



Configuring MPLS Egress NetFlow Accounting and Analysis

This module contains information about and instructions for configuring the MPLS Egress NetFlow Accounting feature. The MPLS Egress NetFlow Accounting feature allows you to capture IP flow information for packets undergoing MPLS label disposition; that is, packets that arrive on a router as MPLS packets and are transmitted as IP packets.

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

Module History

This module was first published on June 19th, 2006, and last updated on June 19th, 2006.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all features. To find information about feature support and configuration, use the [“Feature Information for Configuring MPLS Egress NetFlow Accounting”](#) section on page 13.

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Prerequisites for Configuring MPLS Egress NetFlow Accounting

The network must support the following Cisco IOS features before you enable the MPLS Egress NetFlow Accounting feature:

- Multiprotocol label switching (MPLS)

Before you can configure the MPLS Egress NetFlow Accounting feature, you must:

- Configure the router for IP routing
- Configure Cisco Express Forwarding (CEF) switching or distributed CEF (dCEF) switching on the router and on the interfaces that you want to enable MPLS Egress NetFlow Accounting on (fast switching is not supported)

Restrictions for Configuring MPLS Egress NetFlow Accounting

The MPLS Egress NetFlow Accounting feature is not supported in Cisco IOS Release 12.2(25)S and later. Use the Egress NetFlow Accounting feature, which captures either IP or MPLS packets as they leave the router.

Capturing Flows from Sites that Connect to the Same PE Router

The captured egress flows must originate from different sites of the same Virtual Private Network (VPN), and they cannot connect to the same provider edge (PE) router. If both source and destination VPN sites are connected to the PE router, the MPLS egress NetFlow accounting feature does not capture these egress flows. You can capture these flows by enabling ingress NetFlow on the incoming customer edge (CE)-PE link of the PE router. For example, in [Figure 1](#), traffic from site 3 (VPN1 destined for site 2) is captured by an ingress NetFlow enabled on the PE2-CE3 link of PE2.

Memory Impact

During times of heavy traffic, the additional flows can fill up the global flow hash table. If you need to increase the size of the global flow hash table, increase the memory of the router.

Performance Impact

MPLS egress NetFlow accounting might adversely affect network performance because of the additional accounting-related computations that occur in the traffic-forwarding path of the router.

Information About Configuring MPLS Egress NetFlow Accounting

The following sections provide information that you should understand before you configure MPLS egress NetFlow accounting:

- [MPLS Egress NetFlow Accounting Benefits: Enhanced Network Monitoring and More Accurate Accounting Statistics](#), page 3
- [MPLS VPN Flow Capture with MPLS Egress NetFlow Accounting](#), page 3

MPLS Egress NetFlow Accounting Benefits: Enhanced Network Monitoring and More Accurate Accounting Statistics

Enhanced Network Monitoring for Complete Billing Solution

You can now capture flows on the egress and ingress router interfaces and obtain complete end-to-end usage information on network traffic. The accounting server uses the collected data for various levels of aggregation for accounting reports and application programming interface (API) accounting information, thus providing a complete billing solution.

More Accurate Accounting Statistics

NetFlow data statistics provided by the MPLS Egress NetFlow Accounting feature can account for all packets that are dropped in the core of the service provider network, thus providing more accurate traffic statistics and patterns.

MPLS VPN Flow Capture with MPLS Egress NetFlow Accounting

The MPLS Egress NetFlow Accounting feature allows you to capture IP flow information for packets that arrive on a router as MPLS packets and are transmitted as IP packets.

This feature allows you to capture the MPLS Virtual Private Network (VPN) IP flows that are traveling through the service provider backbone from one site of a VPN to another site of the same VPN.

Formerly, you could capture flows only for IP packets on the ingress interface of a router. You could not capture flows for MPLS encapsulated frames, which were switched through CEF from the input port. Therefore, in an MPLS VPN environment, you captured flow information when packets were received from a customer edge (CE) router and forwarded to the backbone. However, you could not capture flow information when packets were transmitted to a CE router because those packets were received as MPLS frames.

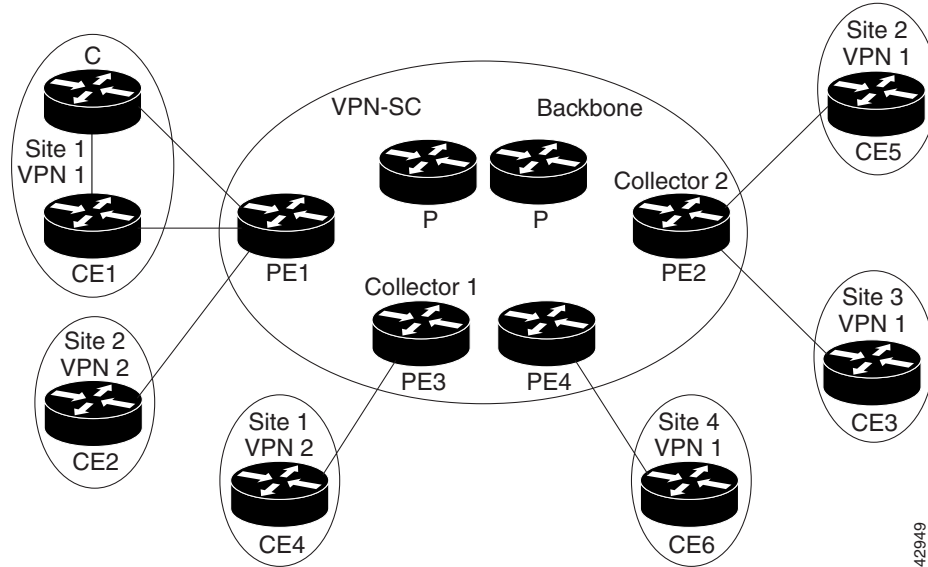
The MPLS Egress NetFlow Accounting feature lets you capture the flows on the outgoing interfaces.

[Figure 1](#) shows a sample MPLS VPN network topology that includes four VPN 1 sites and two VPN 2 sites. If MPLS egress NetFlow is enabled on an outgoing PE interface, you can capture IP flow information for packets that arrive at the PE as MPLS packets (from an MPLS VPN) and that are transmitted as IP packets. For example,

- To capture the flow of traffic going to site 2 of VPN 1 from any remote VPN 1 sites, you enable MPLS egress NetFlow on link PE2-CE5 of provider edge router PE2.
- To capture the flow of traffic going to site 1 of VPN 2 from any remote VPN 2 site, you enable MPLS egress NetFlow on link PE3-CE4 of the provider edge router PE3.

The flows are stored in a global flow cache maintained by the router. You can use the **show ip cache flow** command or other aggregation flow commands to view the egress flow data.

Figure 1 Sample MPLS VPN Network Topology with MPLS Egress NetFlow Accounting



The PE routers export the captured flows to the configured collector devices in the provider network. Applications such as the Network Data Analyzer or the VPN Solution Center (VPN-SC) can gather information from the captured flows and compute and display site-to-site VPN traffic statistics.

How to Configure MPLS Egress NetFlow Accounting

Perform the following tasks to configure and verify MPLS egress NetFlow accounting:

- [Configuring MPLS Egress NetFlow Accounting, page 4](#) (required)
- [Verifying MPLS Egress NetFlow Accounting Configuration, page 5](#) (optional)

Configuring MPLS Egress NetFlow Accounting

Perform the steps in this required task to configure MPLS egress NetFlow accounting.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *interface-type interface-number*
4. **mpls netflow egress**
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	(Required) Enables privileged EXEC mode. <ul style="list-style-type: none">Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	(Required) Enters global configuration mode.
Step 3	interface interface-type interface-number Example: Router(config)# interface ethernet 1/4	(Required) Specifies the interface and enters interface configuration mode.
Step 4	mpls netflow egress Example: Router(config-if)# mpls netflow egress	(Required) Enables the MPLS Egress NetFlow Accounting feature on the egress router interface.
Step 5	end Example: Router(config-if)# end	(Required) Exits the current configuration mode and returns to privileged EXEC mode.

Troubleshooting Tips

To display debug messages for MPLS egress NetFlow accounting, use the **debug mpls netflow** command.

Verifying MPLS Egress NetFlow Accounting Configuration

Perform the steps in this optional task to verify that the MPLS Egress NetFlow Accounting configuration is as you expect.

SUMMARY STEPS

1. **show ip cache flow**
2. **show mpls forwarding-table detail**
3. **show mpls interfaces internal**

DETAILED STEPS

Step 1 show ip cache flow

Use this command to verify that the MPLS Egress NetFlow Accounting configuration is as you expect. For example:

```

Router# show ip cache flow

IP packet size distribution (10 total packets):
  1-32  64  96 128 160 192 224 256 288 320 352 384 416 448 480
  .000 .000 .000 1.00 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000

  512  544  576 1024 1536 2048 2560 3072 3584 4096 4608
  .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000

IP Flow Switching Cache, 4456704 bytes
  1 active, 65535 inactive, 2 added
  26 ager polls, 0 flow alloc failures
  Active flows timeout in 30 minutes
  Inactive flows timeout in 15 seconds
  last clearing of statistics never

Protocol          Total      Flows    Packets Bytes  Packets Active(Sec) Idle(Sec)
-----          Flows      /Sec     /Flow  /Pkt   /Sec   /Flow   /Flow
ICMP              1          0.0      5      100    0.0    0.0    15.7
Total :           1          0.0      5      100    0.0    0.0    15.7

SrcIf          SrcIPAddress  DstIf          DstIPAddress  Pr SrcP DstP  Pkts
Et1/1          34.0.0.2      Et1/4          180.1.1.2     01 0000 0800  5

```

Step 2 show mpls forwarding-table detail

Use this command to verify the configuration of MPLS egress NetFlow accounting. Check that the quick flag is set for prefixes, which indicates capture by MPLS egress NetFlow accounting. For example:

```
Router# show mpls forwarding-table detail
```

```

Local  Outgoing  Prefix          Bytes tag  Outgoing  Next Hop
tag    tag or VC  or Tunnel ID    switched  interface
16     Aggregate  34.0.0.0/8[V]   0         Et0/0/2   34.0.0.1
      MAC/Encaps=0/0, MTU=0, Tag Stack{}
      VPN route: vpn1
      Feature Quick flag set

```



Note As shown above, the quick flag is set for the first two prefixes; therefore, traffic destined for those prefixes is captured by MPLS egress NetFlow accounting.

```

Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
17     Untagged  2.0.0.0/8[V]   0         Et0/0/2   34.0.0.1
      MAC/Encaps=0/0, MTU=1500, Tag Stack{}
      VPN route: vpn1
      Feature Quick flag set

Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
18     Untagged  42.42.42.42/32[V] 4185     Et0/0/2   34.0.0.1
      MAC/Encaps=0/0, MTU=1500, Tag Stack{}
      VPN route: vpn1
      Feature Quick flag set

Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
19     2/33     41.41.41.41/32  0         AT1/0/0.1 point2point
      MAC/Encaps=4/8, MTU=4470, Tag Stack{2/33(vcd=2)}
      00028847 00002000
      No output feature configured

```



Note As shown above, the feature is not configured because MPLS egress NetFlow accounting is not enabled on the outgoing interface for this prefix.

```

Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
20   Aggregate   39.39.39.39/32[V] 0
Local Outgoing   Prefix           Bytes tag  Outgoing   Next Hop
tag   tag or VC   or Tunnel Id     switched   interface
      MAC/Encaps=0/0, MTU=0, Tag Stack{}
      VPN route: vpn1
      No output feature configured
Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Router#

```

Step 3 show mpls interfaces internal

Use this command to show whether or not MPLS egress NetFlow accounting is enabled on the interface. For example:

```

Router# show mpls interfaces internal

Interface Ethernet0/0/1:
  IP tagging enabled (tdp)
  TSP Tunnel tagging not enabled
  Tag Frame Relay Transport tagging not enabled
  Tagging operational
  IP to Tag Fast Feature Switching Vector
Tag Switching Turbo Feature Vector
  MTU = 1500, status=0x100043, appcount=1
  Output_feature_state=0x0

```



Note The “Output_feature_state=0x0” entry indicates that MPLS egress NetFlow accounting is disabled on interface Ethernet 0/0/1.

```

Tag VPI = 1, Control VC = 0/32
Interface Ethernet0/0/2:
  IP tagging enabled (tdp)
  TSP Tunnel tagging not enabled
  Tag Frame Relay Transport tagging not enabled
  Tagging operational
  IP to Tag Fast Feature Switching Vector
Tag Switching Turbo Feature Vector
  MTU = 1500, status=0x100043, appcount=1
  Output_feature_state=0x1

```



Note The “Output_feature_state=0x1” entry indicates that MPLS egress NetFlow accounting is enabled on interface Ethernet 0/0/2.

```

Tag VPI = 1, Control VC = 0/32
Interface ATM1/0/0.1:
  IP tagging enabled (tdp)

```

Configuration Examples for Configuring MPLS Egress NetFlow Accounting

This section contains the following configuration example for MPLS egress NetFlow accounting:

- [Enabling MPLS Egress NetFlow Accounting: Example, page 8](#)

Enabling MPLS Egress NetFlow Accounting: Example

This section contains a sample configuration for the MPLS Egress NetFlow Accounting feature.

The **show ip vrf** command lists the Virtual Private Network (VPN) routing and forwarding instances (VRFs) configured in the router:

```
Router# show ip vrf
      Name                Default RD      Interfaces
-----
      vpn1                 100:1          Ethernet1/4
                        Loopback1
      vpn3                 300:1          Ethernet1/2
                        Loopback2
```

In the following example, MPLS Egress NetFlow Accounting is enabled on interface Ethernet 1/4:

```
configure terminal
!
interface ethernet 1/4
 ip address 172.17.24.2 255.255.255.0
 mpls netflow egress
exit
```

Enter the **show running-config** command to view the current configuration in the router:

```
Router# show running-config

Building configuration...

Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
```

```
ip cef
no ip domain-lookup
```

```
!
```

This section of the output shows the VRF being defined and shows that the MPLS Egress NetFlow Accounting feature is enabled:

```
ip vrf vpn1
 rd 100:1
 route-target export 100:1
 route-target import 100:1
!
interface Loopback0
 ip address 10.41.41.41 255.255.255.255
 no ip directed-broadcast
 no ip mroute-cache
!
interface Ethernet1/4
 ip vrf forwarding vpn1
 ip address 172.17.24.2 255.255.255.0
 no ip directed-broadcast
 mpls netflow egress
!
```

Additional References

The following sections provide references related to configuring the MPLS Egress NetFlow Accounting feature.

Related Documents

Related Topic	Document Title
Overview of Cisco IOS NetFlow	“Cisco IOS NetFlow Overview”
List of the features documented in the <i>Cisco IOS NetFlow Configuration Guide</i> configuration guide	“Cisco IOS NetFlow Features Roadmap”
The minimum information about and tasks required for configuring NetFlow and NetFlow Data Export	“Getting Started with Configuring NetFlow and NetFlow Data Export”
Tasks for configuring NetFlow to capture and export network traffic data	“Configuring NetFlow and NetFlow Data Export”
Tasks for configuring Configuring MPLS Aware NetFlow	Configuring MPLS Aware NetFlow
Tasks for configuring NetFlow input filters	“Using NetFlow Filtering or Sampling to Select the Network Traffic to Track”
Tasks for configuring Random Sampled NetFlow	“Using NetFlow Filtering or Sampling to Select the Network Traffic to Track”
Tasks for configuring NetFlow aggregation caches	“Configuring NetFlow Aggregation Caches”
Tasks for configuring NetFlow BGP next hop support	“Configuring NetFlow BGP Next Hop Support for Accounting and Analysis”
Tasks for configuring NetFlow multicast support	“Configuring NetFlow Multicast Accounting”
Tasks for detecting and analyzing network threats with NetFlow	Detecting and Analyzing Network Threats With NetFlow
Tasks for configuring NetFlow Reliable Export With SCTP	NetFlow Reliable Export With SCTP
Tasks for configuring NetFlow Layer 2 and Security Monitoring Exports	“NetFlow Layer 2 and Security Monitoring Exports”
Tasks for configuring the SNMP NetFlow MIB	“Configuring SNMP and using the NetFlow MIB to Monitor NetFlow Data”
Tasks for configuring the NetFlow MIB and Top Talkers feature	“Configuring NetFlow Top Talkers using Cisco IOS CLI Commands or SNMP Commands”
Information for installing, starting, and configuring the CNS NetFlow Collection Engine	“Cisco CNS NetFlow Collection Engine Documentation”

Standards

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

MIBs

MIBs	MIBs Link
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

RFCs	Title
• RFC 1163	<i>Border Gateway Protocol (BGP)</i>
• RFC 1340	<i>Assigned Numbers</i>
• RFC 1918	<i>Address Allocation For Private Internets</i>
• RFC 2547	<i>BGP/MPLS VPNs</i>

Technical Assistance

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

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. BGP is defined by RFC 1163.

BGP/MPLS/VPN—A Virtual Private Network (VPN) solution that uses Multiprotocol Label Switching (MPLS) and Border Gateway Protocol (BGP) to allow multiple remote customer sites to be connected over an IP backbone. Refer to RFC 2547 for details.

CE router—A customer edge router. A router that is part of a customer network and interfaces to a provider edge (PE) router.

customer network—A network that is under the control of an end customer. A customer network can use private addresses as defined in RFC 1918. Customer networks are logically isolated from each other and from the provider network. A customer network is also known as a C network.

egress PE—The provider edge router through which traffic moves from the backbone to the destination Virtual Private Network (VPN) site.

flow—A set of packets with the same source IP address, destination IP address, source/destination ports, and type-of-service, and the same interface on which flow is monitored. Ingress flows are associated with the input interface, and egress flows are associated with the output interface.

ingress PE—The provider edge router through which traffic enters the backbone (provider network) from a Virtual Private Network (VPN) site.

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

MPLS—Multiprotocol Label Switching. An emerging industry standard for the forwarding of packets along normally routed paths (sometimes called MPLS hop-by-hop forwarding).

PE router—A provider edge router. A router at the edge of a provider network that interfaces to customer edge (CE) routers.

provider network—A backbone network that is under the control of a service provider and provides transport among customer sites. A provider network is also known as the P network.

VPN—Virtual Private Network. The result of a router configuration that enables IP traffic to use tunneling to travel securely over a public TCP/IP network.

VRF—Virtual Private Network (VPN) routing/forwarding instance. The VRF is a key element in the MPLS VPN technology. VRFs exist on PEs only. A VRF is populated with VPN routes and allows one PE to have multiple routing tables. One VRF is required per VPN on each PE in the VPN.

Feature Information for Configuring MPLS Egress NetFlow Accounting

Table 1 lists the features in this module and provides links to specific configuration information. Only features that were introduced or modified in Cisco IOS Release 12.1(5)T or 12.0(3)S or a later release appear in the table.

Not all commands may be available in your Cisco IOS software release. For details on when support for a specific command was introduced, see the command reference documentation.

For information on a feature in this technology that is not documented here, see the “[Cisco IOS NetFlow Features Roadmap](#)” module.

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Note

Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for Configuring MPLS Egress NetFlow Accounting

Feature Name	Releases	Feature Configuration Information
MPLS Egress NetFlow Accounting	12.1(5)T 12.0(20)S	<p>The MPLS Egress NetFlow Accounting feature allows you to capture IP flow information for packets undergoing MPLS label disposition; that is, packets that arrive on a router as MPLS packets and are transmitted as IP packets.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> • MPLS Egress NetFlow Accounting Benefits: Enhanced Network Monitoring and More Accurate Accounting Statistics, page 3 • MPLS VPN Flow Capture with MPLS Egress NetFlow Accounting, page 3 • Configuring MPLS Egress NetFlow Accounting, page 4 • Verifying MPLS Egress NetFlow Accounting Configuration, page 5 • Enabling MPLS Egress NetFlow Accounting: Example, page 8 <p>The following commands were introduced or modified by this feature: debug mpls netflow, mpls netflow egress, show mpls forwarding-table, and show mpls interface.</p>

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