



CHAPTER 56

Configuring aCEF

This chapter describes how to configure Accelerated Cisco Express Forwarding (aCEF) which requires the following hardware components:

- Supervisor Engine 720 with the integrated 720Gbps switch fabric
- Supported switching modules:
 - 48-port 10/100/1000BASE-TX (WS-X6748-GE-TX)
 - 24-port 1000BASEX (WS-X6724-SFP)
 - 48 port-1000BASEX (WS-X6748-SFP)
 - 4-port 10-Gigabit Ethernet (WS-X6704-10GE)



Note

For complete information on the syntax and usage information for the supervisor engine commands that are used in this chapter, refer to the *Catalyst 6500 Series Command Reference* publication.

This chapter consists of these sections:

- [Understanding How aCEF Works, page 56-1](#)
- [aCEF Configuration Guidelines and Restrictions, page 56-1](#)
- [Configuring aCEF, page 56-2](#)

Understanding How aCEF Works

The aCEF-supported switching modules utilize cache-based forwarding to reduce lookup overhead on the supervisor engine PFC3. The cache-based forwarding significantly improves forwarding performance.

aCEF Configuration Guidelines and Restrictions

This section describes the guidelines and restrictions for configuring aCEF:

- With aCEF-supported switching modules, there are only two switching modes:
 - Truncated mode (at least one nonfabric-enabled module is installed)
 - Compact mode (no nonfabric-enabled modules are installed)
- Remote (console) access to aCEF-supported switching modules from the supervisor engine is not supported.

- The only MLS flow mask supported is full flow. Full flow is the most-specific flow mask. A full flow entry includes the destination/source IP address, destination/source Layer 4 port number, protocol type, and Layer 2 header.

Configuring aCEF

All the **show** and **set** commands can be entered at the module level, module/port level, or at the system (global) level. A command entered at the system level is applied to all installed aCEF-supported switching modules. However, because multiple ports on a module are controlled by one ASIC, granularity down to an individual port is not supported. If you use the module/port level to change the configuration of a single port on a module, all the module ports get the configuration change.

The module/port level configuration takes precedence over the module level configuration, and the module level configuration takes precedence over the system level configuration.

These sections describe how to configure aCEF:

- [Configuring Non-Switch Flows, page 56-2](#)
- [Configuring Aging Parameters, page 56-2](#)
- [show commands, page 56-3](#)

Configuring Non-Switch Flows

The **non-switch-flow** configuration option can be used to designate IP version 4 flows that you do not want to be switched (cached) by the aCEF-supported switching modules. You use the **no-switch-flow** option to designate flows that are not making efficient usage of the cache. Use the **any** keyword to ignore certain parameters. The command syntax is as follows:

```

Console> (enable) set mls accelerated-cef 3 non-switch-flow ?
    ipv4                               IPv4 flows
Console> (enable) set mls accelerated-cef 3 non-switch-flow ipv4 ?
    <vlan>                               VLAN number
    any                                  Any Vlan
Console> (enable) set mls accelerated-cef 3 non-switch-flow ipv4 any ?
    <ip/mask>                             Source IP/Mask
    any                                  Any source IP/Mask
Console> (enable) set mls accelerated-cef 3 non-switch-flow ipv4 1 ?
    <ip/mask>                             Source IP/Mask
    any                                  Any source IP/Mask
Console> (enable) set mls accelerated-cef 3 non-switch-flow ipv4 1 any ?
    <ip/mask>                             Destination IP/Mask
    any                                  Any destination IP/Mask
Console> (enable)

```

Configuring Aging Parameters

The state and identity of flows are maintained by the aCEF-supported switching modules cache while packet traffic is active; when traffic for a flow ceases, the entry ages out. You can configure the aging time for entries that are kept in the cache. If an entry is not used for the specified period of time, the entry ages out. Normal and aggressive aging are supported. Aggressive aging can be turned on to improve performance. The aggressive-aging monitor-time period and packet-rate thresholds can also be configured.

The command syntax is as follows:

```

Console> (enable) set mls accelerated-cef aging ?
    aggressive    aggressive aging parameters to improve accelerated-cef performance
    normal        normal aging

Console> (enable) set mls accelerated-cef aging normal ?
    <1-1024>    aging time in seconds (default is 16 secs)

Console> (enable) set mls accelerated-cef aging normal 100 ?
    <cr>

Console> (enable) set mls accelerated-cef aging aggressive ?
    disable      Disable aggressive aging
    interval     Time interval to monitor accelerated CEF usage to trigger
                  aggressive aging (default is 5 secs)
    pkt-rate-range packet rates to age out accelerated CEF entries
    threshold    Accelerated CEF utilization % to trigger aggressive aging
                  (default is 75 %)

Console> (enable) set mls accelerated-cef aging aggressive disable ?
    <cr>

Console> (enable) set mls accelerated-cef aging aggressive interval ?
    <1-100>    Time interval in secs

Console> (enable) set mls accelerated-cef aging aggressive interval 10 ?
    <cr>

Console> (enable) set mls accelerated-cef aging aggressive pkt-rate-range ?
    start-rate  Starting pkt rate - entries with lower rate will be aged out

Console> (enable) set mls accelerated-cef aging aggressive pkt-rate-range start-rate ?
    <0-1024>    Starting pkt rate per second - default is 0 pkt/sec

Console> (enable) set mls accelerated-cef aging aggressive pkt-rate-range start-rate 100 ?
    end-rate   Ending pkt rate to be used by the ager - (increments from the
                  start-rate till this rate)

Console> (enable) set mls accelerated-cef aging aggressive pkt-rate-range start-rate 100
end-rate ?
    <0-65536>    End pkt rate per second - default is 8 pkt/sec

Console> (enable) set mls accelerated-cef aging aggressive pkt-rate-range start-rate 100
end-rate 1000 ?
    <cr>

Console> (enable) set mls accelerated-cef aging aggressive threshold ?
    <50-99>    utilization range

Console> (enable) set mls accelerated-cef aging aggressive threshold 80 ?
    <cr>

```

show commands

The command syntax is as follows:

```

Console> (enable) show mls accelerated-cef ?
    <mod>                Module number
    <mod/port>          Module number and Port number(s)
    aging               Aging summary
    entries             Entries

```

```

non-switched-flows      Flows that are not switched on Accelerated CEF
summary                Summary for the system
Console> (enable) show mls accelerated-cef 3 ?
aging                  Aging summary
entries               Entries
non-switched-flows    Flows that are not switched on Accelerated CEF
summary              Summary for the system
Console> (enable) show mls accelerated-cef 3/1 ?
aging                  Aging summary
entries               Entries
non-switched-flows    Flows that are not switched on Accelerated CEF
summary              Summary for the system

```

The following sections provide a sampling of the **show** commands:

- [show mls accelerated-cef aging, page 56-4](#)
- [show mls accelerated-cef entries, page 56-5](#)
- [show mls accelerated-cef non-switched-flows, page 56-5](#)
- [show mls accelerated-cef summary, page 56-6](#)

show mls accelerated-cef aging

```

Console> (enable) show mls accelerated-cef aging

Aging summary for Module 3, Ports 1, 3, 5 ... 47
-----
Aging configuration:
  Normal aging time = 16 secs
  Aggressive aging:
    threshold usage to trigger aggressive aging = 75 %
    Accelerated CEF usage monitor interval = 10 secs
    Packet range for aggressive aging = 0 .. 8 pkts/sec
  Current aging state = Normal

Aging summary for Module 3, Ports 2, 4, 6 ... 48
-----
Aging configuration:
  Normal aging time = 16 secs
  Aggressive aging:
    threshold usage to trigger aggressive aging = 75 %
    Accelerated CEF usage monitor interval = 10 secs
    Packet range for aggressive aging = 0 .. 8 pkts/sec
  Current aging state = Normal
Console> (enable)

```

show mls accelerated-cef entries

```

Console> (enable) show mls accelerated-cef entries ipv4

Accelerated CEF entries for Module 3, Ports 1, 3, 5 ... 47
-----

Accelerated CEF Entry addr=64:
-----
Flow key:
  flow_type=IPv4  module/port=3/27 source_vlan=1
  smac=00-00-00-00-00-97  dmac=00-00-00-00-00-95
  ip_src=10.7.41.101 ip_dst=10.6.41.101
  protocol=0(other)
Flow mask memory:
  reaffirmation_period=512 msec, reaffirmation_pkt_count=1024
  Flow Mask is Accelerated CEF full flow

Accelerated CEF Entry addr=79:
-----
Flow key:
  flow_type=IPv4  module/port=3/27 source_vlan=1
  smac=00-00-00-00-00-97  dmac=00-00-00-00-00-95
  ip_src=10.7.41.110 ip_dst=10.6.41.110
  protocol=0(other)
Flow mask memory:
  reaffirmation_period=512 msec, reaffirmation_pkt_count=1024
  Flow Mask is Accelerated CEF full flow
.
.
.
Console> (enable)

```

show mls accelerated-cef non-switched-flows

```

Console> (enable) show mls accelerated-cef 3 non-switched-flows

Non switched flows for Module 3, Ports 1, 3, 5 ... 47
-----

Non switched flows for Module 3, Ports 2, 4, 6 ... 48
-----

Console> (enable) show mls accelerated-cef 3 non-switched-flows ipv4

Non switched flows for Module 3, Ports 1, 3, 5 ... 47
-----

```

idx	vlan	source IP	destination IP	protocol	src_port	dst_port	tcp_info
1	*	*	*	icmp	*	*	0
2	*	*	*	udp	*	domain	0
3	*	*	*	udp	*	ntp	0
4	*	*	*	tcp	*	smtp	0
5	*	*	*	tcp	*	*	1 (FIN)
6	*	*	*	tcp	*	*	4 (RST)
7	1	10.7.41.128	*	*			
8	1	10.7.41.116	*	*			

Non switched flows for Module 3, Ports 2, 4, 6 ... 48

```
-----
idx vlan    source IP    destination IP  protocol  src_port  dst_port  tcp_info
-----
 1 *         *           *             *         icmp      *         *         0
 2 *         *           *             *         udp       *         domain   0
 3 *         *           *             *         udp       *         ntp      0
 4 *         *           *             *         tcp       *         smtp     0
 5 *         *           *             *         tcp       *         *        1 (FIN)
 6 *         *           *             *         tcp       *         *        4 (RST)
 7 1         10.7.41.128 *             *         *         *         *         *
 8 1         10.7.41.116 *             *         *         *         *         *
```

show mls accelerated-cef summary

Console> (enable) **show mls accelerated-cef summary**

Accelerated CEF Summary for Module 3, Ports 1, 3, 5 ... 47

```
-----
Accelerated CEF size = 8 K
Total number of flows = 27
  Total IPv4 flows = 27
  Total IPv6 flows = 0
Total number of packets forwarded by Accelerated CEF = 13839862646
```

IPv4 Default Flow Mask Memory :
 reaffirmation_period=512 msec, reaffirmation_pkt_count=1024
 Flow Mask is Accelerated CEF full flow

IPv6 Default Flow Mask Memory :
 reaffirmation_period=512 msec, reaffirmation_pkt_count=1024
 Flow Mask is Accelerated CEF full flow

List of default accelerated-cef non-switched ipv4 flows:
 DNS ICMP SMTP NTP TCP-FIN TCP-RST
 List of default accelerated-cef non-switched ipv6 flows:
 TCP-FIN TCP-RST

Accelerated CEF Summary for Module 3, Ports 2, 4, 6 ... 48

```
-----
Accelerated CEF size = 8 K
Total number of flows = 0
  Total IPv4 flows = 0
  Total IPv6 flows = 0
Total number of packets forwarded by Accelerated CEF = 0
```

IPv4 Default Flow Mask Memory :
 reaffirmation_period=512 msec, reaffirmation_pkt_count=1024
 Flow Mask is Accelerated CEF full flow

IPv6 Default Flow Mask Memory :
 reaffirmation_period=512 msec, reaffirmation_pkt_count=1024
 Flow Mask is Accelerated CEF full flow

List of default accelerated-cef non-switched ipv4 flows:
 DNS ICMP SMTP NTP TCP-FIN TCP-RST
 List of default accelerated-cef non-switched ipv6 flows:
 TCP-FIN TCP-RST

```
Console> (enable) show mls accelerated-cef summary protocol
```

```
Protocol based summary for Module 3, Ports 1, 3, 5 ... 47
```

```
-----
```

Protocol	Port	Total flows
-----	----	-----
tcp	telnet	0
tcp	www	0
tcp	ftp	0
tcpftp-data		0

```
Protocol based summary for Module 3, Ports 2, 4, 6 ... 48
```

```
-----
```

Protocol	Port	Total flows
-----	----	-----
tcp	telnet	0
tcp	www	0
tcp	ftp	0
tcpftp-data		0

```
Console> (enable)
```

