



Configuring NDE

This chapter describes how to configure NetFlow Data Export (NDE) on the Catalyst 6000 family switches.



Note

For complete syntax and usage information for the commands used in this chapter, refer to the *Catalyst 6000 Family Command Reference* publication.

This chapter consists of these sections:

- [Understanding How NDE Works, page 15-1](#)
- [Default NDE Configuration, page 15-3](#)
- [Configuring NDE, page 15-3](#)

Understanding How NDE Works

These sections describe how NDE works:

- [Overview of NDE and Integrated Layer 3 Switching Management, page 15-1](#)
- [Traffic Statistics Data Collection, page 15-2](#)
- [Using NDE Filters, page 15-3](#)

Overview of NDE and Integrated Layer 3 Switching Management

Catalyst 6000 family switches provide Layer 3 switching with Cisco Express Forwarding for Policy Feature Card 2 (CEF for PFC2) or with Multilayer Switching (MLS). You can use NDE to monitor all Layer 3-switched traffic through the Multilayer Switch Feature Card (MSFC). NDE complements the embedded Remote Monitoring (RMON) capabilities on the switch that allow you to see all port traffic.



Note

NDE is not supported for IP multicast or Internetwork Packet Exchange (IPX) traffic.



Note

NDE version 7 and NDE version 8 are not supported for the MSFC.



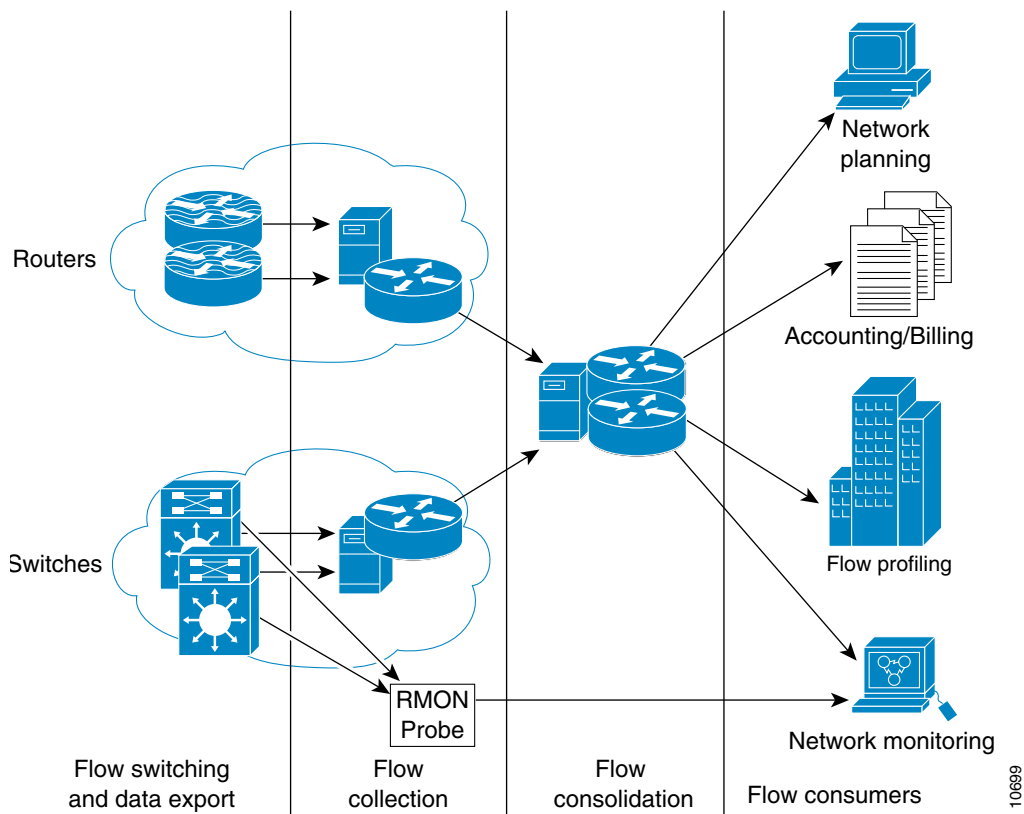
Note For information on configuring CEF for PFC2, see [Chapter 13, “Configuring CEF for PFC2.”](#) For information on configuring MLS, see [Chapter 14, “Configuring MLS.”](#)

Integrated Layer 3-switching management includes products, management utilities, and partner applications designed to gather flow statistics, export the statistics, collect and perform data reduction on the exported statistics, and forward them to applications for traffic monitoring, planning, and accounting. Flow collectors, such as the Cisco SwitchProbe and NetFlow FlowCollector, gather and classify flows. This flow information is then aggregated and fed to applications such as TrafficDirector, NetSys, or NetFlow Analyzer.

Traffic Statistics Data Collection

An external data collector gathers flow entries from the statistics cache of one or more switches or Cisco routers. The switch or router transmits data to the flow collector by grouping flow entries for expired flows from its statistics cache into a User Datagram Protocol (UDP) datagram, which consists of a header and a series of flow entries. See [Figure 15-1](#).

Figure 15-1 Integrated Layer 3 Switching Management



Using NDE Filters

By default, *all* expired flows are exported until you specify a filter. After specifying a filter, only expired and purged flows matching the specified filter criteria are exported. Filter values are stored in NVRAM and are not cleared when NDE is disabled.

If the flow mask is destination-ip mode and the NDE filter contains a filter on both source and destination, only the destination filter is effective. For example, in the filter specified in the following display if the flow mask is in destination-ip mode, all flows with destination address 9.1.2.15 are exported. The source filter for host 10.1.2.15 is not effective (it is ignored).

```
Console> (enable) set mls nde flow destination 9.1.2.15/32 source 10.1.2.15/32
Netflow data export: destination filter set to 9.1.2.15/32
Netflow data export: source filter set to 10.1.2.15/32
Console> (enable)
```

Default NDE Configuration

Table 15-1 shows the default NDE configuration.

Table 15-1 Default NDE Configuration

Feature	Default Value
NDE	Disabled
NDE data collector address and UDP port	None specified
NDE filters	None configured

Configuring NDE

These sections describe how to configure NDE:

- [Usage Guidelines, page 15-4](#)
- [Specifying an NDE Collector, page 15-4](#)
- [Specifying an NDE Destination Address on the MSFC, page 15-5](#)
- [Specifying an NDE Source Address on the MSFC, page 15-5](#)
- [Enabling NDE, page 15-6](#)
- [Specifying a Destination Host Filter, page 15-6](#)
- [Specifying a Destination and Source Subnet Filter, page 15-6](#)
- [Specifying a Destination TCP/UDP Port Filter, page 15-7](#)
- [Specifying a Source Host and Destination TCP/UDP Port Filter, page 15-7](#)
- [Specifying a Protocol Filter, page 15-8](#)
- [Specifying Protocols for Statistics Collection, page 15-8](#)
- [Removing Protocols for Statistics Collection, page 15-8](#)

- [Clearing the NDE Flow Filter, page 15-9](#)
- [Disabling NDE, page 15-9](#)
- [Removing the NDE IP Address, page 15-9](#)
- [Displaying the NDE Configuration, page 15-10](#)

Usage Guidelines

If too many entries are added to the NetFlow table, follow these guidelines:

- Reduce the MLS aging time. Set the aging time high enough to keep the number of entries within the 32k-flow range of the PFC. For information on how to change the MLS aging time, see the [“Specifying MLS Aging-Time Value” section on page 14-17 in Chapter 14, “Configuring MLS.”](#)
- If there are protocols with fewer packets per flow running, reduce the MLS fast aging time. For information on how to change the MLS fast aging time, see the [“Specifying IP MLS Fast Aging Time and Packet Threshold Values” section on page 14-18 in Chapter 14, “Configuring MLS.”](#)
- Use the correct flow mask. Use the flow mask required to extract the kind of information you want. A full flow mask gives more information but as the number of flows increase, the load on the Layer 3 aging also increases. Try to use a flow mask with the minimum granularity required to get the data you need. With a full flow mask, you might need to decrease the MLS aging time because a full flow mask increases the number of flows per second. For information on setting the flow mask, see the [“Setting the Minimum IP MLS Flow Mask” section on page 14-19 in Chapter 14, “Configuring MLS.”](#)
- Exclude entries with fewer packets per flow. Some query protocols, like Domain Name System (DNS), generate fewer packets per flow and can be excluded from the NetFlow table with the **set mls exclude protocol** command. You can specify up to four protocol filters, but packets from filtered protocols will go to the MSFC.
- Keep specific flows from being added to the Netflow table with the **set mls nde flow exclude** command.

Specifying an NDE Collector

Before enabling NDE for the first time, you must specify an NDE collector and UDP port to receive the exported statistics. The collector address and UDP port number are saved in NVRAM and are preserved if NDE is disabled and reenabled or if the switch is power cycled.



Note

If you are using the NetFlow FlowCollector application for data collection, verify that the UDP port number you specify is the same port number shown in the FlowCollector’s `nfconfig.file`. This file is located at `/opt/csconfc/config/nfconfig.file` in the FlowCollector application.

To specify an NDE collector, perform this task in privileged mode:

Task	Command
Specify an NDE collector and UDP port for data export of hardware-switched packets.	set mls nde { <i>collector_ip</i> <i>collector_name</i> } { <i>udp_port_number</i> }

This example shows how to specify an NDE collector:

```
Console> (enable) set mls nde Stargate 9996
Netflow data export not enabled.
Netflow data export to port 9996 on 172.20.15.1(Stargate)
Console> (enable)
```

Specifying an NDE Destination Address on the MSFC

To monitor data and statistics about Layer 3 traffic that is switched in software by the MSFC, you must specify the NDE collector and UDP port on the MSFC by entering the **ip flow-export destination** command on the MSFC.

To specify the NDE collector for Layer 3 traffic that is being switched by the MSFC, perform this task in privileged mode:

Task	Command
Specify an NDE collector and UDP port for data export of software-switched packets.	ip flow-export destination {hostname ip_address} {udp_port_number}

This example shows how to specify the NDE collector from the MSFC:

```
Router(config)# ip flow-export destination Stargate 9996
Router(config)#
```

Specifying an NDE Source Address on the MSFC

The MSFC and the PFC use the NDE source address when sending statistics to the data collection application. You configure the source address on the MSFC so the data collection application can aggregate export data from both the MSFC and the PFC for the same flow by entering the **ip flow-export source vlan** command on the MSFC.



Note

The **ip flow-export source vlan** command is optional. If you do not specify an NDE source address on the MSFC, the MSFC and PFC automatically use the IP address of one of the MSFC VLAN interfaces.

To specify the NDE source address for Layer 3 traffic that is being switched by the MSFC, perform this task in privileged mode:

Task	Command
Specify an NDE source address for data export of software-switched packets.	ip flow-export source vlan {vlan_interface_number}

This example shows how to specify the NDE source address on the MSFC:

```
Router(config)# ip flow-export source vlan 10
Router(config)#
```

Enabling NDE

To enable NDE, perform this task in privileged mode:

Task	Command
Enable NDE on the switch.	set mls nde enable

This example shows how to enable NDE on the switch:

```
Console> (enable) set mls nde enable
Netflow data export enabled.
Netflow data export to port 9996 on 172.20.15.1 (Stargate)
Console> (enable)
```

If you attempt to enable NDE without first specifying a collector, you see this display:

```
Console> (enable) set mls nde enable
Please set host name and UDP port number with 'set mls nde <collector_ip>
<udp_port_number>'.
Console> (enable)
```

Specifying a Destination Host Filter

To specify a destination host filter, perform this task in privileged mode:

Task	Command
Specify a destination host filter for an NDE flow.	set mls nde flow destination [<i>ip_addr_spec</i>]

This example shows how to specify a destination host filter so that only expired flows to host 171.69.194.140 are exported:

```
Console> (enable) set mls nde flow destination 171.69.194.140
Netflow Data Export successfully set
Destination filter is 171.69.194.140/255.255.255.255
Filter type: include
Console> (enable)
```

Specifying a Destination and Source Subnet Filter

To specify a destination and source subnet filter, perform this task in privileged mode:

Task	Command
Specify a destination and source subnet filter for an NDE flow.	set mls nde flow destination [<i>ip_addr_spec</i>] source [<i>ip_addr_spec</i>]

This example shows how to specify a destination and source subnet filter so that only expired flows to subnet 171.69.194.0 from subnet 171.69.173.0 are exported (assuming the flow mask is set to source-destination-ip):

```
Console> (enable) set mls nde flow destination 171.69.194.140/24 source 171.69.173.5/24
Netflow Data Export successfully set
Source filter is 171.69.173.0/24
Destination filter is 171.69.194.0/24
Filter type: include
Console> (enable)
```

Specifying a Destination TCP/UDP Port Filter

To specify a destination TCP/UDP port filter, perform this task in privileged mode:

Task	Command
Specify a destination TCP/UDP port filter for an NDE flow.	set mls nde flow dst_prt [<i>port_number</i>]

This example shows how to specify a destination TCP/UDP port filter so that only expired flows to destination port 23 are exported (assuming the flow mask is set to ip-flow):

```
Console> (enable) set mls nde flow dst_port 23
Netflow Data Export successfully set
Destination port filter is 23
Filter type: include
Console> (enable)
```

Specifying a Source Host and Destination TCP/UDP Port Filter

To specify a source host and destination TCP/UDP port filter, perform this task in privileged mode:

Task	Command
Specify a source host and destination TCP/UDP port filter for an NDE flow.	set mls nde flow source [<i>ip_addr_spec</i>] dst_prt [<i>port_number</i>]

This example shows how to specify a source host and destination TCP/UDP port filter so that only expired flows from host 171.69.194.140 to destination port 23 are exported (assuming the flow mask is set to ip-flow):

```
Console> (enable) set mls nde flow source 171.69.194.140 dst_port 23
Netflow Data Export successfully set
Source filter is 171.69.194.140/255.255.255.255
Destination port filter is 23
Filter type: include
Console> (enable)
```

Specifying a Protocol Filter

To specify a protocol filter, perform this task in privileged mode:

Task	Command
Specify a protocol filter for an NDE flow.	set mls nde flow protocol <i>protocol</i>

This example shows how to specify a protocol filter so that only expired flows from protocol 17 are exported:

```
Console> (enable) set mls nde flow protocol 17
Netflow Data Export filter successfully set.
Protocol filter is 17
Filter type: include
Console> (enable)
```

Specifying Protocols for Statistics Collection

You can enter the **set mls statistics protocol** *protocol port* command to specify up to 64 different protocols for which to collect statistics to be exported using NDE. The *protocol* argument can be **ip**, **ipinip**, **icmp**, **igmp**, **tcp**, and **udp**, or a decimal number for other protocol families. The *port* argument specifies the protocol port.

To specify protocols for statistics collection, perform this task in privileged mode:

Task	Command
Specify protocols for statistics collection.	set mls statistics protocol <i>protocol port</i>

This example shows how to specify a protocol for statistics collection:

```
Console> (enable) set mls statistics protocol 17 1934
Protocol 17 port 1934 is added to protocol statistics list.
Console> (enable)
```

Removing Protocols for Statistics Collection

You can enter the **clear mls statistics protocol** *{protocol port | all}* command to specify up to 64 different protocols for which to collect statistics to be exported using NDE. The *protocol* argument can be **tcp**, **udp**, **icmp**, or a decimal number for other protocol families. The *port* argument specifies the protocol port. Use the **all** keyword to remove all protocols for statistics collection.

To remove protocols for statistics collection, perform this task in privileged mode:

Task	Command
Remove protocols for statistics collection.	clear mls statistics protocol <i>{protocol port all}</i>

This example shows how to remove a protocol for statistics collection:

```
Console> (enable) clear mls statistics protocol 17 1934
Protocol 17 port 1934 cleared from protocol statistics list.
Console> (enable)
```

Clearing the NDE Flow Filter

To clear the NDE flow filter and reset the filter to the default (all flows exported), perform this task in privileged mode:

Task	Command
Clear the NDE flow filter.	clear mls nde flow

This example shows how to clear the NDE flow filter so that all flows are exported:

```
Console> (enable) clear mls nde flow
Netflow data export filter cleared.
Console> (enable)
```

Disabling NDE



Note

With Supervisor Engine 1 and a PFC, if NDE is enabled and you disable MLS, you lose the statistics for existing cache entries—they are not exported.

To disable NDE on the switch, perform this task in privileged mode:

Task	Command
Disable NDE on the switch.	set mls nde disable

This example shows how to disable NDE on the switch:

```
Console> (enable) set mls nde disable
Netflow data export disabled.
Console> (enable)
```

Removing the NDE IP Address

To remove the NDE IP address from the MSFC, perform this task in global configuration mode:

Task	Command
Remove the NDE IP address from the MSFC.	Router(config)# no mls nde-address [<i>ip_addr</i>]

This example shows how to remove the NDE IP addresses from the MSFC:

```
Router(config)# no mls nde-address 170.170.2.1
Router(config)#
```

Displaying the NDE Configuration

To display the NDE configuration on the switch, perform this task in privileged mode:

Task	Command
Display the NDE configuration on the switch.	show mls nde

This example shows how to display the NDE configuration on the switch:

```
Console> (enable) show mls nde
Netflow Data Export enabled
Netflow Data Export configured for port 1098 on host 172.20.15.1
Source filter is 171.69.194.140/255.255.255.0
Destination port filter is 23
Total packets exported = 26784
Console> (enable)
```