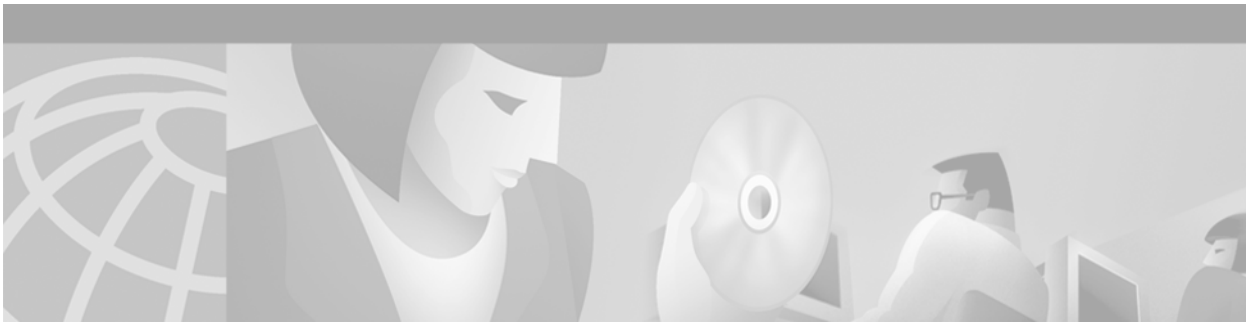


# NetFlow ToS-Based Router Aggregation

**Feature History**

| Release | Modification |
|---|---|
| 12.0(15)S | This feature was introduced on the Cisco 12000 Internet router. |
| 12.0(16)ST | This feature was integrated into Cisco IOS Release 12.0(16)ST. |
| 12.2(4)T | This feature was integrated into Cisco IOS Release 12.2(4)T. |
| 12.2(14)S | This feature was integrated into Cisco IOS Release 12.2(14)S. |

This feature module describes the NetFlow ToS-Based Router Aggregation feature and includes the following sections:



# Feature Overview

The NetFlow ToS-Based Router Aggregation feature provides the ability to enable limited router-based type of service (ToS) aggregation of NetFlow Export data, which results in summarized NetFlow Export data to be exported to a collection device. The result is lower bandwidth requirements for NetFlow Export data and reduced platform requirements for NetFlow data collection devices.

## Benefits

### Router-Based Aggregation

Aggregation of export data is typically performed by NetFlow collection tools on management workstations. Router-based aggregation allows limited aggregation of NetFlow export records to occur on the router for the following benefits:

- Reduce the required bandwidth between the router and the workstations
- Reduce the number of collection workstations required
- Improve performance and scalability on high flow-per-second routers

# NetFlow Aggregation Cache

Cisco IOS NetFlow aggregation maintains one or more extra flow caches with different combinations of fields that determine which traditional flows are grouped together. These extra flow caches are called aggregation caches. As flows expire from the main flow cache, they are added to each enabled aggregation cache.

**Note** The normal flow ager process runs on each active aggregation cache the same way it runs on the main cache. On-demand aging is also supported.

# ToS-Based NetFlow Aggregation Schemes

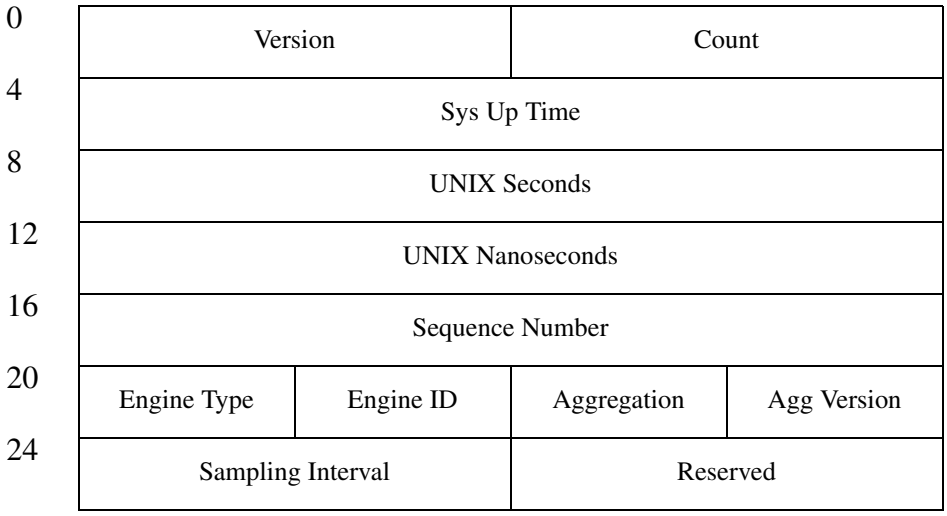
The NetFlow ToS-Based Router Aggregation feature introduces support for six aggregation schemes that include the ToS byte as a field. This support is described in the following sections:

- AS-ToS Aggregation Scheme
- Protocol-Port-ToS Aggregation Scheme
- Prefix-ToS Aggregation Scheme
- SourcePrefix-ToS Aggregation Scheme
- DestinationPrefix-ToS Aggregation Scheme
- Prefix-Port Aggregation Scheme

### Export Formats for ToS-Based Aggregation Schemes

Six new aggregation export records are defined, one for each new aggregation scheme. The new aggregation export records also use the Version 8 datagram format (just like the current aggregation export records do). The Version 8 datagram consists of a header with the version number (which is 8) and time stamp information, followed by one or more records corresponding to individual entries in the flow cache. Figure 1 displays the Version 8 header format followed by the six new export formats.

***Figure 1 Version 8 Header Format***




Version: Flow export format version number. In this case 8.

Count: Number of export records contained in the datagram.

Sys Up Time: Current time in milliseconds since router booted.

UNIX Seconds: Current seconds since 0000 UTC 1970.

UNIX Nanoseconds: Residual nanoseconds since 0000 UTC 1970.

Sequence Number: Sequence counter of total flows sent for this export stream.

Engine Type: Type of flow switching engine. (RP, VIP, and so on.)

Engine ID: ID number of the flow switching engine.

Aggregation: Aggregation method being used.

Agg Version: Version of the aggregation export sub format.

Sampling Interval: Interval value used if Sampled NetFlow is configured.

Reserved: Zero field.

## AS-ToS Aggregation Scheme

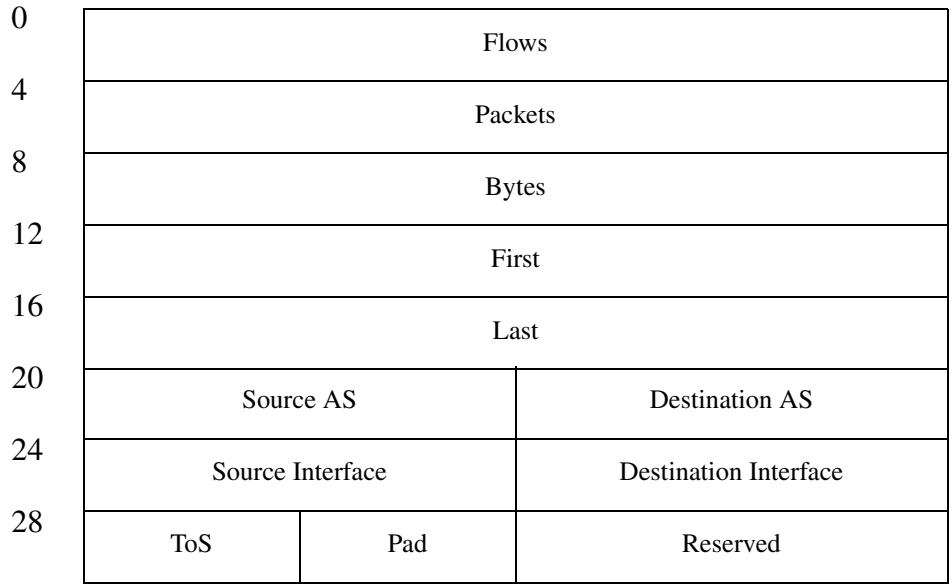
The AS-ToS aggregation scheme groups together flows that have the same source and destination BGP autonomous system, source and destination interfaces, and ToS byte. The aggregated NetFlow Export record reports the following:

- Source BGP autonomous system

- Destination BGP autonomous system
- ToS byte
- Number of flows summarized by the aggregated record
- Number of bytes summarized by this aggregated record, number of packets summarized by this aggregation record
- Source and destination interface
- Starting and ending time stamps

This aggregation scheme is particularly useful for generating autonomous system-to-autonomous system traffic flow data, and for providing substantial NetFlow Export data volume reduction. Figure 2 displays the AS-ToS aggregation export record format and a list follows describing the data.

***Figure 2 AS-ToS Aggregation Export Record Format***




Flows: Number of main cache flows that were aggregated.

Packets: Number of packets in the aggregated flows.

Bytes: Number of bytes in the aggregated flows.

First: Sys up time at which the first packet was switched.

Last: Sys up time at which the last packet was switched.

Source AS: autonomous system of the source IP address (peer or origin).

Destination AS: autonomous system of the destination IP address (peer or origin).

Source Interface: SNMP index of the interface the packets arrived on.

Destination Interface: SNMP index of the interface the packets went out.

ToS: Type of service byte.

Pad: Zero field.

Reserved: Zero field.

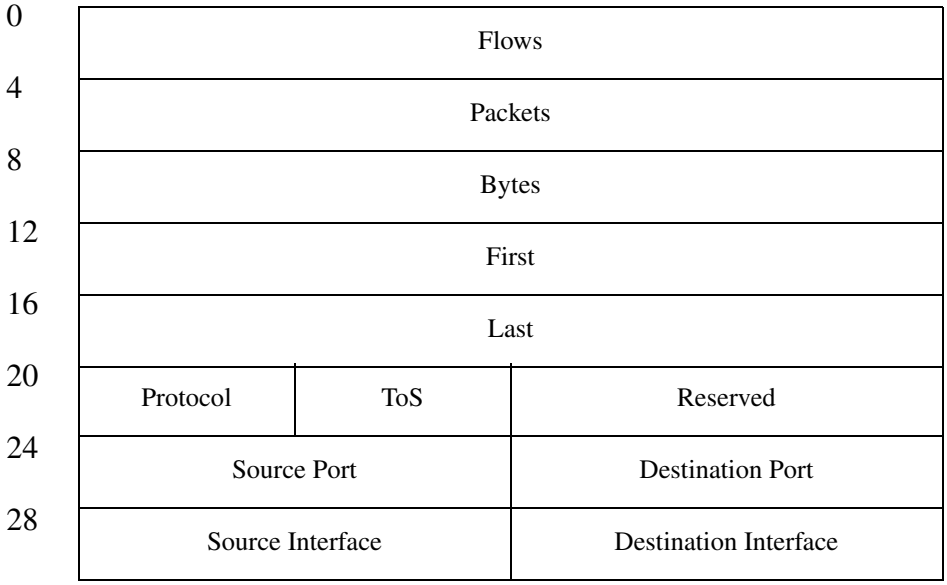
## Protocol-Port-ToS Aggregation Scheme

The Protocol-Port-ToS aggregation scheme groups flows with common IP protocol, ToS byte, source and destination port numbers when applicable, and source and destination interfaces. The aggregated NetFlow Export record reports the following:

- Source application port number
- Destination port number
- Source and destination interface
- IP protocol
- ToS byte
- Number of flows summarized by the aggregated record
- Number of bytes summarized by this aggregated record
- Number of packets summarized by this aggregation record
- Starting and ending time stamps

This aggregation scheme is particularly useful for generating data with which to examine network usage by type of traffic. Figure 3 displays the Protocol-Port-ToS aggregation export record format and a list follows describing the data.

***Figure 3 Protocol-Port-ToS Aggregation Export Record Format***




Flows: Number of main cache flows that were aggregated.

Packets: Number of packets in the aggregated flows.

Bytes: Number of bytes in the aggregated flows.

First: Sys up time at which the first packet was switched.

Last: Sys up time at which the last packet was switched.

Protocol: IP protocol byte.

ToS: Type of service byte.

Reserved: Zero field.

Source Port: Source UDP or TCP port number.

Destination Port: Destination UDP or TCP port number.

Source Interface: SNMP index of the interface the packets arrived on.

Destination Interface: SNMP index of the interface the packets went out.

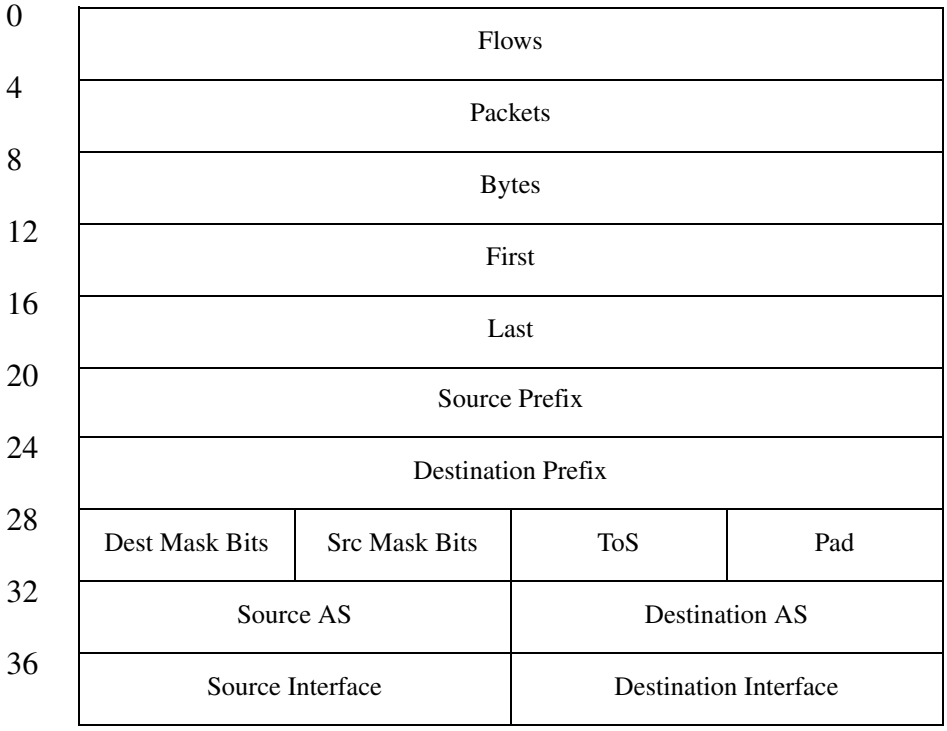
## Prefix-ToS Aggregation Scheme

The Prefix-ToS aggregation scheme groups together flows with common source prefix, source mask, destination prefix, destination mask, source BGP autonomous system, destination BGP autonomous system, input interface, output interface and ToS byte. The aggregated NetFlow Export record reports the following:

- Source prefix
- Source prefix mask
- Destination prefix
- Destination prefix mask
- Source autonomous system
- Destination autonomous system
- Source interface
- Destination interface
- ToS byte
- Number of flows summarized by the aggregated record
- Number of bytes summarized by this aggregated record
- Number of packets summarized by this aggregation record
- Starting and ending time stamps

This aggregation scheme is particularly useful for generating data with which to examine the sources and destinations of network traffic passing through a NetFlow-enabled device. Figure 4 displays the Prefix-ToS aggregation export record format and a list follows describing the data.

*Figure 4 Prefix-ToS Aggregation Export Record Format*




Flows: Number of main cache flows that were aggregated together.

Packets: Number of packets in the aggregated flows.

Bytes: Number of bytes in the aggregated flows.

First: Sys up time at which the first packet was switched.

Last: Sys up time at which the last packet was switched.

Source Prefix: Prefix that the source IP address of the aggregated flows belonged to.

Destination Prefix: Prefix that the destination IP address of the aggregated flows belonged to.

Dest Mask Bits: Number of bits in the destination prefix.

Src Mask Bits: Number of bits in the source prefix.

ToS: Type of Service byte.

Pad: Zero field.

Source AS: autonomous system of the source IP address (peer or origin).

Destination AS: autonomous system of the destination IP address (peer or origin).

Source Interface: SNMP index of the interface the packets arrived on.

Destination Interface: SNMP index of the interface the packets went out.

## SourcePrefix-ToS Aggregation Scheme

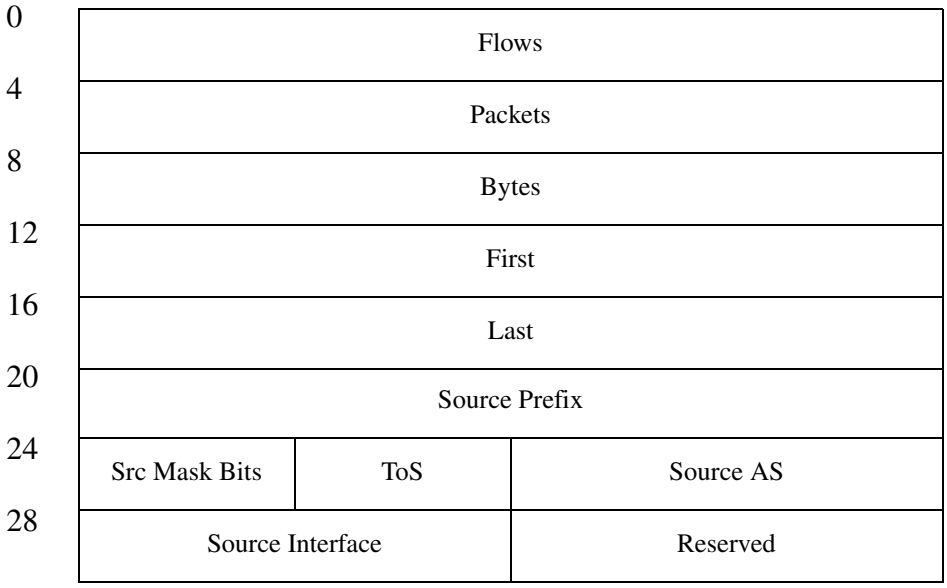
The SourcePrefix-ToS aggregation scheme groups flows with common source prefix, source prefix mask, source BGP autonomous system, ToS byte, and input interface. The aggregated NetFlow Export record reports the following:

- Source prefix
- Source prefix mask
- Source autonomous system
- ToS byte
- Number of bytes summarized by this aggregated record
- Number of packets summarized by this aggregation record
- Input interface
- Starting and ending time stamps

This aggregation scheme is particularly useful for generating data with which to examine the sources of network traffic passing through a NetFlow-enabled device. Figure 5 displays the Source Prefix-ToS aggregation export record format and a list follows describing the data.

**Note** When a router does not have a prefix for the source IP address in the flow, 0.0.0.0 with 0 mask bits is used rather than making /32 entries to prevent DOS attacks with random source address from thrashing the aggregation caches. This is done for the destination in the DestinationPrefix-ToS, and the Prefix-ToS and Prefix-Port aggregation schemes.

***Figure 5 Source Prefix ToS Aggregation Export Record Format***




Flows: Number of main cache flows that were aggregated.

Packets: Number of packets in the aggregated flows.

Bytes: Number of bytes in the aggregated flows.

First: Sys up time at which the first packet was switched.

Last: Sys up time at which the last packet was switched.

Source Prefix: Prefix that the source IP address of the aggregated flows belonged to.

Src Mask Bits: Number of bits in the source prefix.

ToS: Type of Service byte.

Source AS: autonomous system of the source IP address (peer or origin).

Source Interface: SNMP index of the interface the packets arrived on.

Reserved: Zero field.

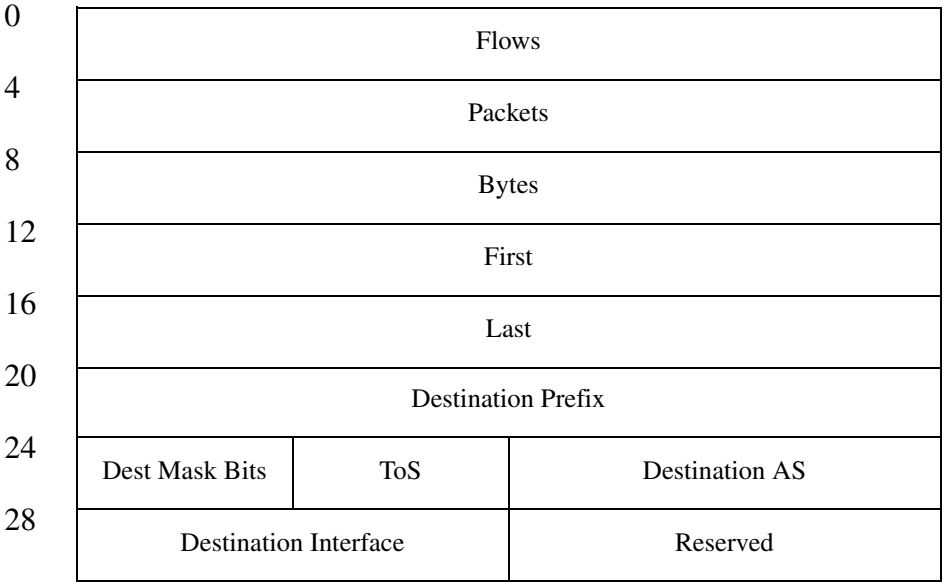
## DestinationPrefix-ToS Aggregation Scheme

The DestinationPrefix-ToS aggregation scheme groups flows with common destination prefix, destination prefix mask, destination BGP autonomous system, ToS byte, and output interface. The aggregated NetFlow Export record reports the following:

- Destination IP address
- Destination prefix mask
- Destination autonomous system
- ToS byte
- Number of flows summarized by the aggregated record
- Number of bytes summarized by this aggregated record
- Number of packets summarized by this aggregation record
- Output interface
- Starting and ending time stamps

This aggregation scheme is particularly useful for generating data with which to examine the destinations of network traffic passing through a NetFlow-enabled device. Figure 6 displays the Destination Prefix aggregation export record format and a list follows describing the data.

*Figure 6 Destination Prefix Aggregation Export Record Format*




Flows: Number of main cache flows that were aggregated.

Packets: Number of packets in the aggregated flows.

Bytes: Number of bytes in the aggregated flows.

First: Sys up time at which the first packet was switched.

Last: Sys up time at which the last packet was switched.

Destination Prefix: Prefix that the destination IP address of the aggregated flows belonged to.

Dest Mask Bits: Number of bits in the destination prefix.

ToS: Type of service byte.

Destination AS: autonomous system of the destination IP address (peer or origin).

Destination Interface: SNMP index of the interface the packets went out.

Reserved: Zero field.

## Prefix-Port Aggregation Scheme

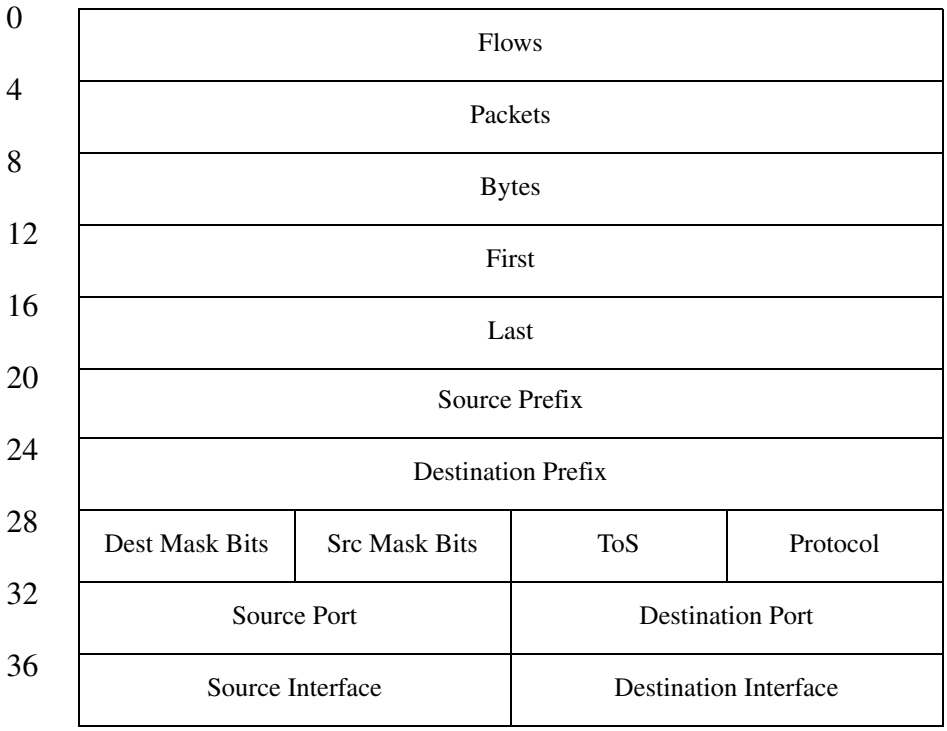
The Prefix-Port aggregation scheme groups flows with common source prefix, source mask, destination prefix, destination mask, source port and destination port when applicable, input interface, output interface, Protocol and ToS byte. The aggregated NetFlow Export record reports the following:

- Source prefix
- Source prefix mask
- Destination prefix
- Destination prefix mask
- Source port
- Destination port

- Source interface
- Destination interface
- Protocol
- ToS byte
- Number of flows summarized by the aggregated record
- Number of bytes summarized by this aggregated record
- Number of packets summarized by this aggregation record
- Starting and ending time stamps

This aggregation scheme is particularly useful for generating data with which to examine the sources and destinations of network traffic passing through a NetFlow-enabled device. Figure 7 displays the Prefix-Port aggregation export record format and a list follows describing the data.

***Figure 7 Prefix-Port Aggregation Export Record Format***




Flows: Number of main cache flows that were aggregated.

Packets: Number of packets in the aggregated flows.

Bytes: Number of bytes in the aggregated flows.

First: Sys up time at which the first packet was switched.

Last: Sys up time at which the last packet was switched.

Source Prefix: Prefix that the source IP address of the aggregated flows belonged to.

Destination Prefix: Prefix that the destination IP address of the aggregated flows belonged to.

Dest Mask Bits: Number of bits in the destination prefix.

Src Mask Bits: Number of bits in the source prefix.

ToS: Type of service byte.

Protocol: IP protocol byte.

Source Port: Source UDP or TCP port number.

Destination Port: Destination UDP or TCP port number.

Source Interface: SNMP index of the interface the packets arrived on.

Destination Interface: SNMP index of the interface the packets went out.

# Content of NetFlow Aggregation Schemes

Table 1 displays which fields are valid for the different aggregation schemes and in the different main cache schemes.

**Note** Each aggregation cache has independent configuration for cache size, cache ager parameters, and export destination. The default size of an aggregation cache is 4096 entries.

The table lists the exported fields and the exported key fields. "X" indicates exported field, "*" indicates exported key fields. Fields in the key are what defines what makes a unique flow.

***Table 1 NetFlow Aggregation Schemes***

| | Main Cache (V1) | Main Cache (V5) | Main Cache (V6) | AS | Protocol -Port | Prefix | Src Prefix | Dest Prefix |
|---|---|---|---|---|---|---|---|---|
| **Src IP Address** | * | * | * | | | | | |
| **Dest IP Address** | * | * | * | | | | | |
| **Protocol** | * | * | * | | * | | | |
| **ToS Byte** | * | * | * | | | | | |
| **Src Port** | * | * | * | | * | | | |
| **Dest Port** | * | * | * | | * | | | |
| **Src Interface** | * | * | * | * | | * | * | |
| **Dest Interface** | X | X | X | * | | * | | * |
| **OR'd TCP Flags** | X | X | X | | | | | |
| **Src AS** | | X | X | * | | * | * | |
| **Dest AS** | | X | X | * | | * | | * |
| **Src Prefix Mask** | | X | X | | | * | * | |
| **Dest Prefix Mask** | | X | X | | | * | | * |
| **Nexthop IP Addr** | X | X | X | | | | | |

*Table 1 NetFlow Aggregation Schemes (continued)*

| | Main Cache (V1) | Main Cache (V5) | Main Cache (V6) | AS | Protocol -Port | Prefix | Src Prefix | Dest Prefix |
|---|---|---|---|---|---|---|---|---|
| **Src Encap Bytes** | | | X | | | | | |
| **Dest Encap Bytes** | | | X | | | | | |
| **Src IP Addr & Src Prefix Mask** | | | | | | * | * | |
| **Dest IP Addr & Dest Prefix Mask** | | | | | | * | | * |
| **First Time stamp** | X | X | X | X | X | X | X | X |
| **Last Time stamp** | X | X | X | X | X | X | X | X |
| **Flows** | | | | X | X | X | X | X |
| **Packets** | X | X | X | X | X | X | X | X |
| **Bytes** | X | X | X | X | X | X | X | X |

"X" indicates exported field, "*" indicates exported key fields.

# Contents of NetFlow ToS-Based Aggregation Schemes

Table 2 displays the six new ToS-based aggregation schemes, the different main cache export schemes, and which fields are valid for the different aggregation schemes and which fields are part of the keys. "X" indicates exported field, "*" indicates exported key fields. Fields in the key define what makes a unique flow.

*Table 2 ToS-Based Aggregation Schemes*

| | Main Cache (V1) | Main Cache (V5) | Main Cache (V6) | AS-ToS | Protocol-Port-ToS | Prefix-ToS | Src Prefix-ToS | Dest Prefix-ToS | Prefix-Port |
|---|---|---|---|---|---|---|---|---|---|
| **Src IP Address** | * | * | * | | | | | | |
| **Dest IP Address** | * | * | * | | | | | | |
| **Protocol** | * | * | * | | * | | | | * |
| **ToS Byte** | * | * | * | * | * | * | * | * | * |
| **Src Port** | * | * | * | | * | | | | * |
| **Dest Port** | * | * | * | | * | | | | * |
| **Src Interface** | * | * | * | * | * | * | * | | * |
| **Dest Interface** | X | X | X | * | * | * | | * | * |
| **OR'd TCP Flags** | X | X | X | | | | | | |

*Table 2 ToS-Based Aggregation Schemes (continued)*

| | Main Cache (V1) | Main Cache (V5) | Main Cache (V6) | AS-ToS | Protocol-Port-ToS | Prefix-ToS | Src Prefix-ToS | Dest Prefix-ToS | Prefix-Port |
|---|---|---|---|---|---|---|---|---|---|
| **Src AS** | | X | X | * | | * | * | | |
| **Dest AS** | | X | X | * | | * | | * | |
| **Src Prefix Mask** | | X | X | | | * | * | | * |
| **Dest Prefix Mask** | | X | X | | | * | | * | * |
| **Nexthop IP Addr** | X | X | X | | | | | | |
| **Src Encap Bytes** | | | X | | | | | | |
| **Dest Encap Bytes** | | | X | | | | | | |
| **Src IP Addr & Src Prefix Mask** | | | | | | * | * | | * |
| **Dest IP Addr & Dest Prefix Mask** | | | | | | * | | * | * |
| **First Time stamp** | X | X | X | X | X | X | X | X | |
| **Last Time stamp** | X | X | X | X | X | X | X | X | |
| **Flows** | | | | X | X | X | X | X | |
| **Packets** | X | X | X | X | X | X | X | X | |
| **Bytes** | X | X | X | X | X | X | X | X | |

X indicates exported field, * indicates exported key fields

## Related Features and Technologies

For more information on setting the minimum prefix mask for router-based aggregation, refer to the Cisco IOS Release 12.1(2)T feature module *NetFlow Minimum Prefix Mask for Router-Based Aggregation*.

# Supported Platforms

This feature is supported on the following platforms:

- Cisco 1720 router
- Cisco 2600 series
- Cisco 3600 series
- Cisco 4500 series
- Cisco 4700 series
- Cisco 5800 series

- Cisco Route Switch Processor (RSP) 7000 series
- Cisco 7200 series
- Cisco 7500 series
- Cisco MGX (RSP) 8800 series
- Cisco RSM (Catalyst5000)

This feature is supported on the following platforms for Cisco IOS Release 12.2(14)S:

- Cisco 7200 series
- Cisco 7400 series
- Cisco 7500 series

# Supported Standards, MIBs, and RFCs

### Standards

None

### MIBs

No new MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB web site on Cisco Connection Online (CCO) at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

### RFCs

None

# Prerequisites

Each NetFlow aggregation cache must be explicitly enabled by entering the **enabled** keyword from aggregation cache configuration mode.

# Configuration Tasks

See the following section for the required configuration task for the NetFlow ToS-Based Router Aggregation feature.

- Configuring a ToS-Based NetFlow Aggregation Scheme (Required)

## Configuring a ToS-Based NetFlow Aggregation Scheme

To enable a ToS-based NetFlow aggregation scheme, use the following commands in aggregation cache configuration mode:

| | Command | Purpose |
|---|---|---|
| **Step 1** | `Router(config)# ip flow-aggregation cache {as-tos \| destination-prefix-tos \| prefix-tos \| prefix-port \| protocol-port-tos \| source-prefix-tos}` | Configures the aggregation cache specifying the aggregation scheme. |
| **Step 2** | `Router(config-flow-cache)# cache timeout active value` | (Optional) Configures aggregation cache operational parameters to time out. |
| **Step 3** | `Router(config-flow-cache)# export destination ip-address port` | Enables the exporting of information from the NetFlow aggregation cache. |
| **Step 4** | `Router(config-flow-cache)# enabled` | Enables an aggregation cache. |

## Verifying ToS-Based NetFlow Aggregation Schemes

To view the configured ToS-based NetFlow aggregation scheme, use the following **show** commands in EXEC mode as needed:

| Command | Purpose |
|---|---|
| `Router# show ip cache flow aggregation` | Displays the aggregation cache configuration. |
| `Router# show ip cache verbose flow` | Displays the aggregation cache flow statistics. |
| `Router# show ip flow export` | Displays the statistics for the data export. |

# Configuration Examples

This section provides the following configuration examples:

- AS-ToS Aggregation Scheme Example
- Prefix-ToS Aggregation Scheme Example

## AS-ToS Aggregation Scheme Example

```
!
ip flow-aggregation cache as-tos
 cache timeout active 20
 export destination 2.2.2.2 3000
 enabled
!
```

## Prefix-ToS Aggregation Scheme Example

```
!
ip flow-aggregation cache prefix-tos
 export destination 4.4.4.4 4000
 enabled
!
```

# Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command reference publications.

- **ip flow-aggregation cache**
- **show ip cache verbose flow aggregation**
- **show ip flow export**

# ip flow-aggregation cache

To enable aggregation cache configuration mode, use the **ip flow-aggregation cache** global configuration mode. To disable aggregation cache configuration mode, use the **no** form of this command.

**ip flow-aggregation cache** {**as** | **as-tos** | **destination-prefix** | **destination-prefix-tos** | **prefix** | **prefix-port** | **prefix-tos** | **protocol-port** | **protocol-port-tos** | **source-prefix** | **source-prefix-tos**}

**no ip flow-aggregation cache** {**as** | **as-tos** | **destination-prefix** | **destination-prefix-tos** | **prefix** | **prefix-port** | **prefix-tos** | **protocol-port** | **protocol-port-tos** | **source-prefix** | **source-prefix-tos**}

## Syntax Description

| | |
|---|---|
| **as** | Configures the autonomous system aggregation cache scheme. |
| **as-tos** | Configures the autonomous system type of service (ToS) aggregation cache scheme. |
| **destination-prefix** | Configures the destination prefix aggregation cache scheme. |
| **destination-prefix-tos** | Configures the destination prefix ToS aggregation cache scheme. |
| **prefix** | Configures the prefix aggregation cache scheme. |
| **prefix-port** | Configures the prefix port aggregation cache scheme. |
| **prefix-tos** | Configures the prefix ToS aggregation cache scheme. |
| **protocol-port** | Configures the protocol port aggregation cache scheme. |
| **protocol-port-tos** | Configures the protocol port ToS aggregation cache scheme. |
| **source-prefix** | Configures the source prefix aggregation cache scheme. |
| **source-prefix-tos** | Configures the source prefix ToS aggregation cache scheme. |

## Defaults

This command is not enabled by default.

## Command Modes

Global configuration

## Command History

| Release | Modification |
|---|---|
| 12.0(3)T | This command was introduced. |
| 12.0(15)S | This command was modified to include the ToS aggregation scheme keywords. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S |

## Usage Guidelines

In source-prefix aggregation mode, only the source mask is configurable. In destination-prefix aggregation mode, only the destination mask is configurable.

## Examples

The following example shows how to enable an autonomous system aggregation scheme:

```
ip flow-aggregation cache as
enabled
```

The following example shows how to enable an autonomous system ToS aggregation scheme:

```
ip flow-aggregation cache as-tos
enabled
```

## Related Commands

| Command | Description |
|---|---|
| **mask destination** | Specifies the destination mask. |
| **mask source** | Specifies the source mask. |
| **show ip cache verbose flow aggregation** | Displays the aggregation cache configuration. |

# show ip cache verbose flow aggregation

To display the aggregation cache configuration, use the **show ip cache verbose flow aggregation** command in EXEC mode.

**show ip cache verbose flow aggregation** {**as** | **as-tos** | **destination-prefix** | **destination-prefix-tos** | **prefix** | **prefix-port** | **prefix-tos** | **protocol-port** | **protocol-port-tos** | **source-prefix** | **source-prefix-tos**}

## Syntax Description

| | |
|---|---|
| **as** | Displays the configuration of the autonomous system aggregation cache scheme. |
| **as-tos** | Displays the configuration of the autonomous system type of service (ToS) aggregation cache scheme. |
| **destination-prefix** | Displays the configuration of the destination prefix aggregation cache scheme. |
| **destination-prefix-tos** | Displays the configuration of the destination prefix ToS aggregation cache scheme. |
| **prefix** | Displays the configuration of the prefix aggregation cache scheme. |
| **prefix-port** | Displays the configuration of the prefix port aggregation cache scheme. |
| **prefix-tos** | Displays the configuration of the prefix ToS aggregation cache scheme. |
| **protocol-port** | Displays the configuration of the protocol port aggregation cache scheme. |
| **protocol-port-tos** | Displays the configuration of the protocol port ToS aggregation cache scheme. |
| **source-prefix** | Displays the configuration of the source prefix aggregation cache scheme. |
| **source-prefix-tos** | Displays the configuration of the source prefix ToS aggregation cache scheme. |

## Defaults

No default behavior or values.

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 12.0(3)T | This command was introduced. |
| 12.0(15)S | This command was modified to include new **show** output for ToS aggregation schemes. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S |

## Examples

The following is an example display of an autonomous system aggregation cache using the **show ip cache verbose flow aggregation as** command:

```
Router# show ip cache verbose flow aggregation as

IP Flow Switching Cache, 278544 bytes
  2 active, 4094 inactive, 13 added
  178 ager polls, 0 flow alloc failures

Src If       Src AS  Dst If       Dst AS  Flows   Pkts  B/Pk  Active
Fa1/0         0      Null          0         1      2     49    10.2
Fa1/0         0      Se2/0         20        1      5    100     0.0
```

The following is an example display of a main cache using the **show ip cache verbose flow aggregation** command:

```
Router# show ip cache verbose flow
IP packet size distribution (230151 total packets):
   1-32   64   96  128  160  192  224  256  288  320  352  384  416  448  480
   .999 .000 .000 .000 .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
IP Flow Switching Cache, 6553988 bytes
  19 active, 65517 inactive, 19073 added
  48401 ager polls, 0 flow alloc failures
  last clearing of statistics never
Protocol         Total    Flows   Packets Bytes  Packets Active(Sec) Idle(Sec)
--------         Flows     /Sec     /Flow  /Pkt     /Sec     /Flow     /Flow
TCP-BGP             71      0.0         1    49      0.0       2.5      15.8
UDP-other           17      0.0         1   328      0.0       0.0      15.7
ICMP             18966      6.7        10    28     72.9       0.1      22.9
Total:           19054      6.7        10    28     72.9       0.1      22.9

SrcIf          SrcIPaddress    DstIf          DstIPaddress    Pr TOS Flgs  Pkts
Port Msk AS                    Port Msk AS    NextHop              B/Pk  Active
Et1/1          52.52.52.1      Fd4/0          42.42.42.1      01 55  10    3748
0000 /8  50                    0000 /8  40    202.120.130.2          28    17.8
Et1/2          52.52.52.1      Fd4/0          42.42.42.1      01 CC  10    3568
0000 /8  50                    0000 /8  40    202.120.130.2          28    17.8
Et1/2          10.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1124
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          11.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1157
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.7
Et1/2          14.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1149
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          15.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1127
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.7
Et1/2          12.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1204
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          13.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1159
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          18.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1223
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          19.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1264
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          16.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1170
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          17.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1167
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          22.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1193
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.8
Et1/2          23.1.3.2        Fd4/0          42.42.42.1      01 C0  10    1212
0000 /0  0                     0000 /8  40    202.120.130.2          28    17.7
```

```
Et1/1          50.50.50.1      Local          31.31.31.1      06 C0  18       2
00B3 /32 0                     2AF8 /32 0     0.0.0.0                49    10.1
```

The following is an example display of an autonomous system ToS aggregation cache using the **show ip cache verbose flow aggregation as-tos** command:

```
Router# show ip cache verbose flow aggregation as-tos

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 103 added
  1609 ager polls, 0 flow alloc failures

Src If         Src AS  Dst If         Dst AS  TOS Flows   Pkts  B/Pk  Active
Et1/2           50     Fd4/0           40     CC     1   3568     28    17.8
Et1/2           0      Fd4/0           40     C0    15     17K    28    17.8
Et1/1           50     Fd4/0           40     55     1   3748     28    17.8
Fd4/0           0      Null            0      C0     1      2     49     0.9
```

The following is an example display of a protocol port ToS aggregation cache using the **show ip cache verbose flow aggregation protocol-port-tos** command:

```
Router# show ip cache verbose flow aggregation protocol-port-tos

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 102 added
  1584 ager polls, 0 flow alloc failures

Prot Src If        SrcPort  Dst If        DstPort TOS Flows  Pkts  B/Pk  Active
0x01 Et1/2           0000   Fd4/0           0000  C0    15    17K    28    17.8
0x01 Et1/2           0000   Fd4/0           0000  CC     1  3568     28    17.8
0x01 Et1/1           0000   Fd4/0           0000  55     1  3748     28    17.8
0x06 Fd4/0           00B3   Null            2AF9  C0     1     2     49     0.9
```

The following is an example display of a source prefix ToS aggregation cache using the **show ip cache verbose flow aggregation source-prefix-tos** command:

```
Router# show ip cache verbose flow aggregation source-prefix-tos

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 105 added
  1683 ager polls, 0 flow alloc failures

Src If         Src Prefix      Msk  AS    TOS Flows  Pkts B/Pk  Active
Et1/1          52.0.0.0        /8   50    55     1  3748    28    17.8
Et1/2          52.0.0.0        /8   50    CC     1  3568    28    17.8
Et1/2          0.0.0.0         /0   0     C0    15    17K   28    17.8
Fd4/0          20.20.20.1      /32  0     C0     1     2    49     0.9
```

The following is an example display of a destination prefix ToS aggregation cache using the **show ip cache verbose flow aggregation destination-prefix-tos** command:

```
Router# show ip cache verbose flow aggregation destination-prefix-tos

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 86 added
  1480 ager polls, 0 flow alloc failures

Dst If         Dst Prefix      Msk  AS    TOS Flows  Pkts B/Pk  Active
Local          31.31.31.1      /32  0     C0     1     2    49     0.9
Fd4/0          42.0.0.0        /8   40    55     1  3748    28    17.8
Fd4/0          42.0.0.0        /8   40    CC     1  3568    28    17.8
Fd4/0          42.0.0.0        /8   40    C0    15    17K   28    17.8
```

The following is an example display of a prefix ToS aggregation cache using the **show ip cache verbose flow aggregation prefix-tos** command:

```
Router# show ip cache verbose flow aggregation prefix-tos

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 4 added
  14 ager polls, 0 flow alloc failures

Src If         Src Prefix      Dst If         Dst Prefix      TOS Flows    Pkts
               Msk AS                         Msk AS              B/Pk   Active
Et1/2          0.0.0.0         Fd4/0          42.0.0.0        C0    15    3933
               /0  0                          /8  40                28     3.9
Et1/1          52.0.0.0        Fd4/0          42.0.0.0        55     1     826
               /8  50                         /8  40              28     3.9
Et1/2          52.0.0.0        Fd4/0          42.0.0.0        CC     1     787
               /8  50                         /8  40              28     3.9
```

The following is an example display of a prefix port aggregation cache using the **show ip cache verbose flow aggregation prefix-port** command:

```
Router# show ip cache verbose flow aggregation prefix-port

IP Flow Switching Cache, 278544 bytes
  4 active, 4092 inactive, 105 added
  1679 ager polls, 0 flow alloc failures

Src If         Src Prefix      Dst If         Dst Prefix      TOS Flows    Pkts
               Port Msk                       Port Msk        Pr  B/Pk   Active
Fd4/0          20.20.20.1      Local          31.31.31.1      C0     1       2
               00B3 /32                       2AF9 /32        06    49     0.9
Et1/2          0.0.0.0         Fd4/0          42.0.0.0        C0    15      17K
               0000 /0                        0000 /8         01    28    17.8
Et1/1          52.0.0.0        Fd4/0          42.0.0.0        55     1    3748
               0000 /8                        0000 /8         01    28    17.8
Et1/2          52.0.0.0        Fd4/0          42.0.0.0        CC     1    3568
               0000 /8                        0000 /8         01    28    17.8
```

Table 3 describes the significant fields shown in this example.

***Table 3 show ip cache verbose flow aggregation Field Descriptions***

| Field | Description |
|---|---|
| Src If | Specifies the source interface. |
| Src AS | Specifies the source autonomous system. |
| Dst If | Specifies the destination interface. |
| Dst AS | Specifies the destination autonomous system. |
| Flows | Number of flows. |
| Pkts | Number of packets. |
| B/Pk | Average number of bytes observed for the packets seen for this protocol (total bytes for this protocol or the total number of flows for this protocol for this summary period). |
| Active | Number of active flows in the NetFlow cache at the time this command was entered. |

**Related Commands**

| Command | Description |
|---|---|
| **ip flow-aggregation cache** | Enables aggregation cache configuration mode. |
| **show ip flow export** | Displays the statistics for the data export. |

# show ip flow export

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

**show ip flow export**

## Syntax Description

This command has no keywords and arguments.

## Defaults

No default behavior or values.

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 11.1CC | This command was introduced. |
| 12.0(15)S | This command was modified to include new show output for type of service (ToS) aggregation schemes. |
| 12.2(14)S | This command was integrated into Cisco IOS Release 12.2(14)S |

## Examples

The following example displays the enabled aggregation caches using the **show ip flow export** command:

```
Router# show ip flow export

Flow export is enabled
  Exporting flows to 2.2.2.2 (3000)
  Exporting using source IP address 181.1.1.1
  Version 5 flow records, peer-as
Cache for as aggregation:
    Exporting flows to 33.1.1.1 (6000)
    Exporting using source IP address 181.1.1.1
Cache for as-tos aggregation:
    Exporting flows to 2.2.2.2 (3000)
    Exporting using source IP address 181.1.1.1
Cache for source-prefix-tos aggregation:
    Exporting flows to 3.3.3.3 (3000)
    Exporting using source IP address 150.1.2.1
Cache for destination-prefix-tos aggregation:
    Exporting flows to 6.6.6.6 (6000)
    Exporting using source IP address 181.1.1.1
Cache for prefix-tos aggregation:
    Exporting flows to 4.4.4.4 (4000)
    Exporting using source IP address 181.1.1.1
Cache for prefix-port aggregation:
    Exporting flows to 5.5.5.5 (5000)
    Exporting using source IP address 5.5.5.5
3 flows exported in 3 udp datagrams
0 flows failed due to lack of export packet
0 export packets were sent up to process level
0 export packets were punted to the RP
3 export packets were dropped due to no fib
0 export packets were dropped due to adjacency issues
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
```

## Related Commands

| Command | Description |
|---|---|
| **ip flow-aggregation cache** | Enables aggregation cache configuration mode. |
| **show ip cache verbose flow aggregation** | Displays the aggregation cache configuration. |