Mini Protocol Analyzer

- Prerequisites for the Mini Protocol Analyzer, page 57-1
- Restrictions for the Mini Protocol Analyzer, page 57-1
- Information About the Mini Protocol Analyzer, page 57-2
- How to Configure the Mini Protocol Analyzer, page 57-2
- Configuration Examples for the Mini Protocol Analyzer, page 57-7

**Note**

- For complete syntax and usage information for the commands used in this chapter, see these publications:
- Cisco IOS Release 12.2SY supports only Ethernet interfaces. Cisco IOS Release 12.2SY does not support any WAN features or commands.

**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:
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**Prerequisites for the Mini Protocol Analyzer**

None.

**Restrictions for the Mini Protocol Analyzer**

The PFC and any DFCs provide hardware support for analysis of IPv4 traffic. Analysis of low volume IPv6 traffic is supported in software.
Information About the Mini Protocol Analyzer

The Mini Protocol Analyzer captures network traffic from a SPAN session and stores the captured packets in a local memory buffer. Using the provided filtering options, you can limit the captured packets to:

- Packets from selected VLANs, ACLs, or MAC addresses.
- Packets of a specific EtherType.
- Packets of a specified packet size.

You can start and stop the capture using immediate commands, or you can schedule the capture to begin at a specified date and time.

The captured data can be displayed on the console, stored to a local file system, or exported to an external server using normal file transfer protocols. The format of the captured file is libpcap, which is supported by many packet analysis and sniffer programs. Details of this format can be found at the following URL:

http://www.tcpdump.org/

By default, only the first 68 bytes of each packet are captured.

How to Configure the Mini Protocol Analyzer

- Configuring a Capture Session, page 57-2
- Filtering the Packets to be Captured, page 57-4
- Starting and Stopping a Capture, page 57-5
- Displaying and Exporting the Capture Buffer, page 57-7

Configuring a Capture Session

To configure a capture session using the Mini Protocol Analyzer, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Router# configure terminal Enter global configuration mode.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Router(config)# [no] monitor session number type capture Configures a SPAN session number with packets directed to the processor for capture. Enters capture session configuration mode. The session number range is 1 to 80. The no prefix removes the session.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Router(config-mon-capture)# buffer-size buf_size (Optional) Sets the size in KB of the capture buffer. The range is 32-65535 KB; the default is 2048 KB.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Router(config-mon-capture)# description session_description (Optional) Describes the capture session. The description can be up to 240 characters and cannot contain special characters. If the description contains spaces, it must be enclosed in quotation marks(&quot;&quot;).</td>
</tr>
</tbody>
</table>
## Chapter 57  Mini Protocol Analyzer

### How to Configure the Mini Protocol Analyzer

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 5</td>
<td>Router(config-mon-capture)# rate-limit pps</td>
</tr>
<tr>
<td>Step 6</td>
<td>Router(config-mon-capture)# source {{interface (single_interface</td>
</tr>
<tr>
<td>Step 7</td>
<td>Router(config-mon-capture)# exit</td>
</tr>
</tbody>
</table>

- Only one capture session is supported; multiple simultaneous capture sessions cannot be configured.
- The **source interface** command argument is either a single interface, or a range of interfaces described by two interface numbers (the lesser one first, separated by a dash), or a comma-separated list of interfaces and ranges.

  **Note** When configuring a source interface list, you must enter a space before and after the comma. When configuring a source interface range, you must enter a space before and after the dash.

- The **source vlan** command argument is either a single VLAN number from 1 through 4094 (except reserved VLANs), or a range of VLANs described by two VLAN numbers (the lesser one first, separated by a dash), or a list of VLANs and ranges.

  **Note** When configuring a source VLAN list, do not enter a space before or after the comma. When configuring a source VLAN range, do not enter a space before or after the dash. Note that this requirement differs from the requirement for source interface lists and ranges.

- Data capture does not begin when the capture session is configured. The capture is started by the **monitor capture start** or **monitor capture schedule** command described in the “Starting and Stopping a Capture” section on page 57-5.
- Although the capture buffer is linear by default, it can be made circular as a run-time option in the **monitor capture start** or **monitor capture schedule** command.
- When no hardware rate limit registers are available, the capture session is disabled.
- The source VLAN cannot be changed if a VLAN filter is configured. Remove any VLAN filters before changing the source VLAN.
Filtering the Packets to be Captured

To filter the packets to be captured by the Mini Protocol Analyzer, perform this task in capture session configuration mode:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Router(config-mon-capture)# <code>filter access-group</code> *(acl_number</td>
</tr>
<tr>
<td>Step 2</td>
<td>Router(config-mon-capture)# <code>filter vlan</code> *(vlan_ID</td>
</tr>
<tr>
<td>Step 3</td>
<td>Router(config-mon-capture)# <code>filter ethertype</code> <em>type</em> (Optional) Captures only packets of the specified EtherType. The <em>type</em> can be specified in decimal, hex, or octal. <strong>Note</strong> Configure <em>type</em> as 0x86dd to filter IPv6 traffic. Analysis of low volume IPv6 traffic is supported in software.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Router(config-mon-capture)# <code>filter length</code> <em>min_len</em> <em>[max_len]</em> (Optional) Captures only packets whose size is between <em>min_len</em> and <em>max_len</em>, inclusive. If <em>max_len</em> is not specified, only packets of exactly size <em>min_len</em> will be captured. The range for <em>min_len</em> is 0 to 9216 bytes and the range for <em>max_len</em> is 1 to 9216 bytes.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Router(config-mon-capture)# <code>filter mac-address</code> <em>mac_addr</em> (Optional) Captures only packets from the specified MAC address.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Router(config-mon-capture)# <code>end</code> Exits the configuration mode.</td>
</tr>
</tbody>
</table>

- Several options are provided for filtering the packets to be captured. Filtering by ACL and VLAN is performed in hardware before any rate-limiting is applied; all other filters are executed in software. Software filtering can decrease the capture rate.
- The `filter vlan` argument is either a single VLAN number from 1 through 4094 (except reserved VLANs), or a range of VLANs described by two VLAN numbers (the lesser one first, separated by a dash), or a list of VLANs and ranges.

**Note** When configuring a filter VLAN list, you must enter a space before and after the comma. When configuring a filter VLAN range, you must enter a space before and after the dash. Note that this requirement differs from the requirement for source VLAN lists and ranges described in the preceding section.

- To enter an EtherType as a decimal number, enter the number (1 to 65535) with no leading zero. To enter a hexadecimal number, precede four hexadecimal characters with the prefix 0x. To enter an octal number, enter numeric digits (0 to 7) with a leading zero. For example, the 802.1Q EtherType can be entered in decimal notation as 33024, in hexadecimal as 0x8100, or in octal as 0100400.
• Enter a MAC address as three 2-byte values in dotted hexadecimal format. An example is 0123.4567.89ab.

• The `no` keyword removes the filter.

**Note**  After removing a VLAN filter using the `no` keyword, you must exit configuration mode, reenter the capture configuration mode, and issue the `source vlan` command before making other capture configuration changes.

• When you configure a VLAN filter, the capture source or destination must be a VLAN. When you configure a port filter, the capture source or destination must be a port.

## Starting and Stopping a Capture

The commands to start and stop a capture are not stored as configuration settings. These commands are executed from the console in EXEC mode. You can start a capture immediately or you can set a future date and time for the capture to start. The capture ends when one of the following conditions occurs:

• A stop or clear command is entered from the console.
• The capture buffer becomes full, unless it is configured as a circular buffer.
• The optionally specified number of seconds has elapsed.
• The optionally specified number of packets has been captured.

When the capture stops, the SPAN session is ended and no further capture session packets are forwarded to the processor.

When starting a packet capture, you have the option to override some configured settings.
To start, stop, or cancel a capture, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Starts a capture with optional run-time configuration changes. The capture can start immediately or it can start at a specified time and date.</td>
</tr>
<tr>
<td>Router# monitor capture [buffer size buf_size][length cap_len][linear</td>
<td>circular][filter acl_number</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Stops the capture.</td>
</tr>
<tr>
<td>Router# monitor capture stop</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Clears any run-time configuration settings, clears any pending scheduled capture, and clears the capture buffer. The filter option clears only the run-time filter settings.</td>
</tr>
<tr>
<td>Router# monitor capture clear [filter]</td>
<td></td>
</tr>
</tbody>
</table>

When using these commands, note the following information:

- The format for time and date is hh:mm:ss dd mmm yyy. The hour is specified in 24-hour notation, and the month is specified by a three-letter abbreviation. For example, to set a capture starting time of 7:30 pm on October 31, 2006, use the notation 19:30:00 31 oct 2006. The time zone is GMT.
- When you specify a capture filter ACL in the start command, the new ACL will not override any configured ACLs. The new ACL will execute in software.
Displaying and Exporting the Capture Buffer

To display the captured packets or information about the capture session, or to export the captured packets for analysis, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Router# show monitor capture</td>
</tr>
<tr>
<td>Step 2</td>
<td>Router# show monitor capture status</td>
</tr>
<tr>
<td>Step 3</td>
<td>Router# show monitor capture buffer [start [end]] [detail][dump [nowrap [dump_length]] [acl acl_number</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>Router# show monitor capture buffer [start [end]] brief [acl acl_number</td>
</tr>
<tr>
<td>Step 5</td>
<td>Router# monitor capture export buffer url</td>
</tr>
</tbody>
</table>

Configuration Examples for the Mini Protocol Analyzer

- General Configuration Examples, page 57-8
- Filtering Configuration Examples, page 57-9
- Operation Examples, page 57-10
- Display Examples, page 57-10
General Configuration Examples

This example shows how to minimally configure the Mini Protocol Analyzer:

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# monitor session 1 type capture
Router(config-mon-capture)# end

Router# show mon cap
Capture instance [1] :
======================
Capture Session ID : 1
Session status : up
rate-limit value : 10000
redirect index : 0x807
buffer-size : 2097152
capture state : OFF
capture mode : Linear
capture length : 68

Router#

This example shows how to configure the buffer size, session description, and rate limit:

Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# monitor session 1 type capture
Router(config-mon-capture)# buffer-size 4096
Router(config-mon-capture)# description “Capture from ports, no filtering.”
Router(config-mon-capture)# rate-limit 20000
Router(config-mon-capture)# end
Router#
Router# show monitor capture
Capture instance [1] :
======================
Capture Session ID : 1
Session status : up
rate-limit value : 20000
redirect index : 0x807
buffer-size : 4194304
capture state : OFF
capture mode : Linear
capture length : 68

Router#

This example shows how to configure the source as a mixed list of ports:

Router(config-mon-capture)# source interface gig 3/1 - 3 , gig 3/5

This example shows how to configure the source as a mixed list of VLANs:

Router(config-mon-capture)# source vlan 123,234-245
Filtering Configuration Examples

This example shows how to configure for capturing packets with the following attributes:

- The packets belong to VLANs 123 or 234 through 245
- The packets are of 802.1Q EtherType (hexadecimal 0x8100, decimal 33024)
- The packet size is exactly 8192 bytes
- The source MAC address is 01:23:45:67:89:ab
- The packets conform to ACL number 99

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config) monitor session 1 type capture
Router(config-mon-capture) source vlan 123,234-245
Router(config-mon-capture) filter ethertype 0x8100
Router(config-mon-capture) filter length 8192
Router(config-mon-capture) filter mac-address 0123.4567.89ab
Router(config-mon-capture) filter access-group 99
Router(config-mon-capture) end
```

```
Router# show monitor capture
Capture instance [1] :
=================================
Capture Session ID : 1
Session status : up
rate-limit value : 20000
redirect index : 0x7E07
Capture vlan : 1019
buffer-size : 4194304
capture state : OFF
capture mode : Linear
capture length : 68
Sw Filters :
  ethertype : 33024
  src mac : 0123.4567.89ab
Hw acl : 99
```

```
Router# show monitor session 1
Session 1
--------
Type : Capture Session
Description : capture from ports
Source VLANs :
  Both : 123,234-245
Capture buffer size : 4096 KB
Capture rate-limit value : 20000
Capture filters :
  ethertype : 33024
  src mac : 0123.4567.89ab
  acl : 99

Egress SPAN Replication State:
  Operational mode : Centralized
  Configured mode : Distributed (default)
```

Router#
This example shows how to capture packets whose size is less than 128 bytes:
```
Router(config-mon-capture)# filter length 0 128
```
This example shows how to capture packets whose size is more than 256 bytes:
```
Router(config-mon-capture)# filter length 256 9216
```

## Operation Examples

This example shows how to start and stop a capture:
```
Router# monitor capture start
Router# monitor capture stop
Router#
```

This example shows how to start a capture to end after 60 seconds:
```
Router# monitor capture start for 60 seconds
Router#
```

This example shows how to start a capture at a future date and time:
```
Router# monitor capture schedule at 11:22:33 30 jun 2008
capture will start at : <11:22:33 UTC Mon Jun 30 2008> after 32465825 secs
Router#
```

This example shows how to start a capture with options to override the buffer size and to change to a circular buffer:
```
Router# monitor capture buffer size 65535 circular start
Router#
```

This example shows how to export the capture buffer to an external server and a local disk:
```
Router# monitor capture export buffer tftp://server/user/capture_file.cap
Router# monitor capture export buffer disk1:capture_file.cap
```

## Display Examples

- Displaying the Configuration, page 57-10
- Displaying the Capture Session Status, page 57-11
- Displaying the Capture Buffer Contents, page 57-12

### Displaying the Configuration

To display the capture session configuration, enter the `show monitor capture` command.
```
Router# show monitor capture
Capture instance [1] :
======================
Capture Session ID : 1
Session status     : up
rate-limit value   : 10000
redirect index     : 0x807
buffer-size        : 2097152
capture state      : OFF
capture mode       : Linear
```

---

Cisco IOS Software Configuration Guide, Release 12.2SY

57-10
Chapter 57      Mini Protocol Analyzer

Configuration Examples for the Mini Protocol Analyzer

Capture length : 68

This example shows how to display more details using the `show monitor session n` command:

Router# show monitor session 1
Session 1
---------
Type : Capture Session
Source Ports :
    Both : Gi3/1-3,Gi3/5
Capture buffer size : 32 KB
Capture filters : None

Egress SPAN Replication State:
Operational mode : Centralized
Configured mode : Distributed (default)

This example shows how to display the full details using the `show monitor session n detail` command:

Router# show monitor session 1 detail
Session 1
---------
Type : Capture Session
Description : -
Source Ports :
    RX Only : None
    TX Only : None
    Both : Gi3/1-3,Gi3/5
Source VLANs :
    RX Only : None
    TX Only : None
    Both : None
Source RSPAN VLAN : None
Destination Ports : None
Filter VLANs : None
Dest RSPAN VLAN : None
Source IP Address : None
Source IP VRF : None
Source ERSPAN ID : None
Destination IP Address : None
Destination IP VRF : None
Destination ERSPAN ID : None
Origin IP Address : None
IP QOS PREC : 0
IP TTL : 255
Capture dst_cpu_id : 1
Capture vlan : 0
Capture buffer size : 32 KB
Capture rate-limit value : 10000
Capture filters : None

Egress SPAN Replication State:
Operational mode : Centralized
Configured mode : Distributed (default)

Displaying the Capture Session Status

To display the capture session status, enter the `show monitor capture status` command.

Router# show monitor capture status
capture state : ON
Displaying the Capture Buffer Contents

To display the capture session contents, enter the `show monitor capture buffer` command. These examples show the resulting display using several options of this command:

Router# `show monitor capture buffer`
1  IP: s=10.12.0.5 , d=224.0.0.10, len 60
2  346 0180.e200.000e 0012.44d8.5000 88CC 020707526F7e
3  60  ffff.ffff.ffff 0012.44d8.5000 0806 00010800060
5  IP: s=7.0.84.23 , d=224.0.0.5, len 116
6  IP: s=10.12.0.1 , d=224.0.0.10, len 60

Router# `show monitor capture buffer detail`
1  Arrival time : 09:44:30 UTC Fri Nov 17 2006
Packet Length : 74 , Capture Length : 68
Ethernet II : 0100.5e00.000a 0008.a4c8.c038 0800
IP: s=10.12.0.5 , d=224.0.0.10, len 60, proto=88
2  Arrival time : 09:44:31 UTC Fri Nov 17 2006
Packet Length : 346 , Capture Length : 68
346 0180.e200.000e 0012.44d8.5000 88CC 020707526F757463031

Router# `show monitor capture buffer dump`
1  74 0100.5e00.000a 0008.a4c8.c038 0800 45C0003C000000
2  346 0180.e200.000e 0012.44d8.5000 88CC 020707526F757465720415
3  60 0180.e200.000e 0004.c999.06c5 0026 42420300000000
4  60  ffff.ffff.ffff 0012.44d8.5000 0806 00010800060400

Router# `show monitor capture buffer dump nowrap`
1  74 0100.5e00.000a 0008.a4c8.c038 0800 45C0003C000000
2  346 0180.e200.000e 0012.44d8.5000 88CC 020707526F757465720415
3  60 0180.e200.000e 0004.c999.06c5 0026 42420300000000
4  60  ffff.ffff.ffff 0012.44d8.5000 0806 00010800060400
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