NetFlow MPLS Label Export

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The NetFlow MPLS Label Export feature allows a label switch router (LSR) to collect and export Multiprotocol Label Switching (MPLS) labels allocated by the LSR when an adjacent router pushes that label on the top of the label stack of a transit packet. At the same time, the LSR collects the prefix associated with the MPLS label and the application that allocated the label. The router collects the information in a table called the MPLS Prefix/Application/Label (PAL) table and exports this data to a NetFlow collector as the label is allocated or, if so configured, periodically exports the full MPLS PAL table.

You can use this information to create a provider edge (PE)-to-PE matrix, which is useful for network traffic planning and billing. To realize this benefit, you must export the MPLS label information to a NetFlow collector for analysis. This feature also provides information that a NetFlow collector can use to create a Virtual Private Network (VPN) routing and forwarding instance (VRF)-to-PE and PE-to-VRF matrix.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for NetFlow MPLS Label Export" section on page 33.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

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CISCO SYSTEMS

Prerequisites for NetFlow MPLS Label Export

The NetFlow MPLS Label Export feature requires the following:

- NetFlow configured on the LSR
- MPLS enabled on the LSR

If you are exporting data to a Cisco NetFlow collector, the following requirements apply:

- NetFlow Version 9 export format configured on the LSR
- NetFlow collector and analyzer that can use MPLS PAL records exported in NetFlow Version 9 format

Restrictions for NetFlow MPLS Label Export

The following restrictions apply to the NetFlow MPLS Label Export feature for Cisco IOS 12.2S releases:

- The MPLS PAL table does not support the export of information for the following:
  - IP Version 6 (IPv6) labels
  - IP Multicast labels
  - Quality of service (QoS) labels
  - Traffic engineering (TE) tunnel headend labels
- The ability to create a VRF-to-VRF traffic matrix is not supported.
- If one application deallocates a label and a second application soon reallocates the same label, the NetFlow collector might not be able to determine how many packets flowed while the label was owned by each application.
- In MPLS PAL table records, for labels allocated by VPNs, Border Gateway Protocol (BGP) IPv4, or BGP VPN Version 4 (VPNv4), the stored prefix can be either 0.0.0.0 or a route distinguisher (RD)-specific address:
  - If you do not configure the **mpls export vpnv4 prefixes** command, VPN prefixes are not tracked in the MPLS PAL table. These prefixes are displayed by the **show mpls flow mappings** command as 0.0.0.0.
  - If you configure the **mpls export vpnv4 prefixes** command, VPN prefixes are tracked and RD-specific addresses are displayed by the **show mpls flow mappings** command.

Information About NetFlow MPLS Label Export

The following sections contain useful information for understanding how to configure and use the NetFlow MPLS Label Export feature:

MPLS Label Information Gathering and Exporting

In a Cisco IOS 12.0S, 12.3T, or 12.4T release that supports the MPLS-Aware NetFlow feature, the mapping of the MPLS label to a prefix and an MPLS application is achieved through the use of the Label Forwarding Information Base (LFIB). You can display this information with the **show ip cache verbose flow** command. These releases do not support the NetFlow MPLS Label Export feature.

In a Cisco IOS 12.2(28)SB release or later release that supports the NetFlow MPLS Label Export feature, the mapping of the MPLS label to a destination prefix or Forwarding Equivalence Class (FEC) and to the MPLS application currently using the label is achieved through the use of an MPLS PAL table. Each supported MPLS application on the router where the NetFlow MPLS Label Export feature is configured registers its label values, prefixes, and owning applications as the labels are allocated. This label-tracking functionality operates on the Route Processor (RP) software.

The MPLS label information (label to prefix and application) mapping is exported to a NetFlow collector at the time when the label is allocated. You can configure periodic export of the full MPLS PAL table to a collector for further processing and analysis through the use of the **mpls export interval** command.

An *interval* argument to the **mpls export interval** command controls the time in minutes between full MPLS PAL table exports to the NetFlow collector. You can configure an interval in the range of 0 to 10080 (1 week) minutes:

- If you want to export MPLS PAL table information only when the label is allocated, then configure this command with a 0 time interval with a **mpls export interval 0** command.
- If you want to trigger an immediate export of the full MPLS PAL table, reconfigure the command with an *interval* argument that is different from the interval that is configured. For example, if you have configured the **mpls export interval 1440** command, reconfigure the command with any nonzero number except 1440.
- If you have a complex network that generates a large amount of traffic, configure a large interval between MPLS PAL table exports. You might want to configure an interval between 6 and 12 hours (360 and 720 minutes).

The *interval* argument that you specify is the least amount of time that passes before another export of the MPLS PAL table occurs. The system could delay the MPLS PAL table export for 10 minutes if the PAL export queue already contains a large number of entries. This could happen if the export occurred at a time when thousands of routes just came up, or if NetFlow did not have the time to clear the export queue from either a previous export of the full table or a previous time when thousands of routes came up in a brief period of time.

After you have entered the **mpls export interval** command, you can use the **show mpls flow mappings** command to display MPLS PAL table entries. To display information about the number of MPLS PAL records exported to the collector, use the **show ip flow export verbose** command.

Labels Allocated by VPNs, BGP IPv4, or BGP VPNv4 in the MPLS PAL Table

If you want to see VPN prefix information, that is, labels allocated by VPN, BGP IPv4, or BGP VPNv4, you need to configure the **mpls export vpnv4 prefixes** command. If you do not configure the **mpls export vpnv4 prefixes** command, MPLS PAL stores labels allocated by these application as prefix 0.0.0.0.

After you configure the **mpls export vpnv4 prefixes** command, the VPN prefix and the associated RD are stored in the MPLS PAL table. VPN addresses are made unique by adding an RD to the front of the address. The RD removes any ambiguity when the same VPN prefix is used for more than one VRF.

Note   To export VPN prefixes and associated RDs from the MPLS PAL table, the first time you configure the **mpls export vpnv4 prefixes** command you need to save the configuration and reboot the router or clear all routes from the table.

To display the VPN prefix entries in the MPLS PAL table, use the **show mpls flow mappings** command.

With the **mpls export vpnv4 prefixes** command configured, a line of the output might look like this:

```
Router# show mpls flow mappings

Label   Owner   Route-Distinguisher Prefix        Allocated
.
.
.
27      BGP     100:1               10.34.0.0      00:57:48
```

The format of the Route-Distinguisher field in the output depends on how the RD was configured. The RD can be configured in the as-number:network number (ASN:nn) format, as shown in the example, or it can be configured in the IP address:network number format (IP-address:nn).

If you did not configure the **mpls export vpnv4 prefixes** command, a line of the output looks like this:

```
Router# show mpls flow mappings
.
.
.
Label   Owner   Route-Distinguisher Prefix        Allocated

21      BGP                         0.0.0.0        00:52:18
```

The Route-Distinguisher field is not populated and the Prefix is displayed as 0.0.0.0.

If the MPLS PAL table tracks a per-VRF aggregate label and you configured the **mpls export vpnv4 prefixes** command, the **show mpls flow mappings** command displays the RD associated with the per-VRF aggregate label, but the prefix for the per-VRF aggregate label is reported as 0.0.0.0. If the **mpls export vpnv4 prefixes** command is not configured, the per-VRF aggregate label is reported with no RD and prefix 0.0.0.0, and you cannot distinguish the per-VRF aggregate label from a normal BGP label.

MPLS PAL Table Record Export

In Cisco IOS Release 12.0S and later releases, the export of MPLS-Aware NetFlow cache records makes use of the NetFlow Version 9 export format data and template. The export of MPLS PAL table entries also uses the NetFlow Version 9 export format. MPLS PAL packets are exported as NetFlow options packets rather than NetFlow data packets. NetFlow options packets are defined in *Cisco Systems NetFlow Services Export Version 9,* Request for Comments (RFC) 3954.

The RP on the PE router learns and queues the MPLS PAL table records for export. The RP can combine large numbers of PAL table entries in a single Version 9 record and send the record to the NetFlow collector. The information exported by the RP contains instances of the following for each tracked label:

Label, allocating-application (Owner), Route-Distinguisher, Prefix, time stamp (Allocated)

Because the mapping may change as labels expire and are reused, each PAL record contains a time stamp indicating the system uptime at which the label was allocated.

NetFlow Export Template Format Used for MPLS PAL Entries

This is the NetFlow Version 9 export template format used for MPLS PAL entries:

MPLS label: 3 bytes

MPLS label application type: 1 byte

MPLS label IP prefix: 4 bytes

MPLS VPN prefix RD: 8 bytes

MPLS label allocation time: 4 bytes

MPLS Application Types Exported

The following MPLS application types are exported in the MPLS label application type field:
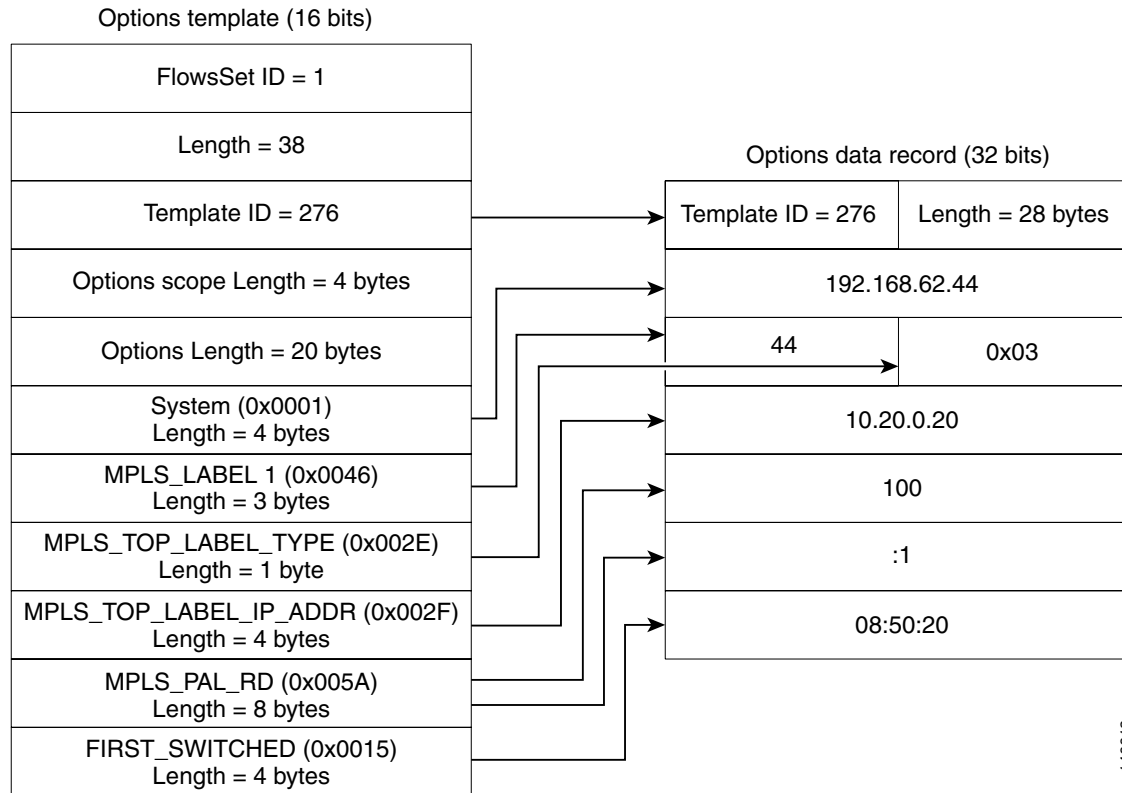
TE = 1

ATOM = 2

VPN = 3

BGP = 4

LDP = 5

Options Template and Options Data Record for MPLS PAL Record Export

Figure 1 shows an example of the options template and options data record for MPLS PAL record export. This example shows that MPLS label 44 was allocated by a VPN 0x03 at 08:50:20 and is associated with the IP address 10.20.0.20 and RD 100:1.

Figure 1　　　　*MPLS PAL Export Format Record*

Options template (16 bits)

FlowsSet ID = 1
Length = 38
Template ID = 276
Options scope Length = 4 bytes
Options Length = 20 bytes
System (0x0001) Length = 4 bytes
MPLS_LABEL 1 (0x0046) Length = 3 bytes
MPLS_TOP_LABEL_TYPE (0x002E) Length = 1 byte
MPLS_TOP_LABEL_IP_ADDR (0x002F) Length = 4 bytes
MPLS_PAL_RD (0x005A) Length = 8 bytes
FIRST_SWITCHED (0x0015) Length = 4 bytes

Options data record (32 bits)

Template ID = 276	Length = 28 bytes
192.168.62.44	
44	0x03
10.20.0.20	
100	
:1	
08:50:20	

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MPLS PAL and NetFlow Statistics Correlation on a NetFlow Collector

A NetFlow collector can gather the PAL NetFlow packets from a PE router and correlate the label mappings with the recent NetFlow records from adjacent provider core (P) routers.

For example, the MPLS PAL export packet contains MPLS label mappings over a period of time, as each label is allocated and reallocated on the PE router. The packet might contain the following information:

```
label 5, prefix 10.0.0.0,  type LDP, 12:00:00
label 4, prefix 10.10.0.0, type LDP, 13:00:00
label 5, prefix 10.9.0.0,  type VPN, 14:00:00
```

The NetFlow collector then receives a NetFlow packet from the adjacent P router indicating the following:

```
label 5, 123 packets, 9876 bytes, time 12:22:15.
```

The collector would match the time range known from the PAL packets with the line card (LC) packet time stamp. This would result in the correct mapping for label 5 at time 12:22:15, as follows:

```
label 5, application LDP, prefix 10.0.0.0.
```

The NetFlow collector needs to be able to handle relative differences in the time stamps caused by different reboot times of the P and PE routers.

To implement the offline label mapping checks in the NetFlow collector, the collector needs to maintain a history of label mappings obtained from the MPLS PAL NetFlow packets sent by the RP. If a label is deallocated and reallocated, the collector should track both the old and the new MPLS PAL information for the label.

> **Note** On a rare occasion, the collector might not be able to accurately track how many packets flowed for a label that has been deallocated by one application and soon reallocated by another application.

MPLS Label Mapping on a Line Card

Label to prefix and application mapping is registered and exported from the router RP. This functionality does not occur on the line card. If you want to see the mapping for a particular label on a line card and the label of interest is tracked by the MPLS PAL table, then you can do the following:

- Enter the **show mpls forwarding** command on the line card.
- Enter the **show mpls flow mappings** on the RP.
- Compare the output of the two commands.

You might find the **| include** keyword to the commands useful in this case. For example, You could enter the **show mpls flow mappings | include 777** command to see the information for any label with substring 777.

How to Configure NetFlow MPLS Label Export

Perform the following tasks to configure the NetFlow MPLS Label Export feature on an LSR. This feature provides the label, prefix, application mapping through the MPLS PAL table that collects and exports the data to a NetFlow collector.

Configuring NetFlow MPLS Label Export and MPLS PAL Table Export

Perform this task to configure the NetFlow MPLS Label Export feature and MPLS PAL table export to a NetFlow collector. You can use the information generated for network traffic planning and billing.

The following task must be completed before MPLS labels are allocated by the router for the MPLS PAL table to be exported to a NetFlow collector.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mpls export interval** *interval*
4. **end**

5. **copy running-config startup-config**

6. **exit**

7. Reboot the router.

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**mpls export interval** *interval* **Example:** Router(config)# mpls export interval 360	Configures a periodic time interval for the export of the entire MPLS PAL table to a NetFlow collector. • The *interval* argument specifies the time in minutes between full PAL table exports. The range of valid time intervals is 0 to 10,080 minutes. • We recommend that you select a time interval from 360 minutes (6 hours) to 1440 minutes (24 hours) depending on the size of your network and how often the NetFlow collector might be restarted. • If you enter an interval of 0, full PAL table exports are disabled. PAL information is exported only as labels are allocated. • If you need to restart your NetFlow collector and want to learn PAL information immediately, you can change the *interval* argument. When you change the time interval, the application exports the full PAL table. **Note** Allocated labels are tracked only after you enter the **mpls export interval** command. Any labels allocated before you enter this command are not tracked.
Step 4	**end** **Example:** Router(config)# end	Exits to privileged EXEC mode.
Step 5	**copy running-config startup-config** **Example:** Router# copy running-config startup-config	Copies the modified configuration into router NVRAM, permanently saving the settings. The next time the router is reloaded or rebooted the NetFlow MPLS Label Export feature is already part of the configuration.

	Command or Action	Purpose

Step 6	`exit`
	
	Example:
	`Router# exit`
		Exits to user EXEC mode.

Step 7	Reboot the router.	(Optional) Saving the configuration and rebooting the router ensures that the information collected by this feature is complete.

Displaying Information About the MPLS PAL Table

Perform this task to display information about the MPLS PAL table. The information displayed includes the label, the application that allocated the label, an RD and destination prefix associated with the label, and the time the label was allocated by the application.

SUMMARY STEPS

1. **enable**
2. **show mpls flow mappings**
3. **show ip flow export verbose | include PAL**
4. **exit**

DETAILED STEPS

Step 1   **enable**

Use this command to enable privileged EXEC mode. Enter your password if prompted. For example:

```
Router> enable
Router#
```

Step 2   **show mpls flow mappings**

Use this command to display entries in the MPLS PAL table. For example:

```
Router# show mpls flow mappings

Label    Owner     Route-Distinguisher Prefix        Allocated
18       LDP                           10.0.0.5       00:52:10
21       BGP                           0.0.0.0        00:52:18
22       BGP                           0.0.0.0        00:52:18
25       BGP                           0.0.0.0        00:51:44
26       LDP                           10.32.0.0      00:52:10
27       TE-MIDPT                      10.30.0.2      00:52:06
28       LDP                           10.33.0.0      00:52:10
29       LDP                           10.0.0.1       00:52:10
30       LDP                           10.0.0.3       00:52:10
```

In this example, the **mpls export vpnv4 prefixes** command was not configured. Therefore, the MPLS PAL functionality did not export an RD for the BGP application, and the associated prefix is exported as 0.0.0.0.

The following shows sample output from the **show mpls flow mappings** command if you previously entered the **mpls export vpnv4 prefixes** command:

```
Router# show mpls flow mappings

Label     Owner    Route-Distinguisher Prefix         Allocated
16        LDP                          10.0.0.3        00:58:03
17        LDP                          10.33.0.0       00:58:03
19        TE-MIDPT                     10.30.0.2       00:58:06
20        LDP                          10.0.0.5        00:58:03
23        LDP                          10.0.0.1        00:58:03
24        LDP                          10.32.0.0       00:58:03
27        BGP      100:1               10.34.0.0       00:57:48
31        BGP      100:1               10.0.0.9        00:58:21
32        BGP      100:1               10.3.3.0        00:58:21
```

Step 3   **show ip flow export verbose | include PAL**

Use this command to display the number of MPLS PAL records that were exported to the NetFlow collector. For example:

```
Router# show ip flow verbose | include PAL

    6 MPLS PAL records exported
```

When you specify the **verbose** keyword and MPLS PAL records have been exported using NetFlow Version 9 data format, the command output contains an additional line that precedes the "*x* records exported in *y* UDP datagrams" line.

Step 4   **exit**

Use this command to exit to user EXEC mode. For example:

```
Router# exit
Router>
```

Configuring the Export of MPLS VPN Version 4 Label Information from the MPLS PAL Table

Perform the following task to configure the export of VPNv4 label information from the MPLS PAL table to a NetFlow collector.

This allows you to track VPN prefix information for MPLS labels allocated by VPNs, BGP IPv4, and BGP VPNv4. You can use the data analyzed by the collector to assist in network traffic planning and billing.

Prerequisites

A VRF must be configured on the router.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mpls export interval** *interval*
4. **mpls export vpnv4 prefixes**

5. **end**

6. **copy running-config startup-config**

7. **exit**

8. Reboot the router.

9. **enable**

10. **show mpls flow mappings**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**mpls export interval** *interval* **Example:** Router(config)# mpls export interval 1440	Configures the collection and export of MPLS PAL information to a NetFlow collector. • The *interval* argument specifies the time in minutes between full PAL table exports. The range of valid time intervals is 0 to 10,080 minutes. • We recommend that you select a time interval of 6 (360) to 24 (1440) hours depending on the size of your network. • If you enter an interval of 0, full PAL table exports are disabled. PAL information is exported only as labels are allocated. • If you need to restart your NetFlow collector and want to learn PAL information immediately, you can change the *interval* argument. When you change the time interval, the application exports the full PAL table.
Step 4	**mpls export vpnv4 prefixes** **Example:** Router(config)# mpls export vpnv4 prefixes	Configures the tracking and export of VPNv4 label information from the MPLS PAL table to a NetFlow collector.
Step 5	**end** **Example:** Router(config)# end	Exits to privileged EXEC mode.

	Command or Action	Purpose

Step 6	`copy running-config startup-config`
	
	Example:
	`Router# copy running-config startup-config`
		Copies the modified configuration into router NVRAM, permanently saving the settings.
		
		The next time the router is rebooted the tracking and export of VPNv4 label information from the MPLS PAL table to a NetFlow collector is already part of the configuration.

Step 7	`exit`
	
	Example:
	`Router# exit`
		Exits to user EXEC mode.

Step 8	Reboot the router.	(Optional) Saving the configuration and rebooting the router ensures that the information collected by this feature is complete.

Step 9	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 10	`show mpls flow mappings`
	
	Example:
	`Router# show mpls flow mappings`
		Displays MPLS PAL table entries that include VPNv4 prefixes and VPN RDs.

Configuration Examples for NetFlow MPLS Label Export

This section contains the following configuration examples for the NetFlow MPLS Label Export feature:

Configuring NetFlow MPLS Prefix/Application/Label Table Export: Examples

The following examples show how to configure NetFlow MPLS PAL table export on a PE router.

This example shows how to configure the export of the full MPLS PAL table every 480 minutes (8 hours):

```
configure terminal
!
mpls export interval 480
end
copy running-config startup-config
exit
```

This example shows how to configure MPLS PAL information export only as the labels are allocated:

```
configure terminal
!
mpls export interval 0
end
```

```
copy running-config startup-config
exit
```

In this example, the full MPLS PAL table is not exported repeatedly.

Configuring the Export of MPLS VPNv4 Label Information from the MPLS PAL Table: Example

The following example shows how to configure the export of MPSL VPNv4 label information from the MPLS PAL table:

```
configure terminal
!
mpls export interval 720
mpls export vpnv4 prefixes
end
copy running-config startup-config
exit
```

The full MPLS PAL table with MPLS VPNv4 label information is configured to export to the NetFlow collector every 720 minutes (12 hours).

Additional References

The following sections provide references related to the NetFlow MPLS Label Export feature.

Related Documents

Related Topic	Document Title
Tasks for configuring MPLS-aware NetFlow	"Configuring MPLS-aware NetFlow"
List of the features documented in the *Cisco IOS NetFlow Configuration Guide*	"Cisco IOS NetFlow Features Roadmap"
Overview of the NetFlow application and advanced NetFlow features and services	"Cisco IOS NetFlow Overview"
Tasks for configuring NetFlow to capture and export network traffic data	"Configuring NetFlow and NetFlow Data Export"
Tasks for configuring MPLS egress NetFlow accounting	"Configuring MPLS Egress NetFlow Accounting"
Detailed information about the fields available in Version 9 export format and about export format architecture	*Cisco IOS NetFlow Version 9 Flow-Record Format*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	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

RFCs

RFC	Title
RFC 3954	*Cisco Systems NetFlow Services Export Version 9*
RFC 2547	*BGP/MPLS VPNs*

Technical Assistance

Description	Link
The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents modified commands only.

- **mpls export interval**
- **mpls export vpnv4 prefixes**
- **show ip flow export**
- **show mpls flow mappings**

mpls export interval

To configure the collection and export of Multiprotocol Label Switching (MPLS) Prefix/Application/Label (PAL) information to a NetFlow collector, use the **mpls export interval** command in global configuration mode. To disable the collecting and exporting of the MPLS PAL information, use the **no** form of this command.

mpls export interval *interval*

no mpls export interval

Syntax Description	*interval*	Specifies the time interval in minutes between full MPLS PAL table exports. The range of valid time intervals is 0 to 10080 minutes.

Command Default No capture or export of PAL table entries is configured.

Command Modes Global configuration

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines Use this command to configure the collection and export of MPLS PAL information to a NetFlow collector. The collector can be the Cisco NetFlow Collection Engine or a third-party collector application.

The *interval* argument specifies the number of minutes between one export of the entire MPLS PAL table and the next export of the entire table. We recommend that you select a time interval from 360 minutes (6 hours) to 1440 minutes (24 hours) depending on the size of your network. If you want to trigger an immediate export of the PAL table, disable the functionality (**no mpls export interval** command) and reconfigure the command with an interval argument greater than zero.

If you enter the command with a periodic interval of zero, entries of the MPLS PAL table are not exported repeatedly, but PAL label tracking still occurs and PAL information is exported to the collector when a label is allocated. To display the entire MPLS PAL table, use the **show mpls flow mappings** command.

The *interval* argument that you specify is the least amount of time that passes before another export of the MPLS PAL table. The system might choose to delay the MPLS PAL table export, if the PAL export queue already contains a large number of entries. This might occur if the export queue contains tens of thousands of entries, for example, if the export occurred at a time when thousands of routes just came up, or if NetFlow did not have the time to clear the export queue from either a previous export of the full table or a previous time when thousands of routes came up in a brief period.

Examples

The following example shows how to configure a time interval of 720 minutes (12 hours) between exports of the entire MPLS PAL table to a NetFlow collector:

```
configure terminal
 mpls export interval 720
 exit
```

Related Commands

Command	Description
mpls export vpnv4 prefixes	Configures the tracking and export of VPNv4 label information from the MPLS PAL table to a NetFlow collector.
show mpls flow mappings	Displays all entries in the MPLS PAL table.

mpls export vpnv4 prefixes

To configure the tracking and export of Virtual Private Network (VPN) IPv4 (VPNv4) label information from the Multiprotocol Label Switching (MPLS) Prefix/Application/Label (PAL) table to a NetFlow collector, use the **mpls export vpnv4 prefixes** command in global configuration mode. To disable the tracking and exporting of VPNv4 label information, use the **no** form of this command.

> **mpls export vpnv4 prefixes**

> **no mpls export vpnv4 prefixes**

Syntax Description This command has no arguments or keywords.

Command Default VPNv4 labels are exported from the MPLS PAL table with a destination prefix of 0.0.0.0.

Command Modes Global configuration

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines Use this command to enable the tracking and export of VPNv4 label information from the MPLS PAL table.

In MPLS PAL table records, the default prefix stored for labels allocated by VPNs, Border Gateway Protocol (BGP) IPv4, or BGP VPNv4 is intentionally 0.0.0.0. This is because VPN prefixes might be reused; Other VPNs might use the same prefix.

If you configure the **mpls export vpnv4 prefixes** command, the MPLS PAL table stores the VPN prefix and its associated route distinguisher (RD). The use of an RD removes any ambiguity among VPN prefixes. Even if IP addresses are reused, the addition of an RD creates a prefix unique.

Examples The following example shows how to configure the tracking and exporting of VPNv4 label information from the MPLS PAL table to a NetFlow collector:

```
configure terminal
 mpls export interval 720
 mpls export vpnv4 prefixes
 exit
```

The full MPLS PAL table with MPLS VPNv4 label information is configured to export to the NetFlow collector every 720 minutes (12 hours).

Related Commands	Command	Description
	mpls export interval	Configures the collection and export of MPLS PAL information to a NetFlow collector.
	show mpls flow mappings	Displays all entries in the MPLS PAL table.

show ip flow export

To display the status and the statistics for NetFlow accounting data export, including the main cache and all other enabled caches, use the **show ip flow export** command in user EXEC or privileged EXEC mode.

show ip flow export [[**sctp**] [**verbose**] | [**template**]]

Syntax Description

sctp	(Optional) Displays the status and statistics for export destinations that are configured to use the Stream Control Transmission Protocol (SCTP).
verbose	(Optional) Displays the current values for the SCTP fail-over and restore-time timers in addition to the status and statistics that are displayed by the **show ip flow export sctp** command.
	For a Multiprotocol Label Switching (MPLS) Prefix/Application/Label (PAL) record, displays additional export information, such as the number of MPLS PAL records exported to a NetFlow collector.
template	(Optional) Displays the data export statistics (such as template timeout and refresh rate) for the template-specific configurations.

Command Modes   User EXEC
Privileged EXEC

Command History

Release	Modification
11.1CC	This command was introduced.
12.2(2)T	This command was modified to display multiple NetFlow export destinations.
12.0(24)S	The **template** keyword was added.
12.3(1)	This command was integrated into Cisco IOS Release 12.3(1).
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(18)SXF	This command was integrated into Cisco IOS Release 12.2(18)SXF.
12.4(4)T	The **sctp** and **verbose** keywords were added.
12.2(28)SB	The number of MPLS PAL records exported by NetFlow was added to the **verbose** keyword output.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples   The following is sample output from the **show ip flow export** command with NetFlow export over User Datagram Protocol (UDP) (the default NetFlow export transport protocol) configured on the networking device:

Note   No NetFlow export over SCTP destinations are configured:

```
Router# show ip flow export
```

```
Flow export v9 is enabled for main cache
  Exporting flows to 172.17.10.2 (100)
  Exporting using source interface Loopback0
  Version 9 flow records
  62 flows exported in 17 udp datagrams
  0 flows failed due to lack of export packet
  8 export packets were sent up to process level
  0 export packets were dropped due to no fib
  0 export packets were dropped due to adjacency issues
  0 export packets were dropped due to fragmentation failures
  0 export packets were dropped due to encapsulation fixup failures
  0 export packets were dropped enqueuing for the RP
  0 export packets were dropped due to IPC rate limiting
  0 export packets were dropped due to output drops
```

The following is sample output from the **show ip flow export** command with NetFlow export over UDP and NetFlow SCTP export destinations configured:

```
Router# show ip flow export

Flow export v9 is enabled for main cache
  Exporting flows to 172.17.10.2 (100)
  Exporting flows to 172.16.45.57 (100) via SCTP
  Exporting using source interface Loopback0
  Version 9 flow records
  Cache for destination-prefix aggregation:
    Exporting flows to 192.168.247.198 (200) via SCTP
    Exporting using source IP address 172.16.254.254
  479 flows exported in 318 udp datagrams
  467 flows exported in 315 sctp messages
  0 flows failed due to lack of export packet
  159 export packets were sent up to process level
  0 export packets were dropped due to no fib
  0 export packets were dropped due to adjacency issues
  0 export packets were dropped due to fragmentation failures
  0 export packets were dropped due to encapsulation fixup failures
```

Table 1 describes the significant fields shown in the display of the **show ip flow export** command.

Table 1   *show ip flow export Field Descriptions*

Field	Description
Exporting flows to	Indicates the export destinations and ports. The ports are in parentheses.
	Note When the export destination is configured with the NetFlow Reliable Transport Using SCTP feature the port number is followed by the text "via SCTP" in the display output.
Exporting using source IP address or Exporting using source interface	Indicates the source IP address or source interface.
	Note The source interface is used when you have configured the **ip flow-export source** *interface-type interface-number* command.
Version flow records	Displays the version of the flow records.

Table 1   show ip flow export Field Descriptions (continued)

Field	Description
Cache for destination-prefix aggregation	Indicates the type of NetFlow aggregation caches that are configured. **Note** The indented lines below the name of the NetFlow aggregation cache indicate the export parameters that are configured for this cache.
flows exported in udp datagrams	Indicates the total number of export packets (datagrams) sent over UDP, and the total number of flows contained within them.
flows exported in sctp messages	Displays the total number of export packets (messages) sent over SCTP, and the total number of flows contained within them. **Note** SCTP is a message-oriented transport protocol. Therefore SCTP traffic is referred to as messages instead of datagrams.
flows failed due to lack of export packet	Indicates the number of flows that failed because no memory was available to create an export packet.
159 export packets were sent up to process level	The packet could not be processed by Cisco Express Forwarding or by fast switching.
export packets were dropped due to no fib export packets were dropped due to adjacency issues	Indicates the number of packets that Cisco Express Forwarding was unable to switch, or forward to the process level.
0 export packets were dropped due to fragmentation failures 0 export packets were dropped due to encapsulation fixup failures	Indicates the number of packets that were dropped because of problems constructing the IP packet.
0 export packets were dropped enqueuing for the RP 0 export packets were dropped due to IPC rate limiting	Indicates the number of times that there was a problem transferring the export packet between the RP and the line card.
0 export packets were dropped due to output drops	Indicates the number of times that the send queue was full while the packet was being sent.

The following is sample output from the **show ip flow export sctp** command with NetFlow SCTP export primary and backup SCTP export destinations configured for the NetFlow main cache and the NetFlow destination-prefix aggregation cache. The primary SCTP export destinations are active:

```
Router# show ip flow export sctp

IPv4 main cache exporting to 172.16.45.57, port 100, none
status: connected
backup mode: fail-over
912 flows exported in 619 sctp messages.
0 packets dropped due to lack of SCTP resources
fail-over time: 25 milli-seconds
restore time:   25 seconds
```

```
backup: 192.168.247.198, port 200
   status: not connected
   fail-overs: 2
   9 flows exported in 3 sctp messages.
   0 packets dropped due to lack of SCTP resources
destination-prefix cache exporting to 172.16.12.200, port 100, full
status: connected
backup mode: redundant
682 flows exported in 611 sctp messages.
0 packets dropped due to lack of SCTP resources
fail-over time: 25 milli-seconds
restore time:   25 seconds
backup: 192.168.247.198, port 200
   status: connected
   fail-overs: 8
   2 flows exported in 2 sctp messages.
   0 packets dropped due to lack of SCTP resources
```

The following is sample output from the **show ip flow export sctp** command with NetFlow SCTP export primary and backup SCTP export destinations configured for the NetFlow main cache and the NetFlow destination-prefix aggregation cache. The backup SCTP export destinations are active because the primary SCTP export destinations are unavailable.

```
Router# show ip flow export sctp

IPv4 main cache exporting to 172.16.45.57, port 100, none
status: fail-over
backup mode: fail-over
922 flows exported in 625 sctp messages.
0 packets dropped due to lack of SCTP resources
fail-over time: 25 milli-seconds
restore time:   25 seconds
backup: 192.168.247.198, port 200
   status: connected, active for 00:00:24
   fail-overs: 3
   11 flows exported in 4 sctp messages.
   0 packets dropped due to lack of SCTP resources
destination-prefix cache exporting to 172.16.12.200, port 100, full
status: fail-over
backup mode: redundant
688 flows exported in 617 sctp messages.
0 packets dropped due to lack of SCTP resources
fail-over time: 25 milli-seconds
restore time:   25 seconds
backup: 192.168.247.198, port 200
   status: connected, active for 00:00:00
   fail-overs: 13
   2 flows exported in 2 sctp messages.
   0 packets dropped due to lack of SCTP resources
Router#
```

Table 2 describes the significant fields shown in the display of the **show ip flow export sctp** commands.

Table 2   show ip flow export sctp Field Descriptions

Field	Description
IPv4 main cache exporting to 172.16.45.57, port 100, none	Indicates the type of cache, the IP address and port number used to reach the destination, and the level of reliability for the association: • IPv4 main cache—The type of NetFlow cache to which the display output applies. • 172.16.45.57—The IP address used for the SCTP export destination. • port 100—The SCTP port used for the SCTP export destination. • none—The level of reliability for this association. **Note** The reliability options are full and none.
status	The current state of each association. The states are: • initializing—The association is being established. • connected—The association is established. **Note** If this is a backup SCTP export destination configured for fail-over mode, you see an additional message indicating how long the association has been active. For example, active for 00:00:01. • not connected—The association will be established when the primary SCTP export backup destination is no longer available. • fail-over—The primary SCTP export destination is no longer available. The backup SCTP export destination is being used. • re-establishing—An association that has been active before is being reestablished.
backup mode	The backup mode of each association. The modes are: • redundant—The association is established (connected). **Note** The fact that the association is established does not mean that it is being used to export NetFlow data. • fail-over—The association will be established after the primary association fails.
flows exported in sctp messages	Indicates the total number of export packets (messages) sent over SCTP, and the total number of flows contained within them. **Note** SCTP is a message-oriented transport protocol. Therefore, SCTP traffic is referred to as messages instead of datagrams.
packets dropped due to lack of SCTP resources	The number of packets that were dropped due to lack of SCTP resources.
fail-over time: milli-seconds	The period of time that the networking device waits after losing connectivity to the primary SCTP export destination before attempting to use a backup SCTP export destination. **Note** This field is displayed when you use the **verbose** keyword after the **show ip flow export sctp** command.

Table 2   ***show ip flow export sctp Field Descriptions (continued)***

Field	Description
restore time: seconds	The period of time that the networking device waits before reverting to the primary SCTP export destination after connectivity to it has been restored. **Note** This field is displayed when you use the **verbose** keyword after the **show ip flow export sctp** command.
backup: 192.168.247.198 port 200	The IP address and SCTP port used for the SCTP export backup destination. • 192.168.247.198—The IP address of the SCTP backup association. • port 200—The SCTP port used for the SCTP backup association.
fail-overs	The number of times that fail-over has occurred.
destination-prefix cache exporting to 172.16.12.200, port 100, full	Indicates the type of cache configures, the destination address and port number for the SCTP export, and the level of reliability for the association: • destination-prefix cache—The type of NetFlow aggregation cache configured. • 172.16.12.200—The IP address used for the SCTP export destination. • port 100—Indicates the SCTP port used for the SCTP export destination. • full—The level of reliability for this association,

The following is sample output from the **show ip flow export template** command:

```
Router# show ip flow export template

    Template Options Flag = 1
    Total number of Templates added = 4
    Total active Templates = 4
    Flow Templates active = 3
    Flow Templates added = 3
    Option Templates active = 1
    Option  Templates added = 1
    Template ager polls = 2344
    Option Template ager polls = 34
Main cache version 9 export is enabled
 Template export information
    Template timeout = 30
    Template refresh rate = 20
 Option export information
    Option timeout = 800
    Option refresh rate = 300
Aggregation cache destination-prefix version 9 export is enabled
 Template export information
    Template timeout = 30
    Template refresh rate = 20
 Option export information
    Option timeout = 30
    Option refresh rate = 20
```

Table 3 describes the significant fields shown in the display of the **show ip flow export template** command.

Table 3   show ip flow export template Field Descriptions

Field	Description
Template Options Flag	Identifies which options are enabled.
	The values are:
	• 0—No option template configured.
	• 1—Version 9 option export statistics configured.
	• 2—Random sampler option template configured.
	• 4—Version 9 option export statistics for IPv6 configured.
Total number of Templates added	Indicates the number of Flow Templates and Option Templates that have been added since Version 9 export was first configured.
	This value in this field is the sum of the "Flow Templates added" and the "Option Templates added" fields.
	The value is incremented when a new template is created, because each template requires a unique ID.
Total active Templates	This is the sum of the values in the "Flow Templates active" and "Option Templates" active fields.
	The value in this field is incremented when a new data template or option template is created.
Flow Templates active	Indicates the number of (data) templates in use for Version 9 data export.
	When a new data template is created, this count, the "Total active Templates," the "Flow Templates added," and the "Total number of Templates added" counts are all incremented.
	Note When a data template is removed, only the "Flow Templates active" count and the "Total active Templates" count are decremented.
Flow Templates added	Indicates the number of Flow Templates and Option Templates that have been added since Version 9 export was first configured.
	The value is incremented when a new flow template is created, because each template requires a unique ID.
Option Templates active	Indicates the number of option templates in use for Version 9 options export.
	Configuring a new option increments this count and also the "Total active Templates," the "Option Templates added," and the "Total number of Templates added" counts.
	Removing (unconfiguring) an option decrements only the "Option Templates active" count and the "Total active Templates" count.

Table 3   show ip flow export template Field Descriptions (continued)

Field	Description
Option Templates added	Indicates the number of Option Templates that have been added since Version 9 export was first configured.
	The count is incremented when a new option template is created, because each template requires a unique ID.
Template ager polls	The number of times, since Version 9 export was configured, that the (data) template ager has run.
	The template ager checks up to 20 templates per invocation, resending any that need refreshing.
Option Template ager polls	The number of times, since Version 9 export was configured, that the option template ager has run.
	The template ager checks up to 20 templates per invocation, resending any that need refreshing.
Main cache version 9 export is enabled	NetFlow export Version 9 is enabled for the main NetFlow cache.
Template export information	Template timeout—The interval (in minutes) that the router waits after sending the templates (flow and options) before they are sent again. You can specify from 1 to 3600 minutes. The default is 30 minutes.
	• Template refresh rate—The number of export packets that are sent before the options and flow templates are sent again. You can specify from 1 to 600 packets. The default is 20 packets.
Option export information	• Option timeout—The interval (in minutes) that the router will wait after sending the options records before they are sent again. You can specify from 1 to 3600 minutes. The default is 30 minutes.
	• Option refresh rate—The number of packets that are sent before the configured options records are sent again. You can specify from 1 to 600 packets. The default is 20 packets.
Aggregation cache destination-prefix version 9 export is enabled	NetFlow export Version 9 is enabled for the NetFlow destination-prefix aggregation cache.

The following example displays the additional line in the **show ip flow export** command output when the **verbose** keyword is specified and MPLS PAL records are being exported to a NetFlow collector:

```
Router# show ip flow export verbose

Flow export v9 is enabled for main cache
  Exporting flows to 10.23.0.5 (4200)
  Exporting using source IP address 10.2.72.35
  Version 9 flow records
  Cache for destination-prefix aggregation:
    Exporting flows to 10.2.0.1 (4200)
    Exporting using source IP address 10.2.72.35
    182128 MPLS PAL records exported
  189305 flows exported in 6823 udp datagrams
```

```
      0 flows failed due to lack of export packet
      0 export packets were sent up to process level
      0 export packets were dropped due to no fib
      0 export packets were dropped due to adjacency issues
      0 export packets were dropped due to fragmentation failures
      0 export packets were dropped due to encapsulation fixup failures swat72f3#
```

The line of output added for the MPLS PAL records precedes the "*x* flows exported in *y* UDP datagrams" line. In this example, the additional line of output precedes "189305 flows exported in 6823 UDP datagrams."

Related Commands	Command	Description
	ip flow-export	Enables export of NetFlow accounting information in NetFlow cache entries.
	show ip cache flow	Displays a summary of the NetFlow accounting statistics.
	show ip cache verbose flow	Displays a detailed summary of the NetFlow accounting statistics.
	show ip flow interface	Displays the NetFlow accounting configuration on interfaces.
	show mpls flow mappings	Displays the full MPLS PAL table.

show mpls flow mappings

To display all entries in the Multiprotocol Label Switching (MPLS) Prefix/Application/Label (PAL) table, use the **show mpls flow mappings** command in user EXEC mode or privileged EXEC mode.

show mpls flow mappings

Syntax Description   This command has no arguments or keywords.

Command Modes   User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines   If you are interested in only a certain type of MPLS label and do not want to display the entire MPLS PAL table, you can use the **show mpls flow mappings | include** *label-type* command.

Examples   The following sample output from the **show mpls flow mappings** command displays all entries in the MPLS PAL table:

```
Router# show mpls flow mappings

Label    Owner    Route-Distinguisher Prefix        Allocated
18       LDP                          10.0.0.5       00:52:10
21       BGP                          0.0.0.0        00:52:18
22       BGP                          0.0.0.0        00:52:18
25       BGP                          0.0.0.0        00:51:44
26       LDP                          10.32.0.0      00:52:10
27       TE-MIDPT                     10.30.0.2      00:52:06
28       LDP                          10.33.0.0      00:52:10
29       LDP                          10.0.0.1       00:52:10
30       LDP                          10.0.0.3       00:52:10
```

In this example, the **mpls export vpnv4 prefixes** command was not configured. Therefore, the MPLS PAL table did not export a route distinguisher for the Border Gateway Protocol (BGP) application, and the associated prefix is exported as 0.0.0.0.

Table 4 describes the significant fields shown in the display.

Table 4   *show mpls flow mappings Field Descriptions*

Field	Description
Label	Value given to the MPLS label by the router.
Owner	MPLS application that allocated the label. • LDP = Label Distribution Protocol • BGP = Border Gateway Protocol • TE-MIDT = Traffic engineering tunnel midpoint
Route-Distinguisher	Value (8-byte) that is concatenated with an IPv4 prefix to create a unique VPN IPv4 prefix.
Prefix	Prefix used by the router to route data to the destination address.
Allocated	System uptime at which the MPLS PAL mapping record was created.

The following is sample output from the **show mpls flow mappings** command if you previously entered the **mpls export vpnv4 prefixes** command:

```
# show mpls flow mappings

Label   Owner    Route-Distinguisher Prefix          Allocated
16      LDP                          10.0.0.3        00:58:03
17      LDP                          10.33.0.0       00:58:03
19      TE-MIDPT                     10.30.0.2       00:58:06
20      LDP                          10.0.0.5        00:58:03
23      LDP                          10.0.0.1        00:58:03
24      LDP                          10.32.0.0       00:58:03
27      BGP      100:1               10.34.0.0       00:57:48
31      BGP      100:1               10.0.0.9        00:58:21
32      BGP      100:1               10.3.3.0        00:58:21
```

The following sample output from the **show mpls flow mappings | include LDP** command displays only MPLS PAL entries that were allocated by LDP:

```
Router# show mpls flow mappings | include LDP

Label   Owner    Route-Distinguisher Prefix          Allocated
16      LDP                          10.0.0.3        00:58:03
17      LDP                          10.33.0.0       00:58:03
20      LDP                          10.0.0.5        00:58:03
23      LDP                          10.0.0.1        00:58:03
24      LDP                          10.32.0.0       00:58:03
```

Related Commands

Command	Description
show ip cache verbose flow	Displays a detailed summary of NetFlow statistics.
show ip flow export	Displays the status and the statistics for NetFlow accounting data export.

Glossary

BGP—Border Gateway Protocol. An interdomain routing protocol that replaces Exterior Gateway Protocol (EGP). A BGP system exchanges reachability information with other BGP systems. It is defined by RFC 1163.

export packet—A type of packet built by a device (for example, a router) with NetFlow services enabled. The packet is addressed to another device (for example, the NetFlow Collection Engine). The packet contains NetFlow statistics. The other device processes the packet (parses, aggregates, and stores information on IP flows).

FEC—Forward Equivalency Class. A set of packets that can be handled equivalently for the purpose of forwarding and thus is suitable for binding to a single label. The set of packets destined for an address prefix is one example of an FEC. A flow is another example

flow—A unidirectional stream of packets between a given source and destination—each of which is defined by a network-layer IP address and transport-layer source and destination port numbers. A unique flow is defined as the combination of the following key fields: source IP address, destination IP address, source port number, destination port number, Layer 3 protocol type, type of service (ToS), and input logical interface.

flowset—A collection of flow records that follow the packet header in an export packet. A flowset contains information that must be parsed and interpreted by the NetFlow Collection Engine. There are two different types of flowsets: template flowsets and data flowsets. An export packet contains one or more flowsets, and both template and data flowsets can be mixed in the same export packet.

IPv6—IP Version 6. Replacement for IP Version 4 (IPv4). IPv6 includes support for flow ID in the packet header, which can be used to identify flows. Formerly called IPng (next generation).

label—A short, fixed-length identifier that tells switching nodes how the data (packets or cells) should be forwarded.

LDP—Label Distribution Protocol. A standard protocol that operates between Multiprotocol Label Switching (MPLS)-enabled routers to negotiate the labels (addresses) used to forward packets. The Cisco proprietary version of this protocol is the Tag Distribution Protocol (TDP).

LFIB—Label Forwarding Information Base. A data structure and way of managing forwarding in which destinations and incoming labels are associated with outgoing interfaces and labels.

LSR—label switch router. A router that forwards packets in a Multiprotocol Label Switching (MPLS) network by looking only at the fixed-length label.

MPLS—Multiprotocol Label Switching. A switching method in which IP traffic is forwarded through use of a label. This label instructs the routers and the switches in the network where to forward the packets. The forwarding of MPLS packets is based on preestablished IP routing information.

NetFlow—A Cisco IOS application that provides statistics on packets flowing through the router. It is emerging as a primary network accounting and security technology.

NetFlow Collection Engine (formerly NetFlow FlowCollector)—A Cisco application that is used with NetFlow on Cisco routers and Catalyst series switches. The NetFlow Collection Engine collects packets from the router that is running NetFlow and decodes, aggregates, and stores them. You can generate reports on various aggregations that can be set up on the NetFlow Collection Engine.

NetFlow v9—NetFlow export format Version 9. A flexible and extensible means of carrying NetFlow records from a network node to a collector. NetFlow Version 9 has definable record types and is self-describing for easier NetFlow Collection Engine configuration.

network byte order—Internet-standard ordering of the bytes corresponding to numeric values.

options data record—Special type of data record that is used in the NetFlow process. It is based on an options template and has a reserved template ID that provides information about the NetFlow process itself.

options template—A type of template record that the router uses to communicate the format of NetFlow-related data to the NetFlow collector.

packet header—First part of an export packet. It provides basic information about the packet (such as the NetFlow version, number of records contained in the packet, and sequence numbering) so that lost packets can be detected.

PAL table—Prefix/Application/Label table. A data structure that collects and exports the prefix, application, and time stamp for a specific label.

PE router—provider edge router. A router that is part of a service provider's network connected to a customer edge (CE) router. All Virtual Private Network (VPN) processing occurs in the PE router.

P router—provider core or backbone router. A router that is part of a service provider's core or backbone network and is connected to the provider edge (PE) routers.

RD—route distinguisher. An 8-byte value that is concatenated with an IPv4 prefix to create a unique VPN IPv4 prefix.

VPNv4 prefix—IPv4 prefix preceded by an 8-byte route distinguisher. The VPN addresses are made unique by adding a route distinguisher to the front of the address.

There are two formats for configuring the route distinguisher argument. It can be configured in the as-number:network number (ASN:nn) format or it can be configured in the IP address:network number format (IP-address:nn).

RP—Route Processor. A processor module in the Cisco 7000 series routers that contains the CPU, system software, and most of the memory components that are used in the router. Sometimes called a Supervisory Processor.

TE—traffic engineering. Techniques and processes that cause routed traffic to travel through the network on a path other than the one that would have been chosen if standard routing methods were used.

template flowset—A collection of template records that are grouped in an export packet.

template ID—A unique number that distinguishes a template record produced by an export device from other template records produced by the same export device. A NetFlow Collection Engine application can receive export packets from several devices. You should be aware that uniqueness is not guaranteed across export devices. Thus, you should configure the NetFlow Collection Engine to cache the address of the export device that produced the template ID in order to enforce uniqueness.

TE tunnel—traffic engineering tunnel. A label-switched tunnel that is used for traffic engineering. Such a tunnel is set up through means other than normal Layer 3 routing; it is used to direct traffic over a path.

VPN—Virtual Private Network. A secure IP-based network that shares resources on one or more physical networks. A VPN contains geographically dispersed sites that can communicate securely over a shared backbone.

VPNv4 prefix—IPv4 prefix preceded by an 8-byte route distinguisher. The VPN addresses are made unique by adding a route distinguisher to the front of the address.

Note See the Cisco *Dictionary of Internetworking Terms and Acronyms* for terms not included in this glossary.

Feature Information for NetFlow MPLS Label Export

Table 5 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Cisco IOS software images are specific to a Cisco IOS software release, a feature set, and a platform. Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 5 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release. Unless noted otherwise, subsequent releases of that Cisco IOS software release also support that feature.

Table 5   Feature Information for NetFlow MPLS Label Export

Feature Name	Releases	Feature Information
NetFlow MPLS Label Export	12.2(28)SB 12.2(33)SRA	The NetFlow MPLS Label Export feature provides the label switch router (LSR) with the capability of collecting and exporting the top label in the MPLS label stack along with its prefix or Forwarding Equivalence Class (FEC) and the application allocating the label to a NetFlow collector for supported MPLS applications. In 12.2(28)SB, this feature was introduced. In 12.2(33)SRA, this feature was integrated into a 12.2SRA release. The following sections provide information about this feature: • MPLS Label Information Gathering and Exporting, page 3 • Labels Allocated by VPNs, BGP IPv4, or BGP VPNv4 in the MPLS PAL Table, page 4 • MPLS PAL Table Record Export, page 4 • MPLS PAL and NetFlow Statistics Correlation on a NetFlow Collector, page 6 • MPLS Label Mapping on a Line Card, page 7 • Configuring NetFlow MPLS Label Export and MPLS PAL Table Export, page 7 • Displaying Information About the MPLS PAL Table, page 9 • Configuring the Export of MPLS VPN Version 4 Label Information from the MPLS PAL Table, page 10 The following commands were modified by this feature: **mpls export interval**, **mpls export vpnv4 prefixes**, **show ip flow export**, and **show mpls flow mappings**.