	    • Destination port
	
	    • Source port

Flow Record Criteria	Description

Collect	Defines how the flow record collects information.
	
	    • Counter—Collects flow record information in one of the following formats:
	
	        • Bytes—32-bit counter (default).
	
	        • Bytes long—64-bit counter (recommended for data rates that are higher than 1 Gbps).
	
	        • Packets—32-bit counter (default). or 64-bit counters.
	
	        • Packets long—64-bit counters (recommended for data rates that are higher than 1 Gbps).
	
	    • timestamp sys-uptime—Collects the system uptime for the first or last packet in the flow.
	
	    • transport tcp flags—Collects the TCP transport layer flags for the packets in the flow.
	
	Note 64-bit counters are recommended.

Predefined Flow Records

Cisco Nexus 1000V Predefined Flow Record: Netflow-Original

```
switch# show flow record netflow-original
Flow record netflow-original:
    Description: Traditional IPv4 input NetFlow with origin ASs
    No. of users: 0
    Template ID: 0
    Fields:
        match ipv4 source address
        match ipv4 destination address
        match ip protocol
        match ip tos
        match transport source-port
        match transport destination-port
        match interface input
        match interface output
        match flow direction
        collect routing source as
        collect routing destination as
        collect routing next-hop address ipv4
        collect transport tcp flags
        collect counter bytes
        collect counter packets
        collect timestamp sys-uptime first
        collect timestamp sys-uptime last
switch#
```

Although the following lines appear in the output of the show flow record command, the commands they are based on are not currently supported in Cisco Nexus 1000V. The use of these commands has no affect on the configuration.

```
collect routing source as
collect routing destination as
collect routing next-hop address ipv4
```

Cisco Nexus 1000V Predefined Flow Record: Netflow IPv4 Original-Input

```
switch# show flow record netflow ipv4 original-input
Flow record ipv4 original-input:
    Description: Traditional IPv4 input NetFlow
    No. of users: 0
    Template ID: 0
    Fields:
        match ipv4 source address
        match ipv4 destination address
        match ip protocol
        match ip tos
        match transport source-port
        match transport destination-port
        match interface input
        match interface output
        match flow direction
        collect routing source as
        collect routing destination as
        collect routing next-hop address ipv4
        collect transport tcp flags
        collect counter bytes
        collect counter packets
        collect timestamp sys-uptime first
        collect timestamp sys-uptime last
switch#
```

Cisco Nexus 1000V Predefined Flow Record: Netflow IPv4 Original-Output

```
switch# show flow record netflow ipv4 original-output
Flow record ipv4 original-output:
    Description: Traditional IPv4 output NetFlow
    No. of users: 0
    Template ID: 0
    Fields:
        match ipv4 source address
        match ipv4 destination address
        match ip protocol
        match ip tos
        match transport source-port
        match transport destination-port
        match interface input
        match interface output
        match flow direction
        collect routing source as
        collect routing destination as
        collect routing next-hop address ipv4
        collect transport tcp flags
        collect counter bytes
        collect counter packets
        collect timestamp sys-uptime first
```

```
        collect timestamp sys-uptime last
switch#
```

Cisco Nexus 1000V Predefined Flow Record: Netflow Protocol-Port

```
switch# show flow record netflow protocol-port
Flow record ipv4 protocol-port:
    Description: Protocol and Ports aggregation scheme
    No. of users: 0
    Template ID: 0
    Fields:
        match ip protocol
        match transport source-port
        match transport destination-port
        match interface input
        match interface output
        match flow direction
        collect counter bytes
        collect counter packets
        collect timestamp sys-uptime first
        collect timestamp sys-uptime last
switch#
```

Accessing NetFlow Data

You can use two methods to access NetFlow data:

- Command-line interface (CLI)

- NetFlow collector (a separate product from the Cisco Nexus 1000V for KVM)

Command-line Interface for NetFlow

You can use the CLI to access NetFlow data and to view what is happening in your network now.

The CLI uses a flow monitor and a flow exporter to capture and export flow records to the Netflow collector. Cisco Nexus 1000V supports the NetFlow Version 9 export format.

Note The Cisco Nexus 1000V supports UDP as the transport protocol for exporting data to up to two exporters per monitor.

Flow Monitor

A flow monitor creates an association between the following NetFlow components:

- Flow record—Consists of matching and collection criteria

- Flow exporter—Consists of the export criteria

This flow monitor enables a set, which consists of a record and an exporter. You can define this set once and reuse it multiple times. You can create multiple flow monitors for different needs. A flow monitor is applied to a specific interface or port profile in a specific direction.

Flow Exporter

Use the flow exporter to define where the flow records are sent from the cache to the reporting server, which is called the NetFlow collector. An exporter definition includes the following.

- Destination IP address

- Source IP address to spoof

- UDP port number (where the collector is listening)

- Export format

> ✎ **Note** NetFlow export packets use the source IP address assigned to the exporter. If the exporter does not have a source IP address assigned to it, the exporter will be inactive.

NetFlow Collector

The NetFlow data reporting process is as follows:

1. You configure NetFlow records to define the information that NetFlow gathers.

2. You configure Netflow monitor to capture flow records to the NetFlow cache.

3. You configure NetFlow export to send flows to the collector.

4. The Cisco Nexus 1000V searches the NetFlow cache for flows that have expired and exports them to the NetFlow collector server.

5. Flows are bundled together based on space availability in the UDP export packet and based on an export timer.

6. The NetFlow collector software creates real-time or historical reports from the data.

Exporting Flows to the NetFlow Collector Server

Timers determine when a flow is exported to the NetFlow collector server. See the following figure where a flow is ready for export when one of the following occurs:

- The flow is inactive for a certain amount of time, during which no new packets are received for the flow.

- The flow has lived longer than the active timer, such as a long FTP download.

- The flow cache is full and some flows must be aged out to make room for new flows.

Figure 1: Exporting Flows to the NetFlow Collector Server
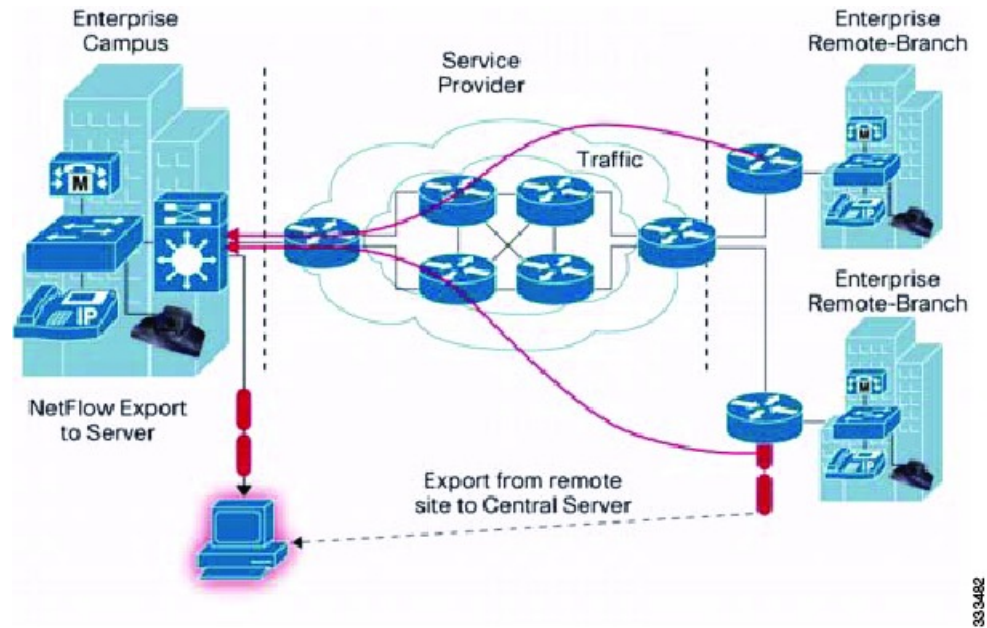
What NetFlow Data Looks Like

The following figure shows an example of NetFlow data.

Figure 2: NetFlow Cache Example

Network Analysis Module

You can also use the Cisco Network Analysis Module (NAM) to monitor NetFlow data sources. NAM enables traffic analysis views and reports such as hosts, applications, conversations, VLAN, and QoS.

High Availability for NetFlow

The Cisco Nexus 1000V supports stateful restarts for NetFlow. After a reboot or supervisor switchover, the Cisco Nexus 1000V applies the running configuration.

Prerequisites for NetFlow

- You must be aware of resource requirements because NetFlow consumes additional memory and CPU resources.

- Memory and CPU resources are provided by the Virtual Ethernet Module (VEM) hosting the flow monitor interface. Resources are limited by the number of CPU cores present on the VEM.

Guidelines and Limitations for NetFlow

- If a source interface IP address is not configured, the NetFlow exporter remains disabled.

- In the Cisco Nexus 1000V, the mgmt0 interface is configured by default as the source interface for an exporter. You can change the source interface if needed.

- In Cisco Nexus 1000V, the mgmt0 interface IP address of the VSM is configured by default as the source IP address for an exporter. You can change the source IP address if needed.

- Predefined flow records use 32-bit counters, which are recommended for data rates above 1 Gbps. For data rates that are higher than 1 Gbps, Cisco recommends that you manually configure the records to use 64-bit counters.

- The Cisco Nexus 1000V includes the following predefined flow records:

  - netflow-original—The Cisco Nexus 1000V predefined traditional IPv4 input NetFlow with origin ASs

    Note The routing-related fields in this predefined flow record are ignored.

  - netflow ipv4 original-input—The Cisco Nexus 1000V predefined traditional IPv4 input NetFlow

  - netflow ipv4 original-output—The Cisco Nexus 1000V predefined traditional IPv4 output NetFlow

  - netflow protocol-port—The Cisco Nexus 1000V predefined protocol and ports aggregation scheme

- Up to 2,000 NetFlow instances are allowed per Distributed Virtual Switch (DVS).

- Up to 216 NetFlow instances are allowed per host.

- A maximum of one flow monitor per interface per direction is allowed.

- Up to two flow exporters are allowed per monitor.

- Up to 64 NetFlow monitors, exporters, or records are allowed per DVS.

- Up to 64 NetFlow policies are allowed per host.

- NetFlow is not supported on port channels or interfaces in a port channel.

Default Settings for NetFlow

Table 2: Default NetFlow Parameters

Parameters	Default
NetFlow version	9
source	line card export with spoofed mgmt0 IP address
match	direction and interface (incoming/outgoing)
flow timeout active	1800
flow timeout inactive	15
DSCP	default/best-effort (0)
VRF	management (1)

Configuring NetFlow

Enabling the NetFlow Feature

Before you begin

You are logged in to the CLI in EXEC mode.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **feature netflow**	Enables the NetFlow feature.
Step 3	switch(config)# **show feature**	(Optional) Displays the available features and whether or not they are enabled.

	Command or Action	Purpose
Step 4	(Optional) switch(config)# **copy running-config startup-config**	Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

This example shows how to enable the NetFlow feature:

```
switch# configure terminal
switch(config)# feature netflow
switch(config)#
```

Defining a Flow Record

Before you begin

- You know which of the options you want this flow record to match.

- You know which options you want this flow record to collect.

Note Although the following lines appear in the output of the show flow record command, the commands they are based on are not currently supported in Cisco Nexus 1000V. The use of these commands has no affect on the configuration.

```
collect routing source as
collect routing destination as
collect routing next-hop address ipv4
```

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **flow record** *name*	Creates a Flow Record by name, and places you in the CLI Flow Record Configuration mode for that specific record.
Step 3	switch(config-flow-record#) **description** *string*	(Optional) Adds a description of up to 63 characters to the Flow Record and saves it to the running configuration.
Step 4	switch(config-flow-record#) **match** {**ip** {**protocol**	**tos**}	**ipv4** {**destination**	**source**}	**transport** {**destination-port**	**source-port**}}	Defines the Flow Record to match one of the following and saves it in the running configuration. • ip: Matches one of the following IP options:

	Command or Action	**Purpose**
		• protocol
		• tos (type of service)
		• ipv4: Matches one of the following ipv4 address options:
		• source address
		• destination address
		• transport: Matches one of the following transport options:
		• destination port
		• source port

Step 5	switch(config-flow-record)# **collect** {**counter** {**bytes** [**long**] | **packets** [**long**]} | **timestamp sys-uptime**{*first* | *last*} | **transport tcp flags**}	Specifies a collection option to define the information to collect in the Flow Record and saves it in the running configuration.
		• counter: Collects Flow Record information in one of the following formats:
		    • bytes: collected in 32-bit counters unless the long 64-bit counter is specified.
		    • packets: collected in 32-bit counters unless the long 64-bit counter is specified.
		• timestamp sys-uptime: Collects the system up time for the first or last packet in the flow.
		• transport tcp flags: Collects the TCP transport layer flags for the packets in the flow.

Step 6	switch(config-flow-record)# **show flow record** [**name**]	(Optional) Displays information about Flow Records.
Step 7	switch(config-flow-record)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

The following example shows how to create a flow record:

```
switch# configure terminal
switch(config)# flow record RecordTest
switch(config-flow-record)# description Ipv4flow
switch(config-flow-record)# match ipv4 destination address
switch(config-flow-record)# collect counter packets
switch(config-flow-record)# show flow record RecordTest
Flow record RecordTest:
    Description: Ipv4flow
    No. of users: 0
    Template ID: 0
    Fields:
        match ipv4 destination address
        match interface input
        match interface output
        match flow direction
        collect counter packets
switch(config-flow-record)#
```

Defining a Flow Exporter

A Flow Exporter defines where and how Flow Records are exported to the NetFlow Collector Server.

- Export format version 9 is supported.

- A maximum of two flow exporters per monitor are permitted.

Before you begin

- You know the destination IP address of the NetFlow Collector Server.

- You know the source IP address that Flow Records are sent from.

- You know the transport UDP that the Collector is listening on.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)#**flow exporter** *name*	Creates a Flow Exporter, saves it in the running configuration, and then places you in CLI Flow Exporter Configuration mode.
Step 3	switch(config-flow-exporter)# **description** *string*	Adds a description of up to 63 characters to this Flow Exporter and saves it in the running configuration.
Step 4	switch(config-flow-exporter)# **destination** {*ipv4-address*	*ipv6-address*}	Specifies the IP address of the destination interface for this Flow Exporter and saves it in the running configuration.

	Command or Action	**Purpose**
Step 5	switch(config-flow-exporter)# **dscp** *value*	Specifies the differentiated services codepoint value for this Flow Exporter, between 0 and 63, and saves it in the running configuration.
Step 6	switch(config-flow-exporter)# **source lc-exp** *ipv4-address*	Specifies the IP address to spoof, from which the Flow Records are sent to the NetFlow Collector Server, and saves it in the running configuration.
Step 7	switch(config-flow-exporter)# **transport udp** *port-number*	Specifies the destination UDP port, between 1 and 65535, used to reach the NetFlow collecton, and saves it in the running configuration.
Step 8	switch(config-flow-exporter)# **version** {**9**}	Specifies NetFlow export version 9, saves it in the running configuration, and places you into the export version 9 configuration mode.
Step 9	switch(config-flow-exporter-version-9)# **option** {**exporter-stats** | **interface-table**} **timeout** *value*	Specifies one of the following version 9 exporter resend timers and its value, between 1 and 86400 seconds, and saves it in the running configuration. • exporter-stats • interface-table
Step 10	switch(config-flow-exporter-version-9)# **template data timeout** *seconds*	Sets the template data resend timer and its value, between 1 and 86400 seconds, and saves it in the running configuration.
Step 11	switch(config-flow-exporter-version-9)# **show flow exporter** [*name*]	(Optional) Displays information about the Flow Exporter.
Step 12	switch(config-flow-exporter-version-9)# **copy running-config startup-config**	Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

The following example shows how to create a flow exporter:

```
switch# configure terminal
switch(config)# flow exporter ExportTest
switch(config-flow-exporter)# description ExportHamilton
switch(config-flow-exporter)# destination 192.0.2.1
switch(config-flow-exporter)# dscp 2
switch(config-flow-exporter)# source lc-exp 192.0.2.2
switch(config-flow-exporter)# transport udp 200
switch(config-flow-exporter)# version 9
switch(config-flow-exporter-version-9)# option exporter-stats timeout 1200
switch(config-flow-exporter-version-9)# template data timeout 1200
switch(config-flow-exporter-version-9)# show flow exporter ExportTest
```

```
Flow exporter ExportTest:
    Description: ExportHamilton
    Destination: 192.0.2.1
    VRF: management (1)
    Destination UDP Port 200
    Source IP Address 192.0.2.2
    Export from Line Card
    DSCP 2
    Export Version 9
        Exporter-stats timeout 1200 seconds
        Data template timeout 1200 seconds
    Exporter Statistics
        Number of Flow Records Exported 0
        Number of Templates Exported 0
        Number of Export Packets Sent 0
        Number of Export Bytes Sent 0
        Number of Destination Unreachable Events 0
        Number of No Buffer Events 0
        Number of Packets Dropped (No Route to Host) 0
        Number of Packets Dropped (other) 0
        Number of Packets Dropped (LC to RP Error) 0
        Number of Packets Dropped (Output Drops) 1
        Time statistics were last cleared: Never
switch(config-flow-exporter-version-9)# copy running-config startup-config
switch(config-flow-exporter-version-9)#
```

Defining a Flow Monitor

A Flow Monitor is associated with a Flow Record and a Flow Exporter.

A maximum of one flow monitor per interface per direction is permitted.

Before you begin

- You know the name of an existing Flow Exporter to associate with this flow monitor.

- You know the name of an existing Flow Record to associate with this flow monitor. You can use either a flow record you previously created, or one of the following Cisco Nexus 1000V predefined flow records:

    - netflow-original

    - netflow ipv4 original-input

    - netflow ipv4 original-output

    - netflow protocol-port

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **flow monitor** *name*	Creates a flow monitor by name, saves it in the running configuration, and then places you in the CLI Flow Monitor Configuration mode.

	Command or Action	**Purpose**
Step 3	switch(config-flow-monitor)# **description** *string*	(Optional) For the specified flow monitor, adds a descriptive string of up to 63 alphanumeric characters, and saves it in the running configuration.
Step 4	switch(config-flow-monitor)# **exporter** *name*	For the specified flow monitor, adds an existing flow exporter and saves it in the running configuration.
Step 5	switch(config-flow-monitor)# **record** { [*name* | **netflow** {**ipv4**}] | **netflow-original** | **original-input** |**original-output** |**protocol-port**}	For the specified flow monitor, adds an existing flow record and saves it in the running configuration. • name: The name of a flow record you have previously created, or the name of a Cisco provided pre-defined flow record. • netflow: Traditional NetFlow collection schemes ipv4: Traditional IPv4 NetFlow collection schemes
Step 6	switch(config-flow-monitor)# **show flow monitor** [*name*]	(Optional) Displays information about existing flow monitors.
Step 7	switch(config-flow-monitor)# **copy running-config startup-config**	Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

The following example shows how to create a flow exporter:

```
switch# configure terminal
switch(config)# flow monitor MonitorTest
switch(config-flow-monitor)# description Ipv4Monitor
switch(config-flow-monitor)# exporter ExportTest
switch(config-flow-monitor)# record RecordTest
switch(config-flow-monitor)# show flow monitor MonitorTest
Flow Monitor Monitortest:
    Use count: 0
    Flow Record: RecordTest
    Flow Exporter: ExportTest
switch(config-flow-monitor)#
```

Assigning a Flow Monitor to an Interface

Before you begin

• You know the name of the flow monitor you want to use for the interface.

• You know the interface type and its number.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **interface** *interface-type interface-number*	Places you in the CLI Interface Configuration mode for the specified interface.
Step 3	switch(config-if)# **ip flow monitor** *name* {**input**	**output**}	For the specified interface, assigns a flow monitor for input or output packets and saves it in the running configuration.
Step 4	switch(config-if)# **show flow interface** *interface-type interface-number*	(Optional) For the specified interface, displays the NetFlow configuration.
Step 5	switch(config-if)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

The following example shows how to assign a flow monitor to an interface:

```
switch# configure terminal
switch(config)# interface veth 2
switch(config-if)# ip flow monitor MonitorTest output
switch(config-if)# show flow interface veth 2
Interface Vethernet2:
    Monitor: MonitorTest
    Direction: Output
switch(config-if)#
```

Adding a Flow Monitor to a Port Profile

Before you begin

• You are logged in to the CLI in EXEC mode.

• You have already created the flow monitor.

• If using an existing port profile, you have already created the port profile and you know its name.

• If creating a new port profile, you know the type of interface (Ethernet or vEthernet), and you know the name you want to give it.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **port-profile** [**type** {**ethernet** | **vethernet**}] *name*	Enters port profile configuration mode for the named port profile.
Step 3	switch(config-port-prof)# **ip flow monitor** *name* {**input** | **output**}	Applies a named flow monitor to the port profile for either incoming (input) or outgoing (output) traffic.
Step 4	switch(config-port-prof)# **show port-profile** [**expand-interface**] [**name** *profile-name*]	(Optional) Displays the configuration for verification.
Step 5	(Optional) switch(config-port-prof)# **copy running-config startup-config**	Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

Example

This example shows how to add a flow monitor to a port profile:

```
switch# configure terminal
switch(config)# port-profile AccessProf
switch(config-port-prof)# ip flow monitor allacces4 output
switch(config-port-prof)# show port-profile name AccessProf
port-profile AccessProf
  type: vethernet
  status: disabled
  capability l3control: no
  pinning control-vlan: -
  pinning packet-vlan: -
  system vlans: none
  port-group:
  max ports: 32
  inherit:
  config attributes:
    ip flow monitor allaccess4 output
  evaluated config attributes:
    ip flow monitor allaccess4 output
  assigned interfaces:
switch(config-port-prof)#
```

Verifying the NetFlow Configuration

Use one of the following commands to verify the configuration:

Command	Purpose
show flow exporter [*name*]	Displays information about NetFlow flow exporter.
show flow interface [*interface-type number*]	Displays information about NetFlow interfaces.

Command	Purpose
show flow monitor [*name* [**cache module** *number* | **statistics module** *number*]]	Displays information about NetFlow flow monitors. **Note** The **show flow monitor cache module** command differs from the **show flow monitor statistics module** command in that the cache command also displays cache entries.
show flow record [*name*]	Displays information about NetFlow flow records.

Example: show flow exporter

```
switch(config-flow-exporter-version-9)# show flow exporter ExportTest
Flow exporter ExportTest:
    Description: ExportHamilton
    Destination: 192.0.2.1
    VRF: management (1)
    Destination UDP Port 200
    Source IP address 192.0.2.2
    Export from Line Card
    DSCP 2
    Export Version 9
        Exporter-stats timeout 1200 seconds
        Data template timeout 1200 seconds
    Exporter Statistics
        Number of Flow Records Exported 0
        Number of Templates Exported 0
        Number of Export Packets Sent 0
        Number of Export Bytes Sent 0
        Number of Destination Unreachable Events 0
        Number of No Buffer Events 0
        Number of Packets Dropped (No Route to Host) 0
        Number of Packets Dropped (other) 0
        Number of Packets Dropped (LC to RP Error) 0
        Number of Packets Dropped (Output Drops) 1
        Time statistics were last cleared: Never
switch(config-flow-exporter-version-9)#
```

Example: show flow interface

```
switch(config-if)# show flow interface veth2
Interface Vethernet2:
    Monitor: MonitorTest
    Direction: Output
switch(config-if)#
```

Example: show flow monitor

```
switch(config-flow-monitor)# show flow monitor
Flow Monitor MonitorTest:
    Use count: 1
    Flow Record: test
    Flow Exporter: ExportTest
Flow Monitor MonitorIpv4:
    Use count: 70
    Flow Record: RecordTest
    Flow Exporter: ExportTest
switch(config-flow-monitor)#
```

Example: show flow monitor cache module

```
november(config)# show flow monitor m1 cache module 3
Cache type:                     Normal
Cache size:                     0
Active Flows:                   1
Flows added:                    148
Packets added:                  349
Flows aged:                     147
    - Watermark aged            0
    - Active timeout            0
    - Inactive timeout          147
    - Event aged                0
    - Emergency aged            0
    - Permanent                 0
    - Immediate aged            0
    - Session aged              0
    - Fast aged                 0
    - Counters Overflow         0


  IPV4 SRC ADDR    IPV4 DST ADDR   IP PROT   IP TOS   TRNS SRC PORT   TRNS DST PORT
 INTF INPUT             INTF OUTPUT   FLOW DIRN   ipv4 next hop addr   tcp flags   bytes
pkts        time first   time last
===============  ===============  =======  ======  =============  =============
================  ===============  =========  ==================  =========
=========  ==========  ==========  ==========
      0.0.0.0   255.255.255.255   17          0x00   68              67
      Veth1              Eth3/1      Input             0.0.0.0        0x00   1026         3
          11609414     11622391
```

Example: show flow monitor statistics module

```
switch(config)# show flow monitor m1 statistics module 3
Cache type:                     Normal
Cache size:                     0
Active Flows:                   1
Flows added:                    149
Packets added:                  350
Flows aged:                     148
    - Watermark aged            0
    - Active timeout            0
    - Inactive timeout          148
    - Event aged                0
    - Emergency aged            0
    - Permanent                 0
    - Immediate aged            0
    - Session aged              0
    - Fast aged                 0
    - Counters Overflow         0
switch(config)#
```

Example: show flow record

```
switch(config-flow-record)# show flow record RecordTest
Flow record RecordTest:
    Description: Ipv4flow
    No. of users: 0
    Template ID: 0
    Fields:
        match ipv4 destination address
        match interface input
        match interface output
        match flow direction
```

```
          collect counter packets
switch(config-flow-record)#
```

Netflow Example Configuration

The following example shows how to configure flow monitor using a new flow record and apply it to an interface:

```
switch# configure terminal
switch(config)# flow record RecordTest
switch(config-flow-record)# description Ipv4flow
switch(config-flow-record)# match ipv4 destination address
switch(config-flow-record)# collect counter packets
switch(config-flow-record)# exit
switch(config)# flow exporter ExportTest
switch(config-flow-exporter)# description ExportHamilton
switch(config-flow-exporter)# destination 192.0.2.1
switch(config-flow-exporter)# dscp 2
switch(config-flow-exporter)# source lc-exp 192.0.2.2
switch(config-flow-exporter)# transport udp 200
switch(config-flow-exporter)# version 9
switch(config-flow-exporter-version-9)# option exporter-stats timeout 1200
switch(config-flow-exporter-version-9)# template data timeout 1200
switch(config-flow-exporter-version-9)# exit
switch(config-flow-exporter)# exit
switch(config)# flow monitor MonitorTest
switch(config-flow-monitor)# description Ipv4Monitor
switch(config-flow-monitor)# exporter ExportTest
switch(config-flow-monitor)# record RecordTest
switch(config-flow-monitor)# exit
switch(config)# interface veth 2
switch(config-if)# ip flow monitor MonitorTest output
switch(config-if)# show flow interface veth 2
Interface Vethernet2:
    Monitor: MonitorTest
    Direction: Output
switch(config-if)#
```

The following example shows how to configure flow monitor using a pre-defined record and apply it to an interface:

```
switch# configure terminal
switch(config)# flow exporter ExportTest
switch(config-flow-exporter)# description ExportHamilton
switch(config-flow-exporter)# destination 192.0.2.1
switch(config-flow-exporter)# dscp 2
switch(config-flow-exporter)# source lc-exp 192.0.2.2
switch(config-flow-exporter)# transport udp 200
switch(config-flow-exporter)# version 9
switch(config-flow-exporter-version-9)# option exporter-stats timeout 1200
switch(config-flow-exporter-version-9)# template data timeout 1200
switch(config-flow-exporter-version-9)# exit
switch(config-flow-exporter)# exit
switch(config)# flow monitor MonitorTest
switch(config-flow-monitor)# description Ipv4Monitor
switch(config-flow-monitor)# exporter ExportTest
switch(config-flow-monitor)# record netflow-original
switch(config-flow-monitor)# exit
switch(config)# interface veth 2
```

```
switch(config-if)# ip flow monitor MonitorTest output
switch(config-if)# show flow interface veth 2
Interface Vethernet2:
    Monitor: MonitorTest
    Direction: Output
switch(config-if)#
```

Related Documents for NetFlow

Related Topic	Document Title
Cisco NetFlow Overview	http://cisco.com/en/US/products/ps6601/products_ios_protocol_group_home.html

Feature History for NetFlow

This table includes only the updates for those releases that have resulted in additions or changes to the feature.

Feature Name	Releases	Feature Information
NetFlow	5.2(1)SM1(5.1)	NetFlow was introduced.