Configuring Traffic Mirroring

This module describes the configuration of the traffic mirroring feature. Traffic mirroring is sometimes called port mirroring, or switched port analyzer (SPAN).

Feature History for Traffic Mirroring

Release	Modification
Release 6.3.1	The local SPAN feature was introduced.

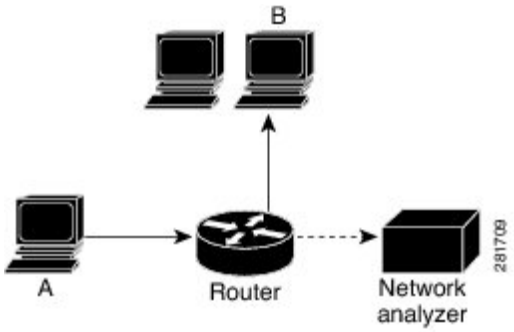
Introduction to Traffic Mirroring

Switched Port Analyzer (SPAN), which is also called port mirroring, or traffic mirroring enables you to monitor network traffic passing in, or out of, a set of ports. You can then pass this traffic to a destination port on the same router.

Traffic mirroring copies traffic from one or more source ports and sends the copied traffic to one or more destinations for analysis by a network analyzer or other monitoring device. However, traffic from one source port can be copied to only one destination port. Traffic mirroring does not affect the flow of traffic on the source ports, and allows the mirrored traffic to be sent to a destination port.

For example, you need to attach a traffic analyzer to the router if you want to capture Ethernet traffic that is sent by host A to host B. Traffic between host A and host B is also seen on the destination port.

Figure 1: Traffic Mirroring Operation



When local traffic mirroring is enabled, the traffic analyzer is attached directly to the port of the same router that is configured to receive a copy of every packet that host A sends. This port is called a traffic mirroring port. The other sections of this document describe how you can fine tune this feature.

Traffic Mirroring Types

The following types of traffic mirroring are supported:

- **Local traffic mirroring**: This is the most basic form of traffic mirroring. The network analyzer or sniffer is attached directly to the destination interface. In other words, all monitored ports are located on the same router as the destination port.
- **Layer 2 or Layer 3 traffic mirroring**: Both Layer 2 and Layer 3 source ports can be mirrored.
- **ACL-based traffic mirroring**: Traffic is mirrored based on the configuration of the interface ACL.

  You can mirror traffic based on the definition of an interface access control list. When you are mirroring Layer 3 traffic, the ACL is configured using the **ipv4 access-list** or the **ipv6 access-list** command with the **capture** option. The **permit** and **deny** commands determine the behavior of regular traffic. The **capture** option designates the packet is to be mirrored to the destination port, and it is supported only on permit type of access control entries (ACEs).

Note Prior to Release 6.5.1, ACL-based traffic mirroring required the use of UDK (User-Defined TCAM Key) with the **enable-capture** option so that the **capture** option can be configured in the ACL.

Restrictions for Traffic Mirroring

- A maximum of 100 source ports/L2 subinterfaces per session are supported.
- Egress mirroring is supported on best effort basis. All the changes made to the source packets may not be reflected in the mirrored packets at the destination port.
- A maximum of up to four sessions are supported, based on the source interface directions.

Configuring Local Traffic Mirroring

The following task describes how to configure local traffic mirroring with physical ports used as the source port.

Note For physical ports, you must configure the **port-level** option of the **monitor-session test direction rx-only port-level** command.

```
Router# configure
Router(config)# monitor-session mon1
Router(config-mon)# destination interface HundredGigE0/1/0/15
Router(config-mon)# exit
Router(config)# interface HundredGigE 0/1/0/1
Router(config-if)# monitor-session mon1 port-level direction rx-only
Router(config-if)# commit
```

The following task describes how to configure local traffic mirroring with L2 sub-interface used as the source port.

```
Router(config)# interface tenGigE 0/0/0/0.1 l2transport
Router(config-subif)# encapsulation dot1q 1000
Router(config-subif)# monitor-session test direction rx-only
Router(config-if-mon)# commit
```

Verification

To verify the status information about configured traffic mirroring sessions, use the **show monitor-session status** command in EXEC mode.

This example shows sample output of the **show monitor-session** command with the **status** keyword:

```
Router# show monitor-session status
Monitor-session ms1
Destination interface HundredGigE0/0/1/2
================================================================================
Source Interface      Dir   Status
--------------------- ----  ------------------------------------------------
Hu0/0/1/3.100         Rx    Operational
Gi0/0/0/5 (port)      Both  Operational
Hu0/0/1/3 (port)      Both  Operational

Router# show monitor-session status detail
Monitor-session ms1
  Destination interface HundredGigE0/0/1/2
  Source Interfaces
  -----------------
  HundredGigE0/0/1/3.100
    Direction:  Rx-only
    Port level: False
    ACL match:  Disabled
    Portion:    Full packet
    Interval:   Mirror all packets
    Status:     Operational
  GigabitEthernet0/0/0/5
    Direction:  Both
    Port level: True
```

```
    ACL match:  Disabled
    Portion:    Full packet
    Interval:   Mirror all packets
    Status:     Operational
  HundredGigE0/0/1/3
    Direction:  Both
    Port level: True
    ACL match:  Disabled
    Portion:    Full packet
    Interval:   Mirror all packets
    Status:     Operational

Router# show monitor-session status error
Monitor-session ms1
Destination interface HundredGigE0/0/1/2
================================================================================
Source Interface      Dir   Status
--------------------- ----  ------------------------------------------------
```

Additional Information on Traffic Mirroring

Traffic Mirroring Terminology

- Ingress Traffic — Traffic that comes into the router.
- Egress Traffic — Traffic that goes out of the router.
- Source (SPAN) interface — An interface that is monitored using the SPAN feature.
- Source port—A port that is monitored with the use of traffic mirroring. It is also called a monitored port.
- Destination port—A port that monitors source ports, usually where a network analyzer is connected. It is also called a monitoring port.
- Monitor session—A designation for a collection of SPAN configurations consisting of a single destination and, potentially, one or many source interfaces.

Characteristics of Source Port

A source port, also called a monitored port, is a routed port that you monitor for network traffic analysis. In a single traffic mirroring session, you can monitor source port traffic. The NCS 5000 Series Router supports a maximum of up to 100 source ports.

A source port has these characteristics:

- Physical ports are supported. It can be any data port type, such as 100 Gigabit Ethernet or 10 Gigabit Ethernet.
- L2 sub-interfaces can be configured as source ports.
- Each source port can be monitored in only one traffic mirroring session.
- When a port is used as a source port, the same port cannot be used as a destination port.

- Each source port can be configured with a direction (ingress, egress, or both) to monitor for local traffic mirroring.

Characteristics of Monitor Session

A monitor session is a collection of traffic mirroring configurations consisting of a single destination and, potentially, many source interfaces. For any given monitor session, the traffic from the source interfaces (called *source ports*) is sent to the monitoring port or destination port. If there are more than one source port in a monitoring session, the traffic from the several mirrored traffic streams is combined at the destination port. The result is that the traffic that comes out of the destination port is a combination of the traffic from one or more source ports.

Monitor sessions have these characteristics:

- Maximum number of monitor sessions supported can vary from 2 to 4, based on the directions (rx| tx| both) we enable for the sessions.

  The following table summarizes the maximum number of monitor sessions supported for various combinations of sessions direction.

Combinations of Sessions Direction	Maximum Number of Sessions Supported
{both, both}	2
{rx|tx, rx|tx, both}	3
{rx|tx, rx|tx, rx|tx, rx|tx}	4

- A single monitor session can have only one destination port.
- A single destination port can belong to only one monitor session.
- A monitor session can have a maximum of 100 source ports.

Characteristics of Destination Port

Each session must have a destination port that receives a copy of the traffic from the source ports.

A destination port has these characteristics:

- A destination port must reside on the same router as the source port for local traffic mirroring.
- A destination port for local mirroring can be any Ethernet physical port. It can be a Layer 2 or Layer 3 transport interface.
- At any one time, a destination port can participate in only one traffic mirroring session. A destination port in one traffic mirroring session cannot be a destination port for a second traffic mirroring session. In other words, no two monitor sessions can have the same destination port.
- A destination port cannot also be a source port.