CHAPTER 48

Configuring Local SPAN, RSPAN, and ERSPAN

This chapter describes how to configure local Switched Port Analyzer (SPAN), remote SPAN (RSPAN), and Encapsulated RSPAN (ERSPAN) on the Cisco 7600 series routers. Policy Feature Card 3 (PFC3) supports ERSPAN (see the "ERSPAN Guidelines and Restrictions" section on page 48-10).

Note

- For complete syntax and usage information for the commands used in this chapter, refer to the Cisco 7600 Series Routers Command References at this URL:

  http://www.cisco.com/en/US/products/hw/routers/ps368/prod_command_reference_list.html

- Shared port adapter (SPA) ports and FlexWAN ports do not support SPAN, RSPAN, or ERSPAN.

This chapter consists of these sections:

- Understanding How Local SPAN, RSPAN, and ERSPAN Work, page 48-1
- Local SPAN, RSPAN, and ERSPAN Configuration Guidelines and Restrictions, page 48-6
- Configuring Local SPAN, RSPAN, and ERSPAN, page 48-11

Understanding How Local SPAN, RSPAN, and ERSPAN Work

These sections describe how local SPAN, RSPAN, and ERSPAN work:

- Local SPAN, RSPAN, and ERSPAN Overview, page 48-1
- Local SPAN, RSPAN, and ERSPAN Sources, page 48-5
- Local SPAN, RSPAN, and ERSPAN Destinations, page 48-6

Local SPAN, RSPAN, and ERSPAN Overview

SPAN copies traffic from one or more ports, one or more EtherChannels, or one or more VLANs, and sends the monitored traffic to one or more destinations such as a SwitchProbe device or other remote monitoring (RMON) probe.

SPAN does not affect the switching of traffic on sources. You must dedicate the destination for SPAN use. The SPAN-generated copies of traffic compete with user traffic for router resources.

These sections provide an overview of local SPAN, RSPAN, and ERSPAN:

- Local SPAN Overview, page 48-2
- RSPAN Overview, page 48-2
- ERSPAN Overview, page 48-3
- Understanding the Traffic Monitored at SPAN Sources, page 48-4

Local SPAN Overview

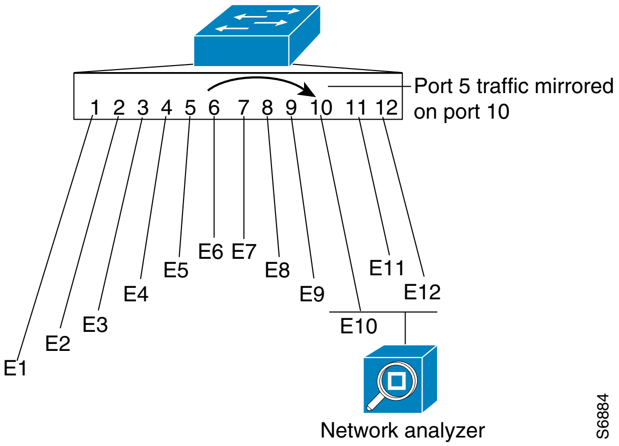
A local SPAN session is an association of source ports and source VLANs with one or more destinations. You configure a local SPAN session on a single router. Local SPAN does not have separate source and destination sessions.

Local SPAN sessions do not copy locally sourced RSPAN VLAN traffic from source trunk ports that carry RSPAN VLANs. Local SPAN sessions do not copy locally sourced RSPAN generic routing encapsulation (GRE)-encapsulated traffic from source ports.

Each local SPAN session can have either ports or VLANs as sources, but not both.

Local SPAN copies traffic from one or more source ports in any VLAN or from one or more VLANs to a destination for analysis (see Figure 48-1). For example, as shown in Figure 48-1, all traffic on Ethernet port 5 (the source port) is copied to Ethernet port 10. A network analyzer on Ethernet port 10 receives all traffic from Ethernet port 5 without being physically attached to Ethernet port 5.

Figure 48-1 Example SPAN Configuration



RSPAN Overview

RSPAN supports source ports, source VLANs, and destinations on different routers. This provides remote monitoring of multiple routers across your network (see Figure 48-2). RSPAN uses a Layer 2 VLAN to carry SPAN traffic between routers.

RSPAN consists of an RSPAN source session, an RSPAN VLAN, and an RSPAN destination session. You separately configure RSPAN source sessions and destination sessions on different routers. To configure an RSPAN source session on one router, you associate a set of source ports or VLANs with an RSPAN VLAN. To configure an RSPAN destination session on another router, you associate the destinations with the RSPAN VLAN.

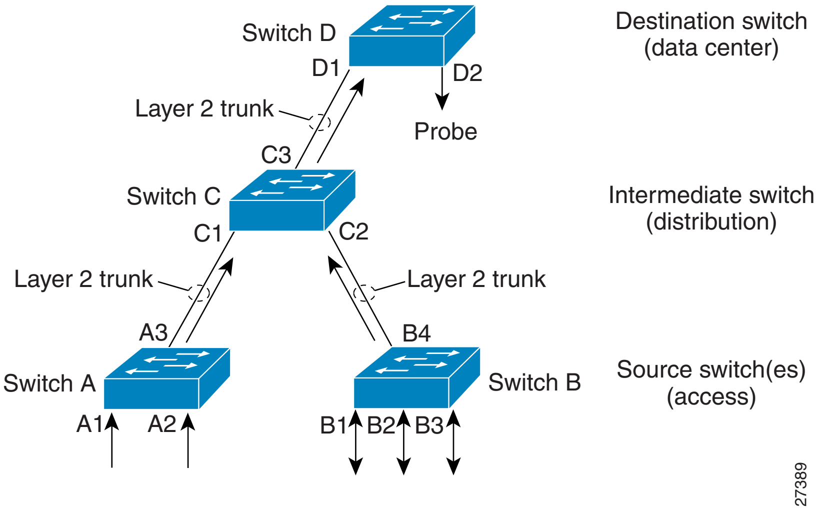
The traffic for each RSPAN session is carried as Layer 2 nonroutable traffic over a user-specified RSPAN VLAN that is dedicated for that RSPAN session in all participating routers. All participating routers must be trunk-connected at Layer 2.

RSPAN source sessions do not copy locally sourced RSPAN VLAN traffic from source trunk ports that carry RSPAN VLANs. RSPAN source sessions do not copy locally sourced RSPAN GRE-encapsulated traffic from source ports.

Each RSPAN source session can have either ports or VLANs as sources, but not both.

The RSPAN source session copies traffic from the source ports or source VLANs and switches the traffic over the RSPAN VLAN to the RSPAN destination session. The RSPAN destination session switches the traffic to the destination ports.

Figure 48-2 RSPAN Configuration



ERSPAN Overview

ERSPAN supports source ports, source VLANs, and destinations on different routers. This provides remote monitoring of multiple routers across your network (see Figure 48-3). ERSPAN uses a GRE tunnel to carry traffic between routers.

ERSPAN consists of an ERSPAN source session, routable ERSPAN GRE-encapsulated traffic, and an ERSPAN destination session. You separately configure ERSPAN source sessions and destination sessions on different routers.

To configure an ERSPAN source session on one router, you associate a set of source ports or VLANs with a destination IP address, ERSPAN ID number, and optionally with a VPN routing and forwarding (VRF) name. To configure an ERSPAN destination session on another router, you associate the destination ports with the source IP address, ERSPAN ID number, and optionally with a VRF name.

ERSPAN source sessions do not copy locally sourced RSPAN VLAN traffic from source trunk ports that carry RSPAN VLANs. ERSPAN source sessions do not copy locally sourced ERSPAN GRE-encapsulated traffic from source ports.

Each ERSPAN source session can have either ports or VLANs as sources, but not both.

The ERSPAN source session copies traffic from the source ports or source VLANs and forwards the traffic using routable GRE-encapsulated packets to the ERSPAN destination session. The ERSPAN destination session switches the traffic to the destinations.

Figure 48-3 ERSPAN Configuration

Understanding the Traffic Monitored at SPAN Sources

These sections describe the traffic that local SPAN, RSPAN, and ERSPAN sources can monitor:

- Monitored Traffic Direction, page 48-4
- Monitored Traffic Type, page 48-4
- Duplicate Traffic, page 48-4

Monitored Traffic Direction

You can configure local SPAN sessions, RSPAN source sessions, and ERSPAN source sessions to monitor ingress traffic (called ingress SPAN), or to monitor egress traffic (called egress SPAN), or to monitor traffic flowing in both directions.

Ingress SPAN copies traffic received by the source ports and VLANs for analysis at the destination port. Egress SPAN copies traffic transmitted from the source ports and VLANs. When you enter the **both** keyword, SPAN copies the traffic received and transmitted by the source ports and VLANs to the destination port.

Monitored Traffic Type

By default, local SPAN and ERSPAN monitor all traffic, including multicast and bridge protocol data unit (BPDU) frames. RSPAN does not support BPDU monitoring.

Duplicate Traffic

In some configurations, SPAN sends multiple copies of the same source traffic to the destination. For example, in a configuration with a bidirectional SPAN session (both ingress and egress) for two SPAN sources, called s1 and s2, to a SPAN destination, called d1, if a packet enters the router through s1 and is sent for egress from the switch to s2, ingress SPAN at s1 sends a copy of the packet to SPAN destination d1 and egress SPAN at s2 sends a copy of the packet to SPAN destination d1. If the packet was Layer 2 switched from s1 to s2, both SPAN packets would be the same. If the packet was Layer 3 switched from s1 to s2, the Layer 3 rewrite would alter the source and destination Layer 2 addresses, in which case the SPAN packets would be different.

Local SPAN, RSPAN, and ERSPAN Sources

These sections describe local SPAN, RSPAN, and ERSPAN sources:

- Source Ports and EtherChannels, page 48-5
- Source VLANs, page 48-5

Source Ports and EtherChannels

A source port or EtherChannel is a port or EtherChannel monitored for traffic analysis. You can configure both Layer 2 and Layer 3 ports as SPAN sources. SPAN can monitor one or more source ports or EtherChannels in a single SPAN session. You can configure ports or EtherChannels in any VLAN as SPAN sources. Trunk ports or EtherChannels can be configured as sources and mixed with nontrunk sources. SPAN does not copy the encapsulation from a source trunk port.

Source VLANs

A source VLAN is a VLAN monitored for traffic analysis. VLAN-based SPAN (VSPAN) uses a VLAN as the SPAN source. All the ports and EtherChannels in the source VLANs become sources of SPAN traffic.

Note Layer 3 VLAN interfaces on source VLANs are not sources of SPAN traffic. Traffic that enters a VLAN through a Layer 3 VLAN interface is monitored when it is transmitted from the router through an egress port of EtherChannel that is in the source VLAN.

Local SPAN, RSPAN, and ERSPAN Destinations

A SPAN destination is a Layer 2 or Layer 3 LAN port or, with Release 12.2(33)SRC and later, an Etherchannel, to which local SPAN, RSPAN, or ERSPAN sends traffic for analysis. When you configure a port or EtherChannel as a SPAN destination, it is dedicated for use only by the SPAN feature.

Destination EtherChannels do not support the Port Aggregation Protocol (PAgP) or Link Aggregation Control Protocol (LACP) EtherChannel protocols; only the on mode is supported, with all EtherChannel protocol support disabled.

There is no requirement that the member links of a destination EtherChannel be connected to a device that supports EtherChannels. For example, you can connect the member links to separate network analyzers. See Chapter 12, "Configuring EtherChannels" for more information about EtherChannels.

Destinations, by default, cannot receive any traffic. With Release 12.2(33)SRC and later, you can configure Layer 2 destinations to receive traffic from any attached devices.

Destinations, by default, do not transmit anything except SPAN traffic. Layer 2 destinations that you have configured to receive traffic can be configured to learn the Layer 2 address of any devices attached to the destination and transmit traffic that is addressed to the devices.

You can configure trunk ports as destinations, which allows trunk destinations to transmit encapsulated traffic. You can use allowed VLAN lists to configure destination trunk VLAN filtering.

Local SPAN, RSPAN, and ERSPAN Configuration Guidelines and Restrictions

These sections describe local SPAN, RSPAN, and ERSPAN configuration guidelines and restrictions:

Feature Incompatibilities

These feature incompatibilities exist with local SPAN, RSPAN, and ERSPAN:

- ES line cards do not support SPAN sessions on EVC.
- Unknown Unicast Flood Blocking (UUFB) ports cannot be RSPAN or Local SPAN egress-only destinations. (CSCsj27695)
- EoMPLS ports cannot be SPAN sources. (CSCed51245)
- A port-channel interface (an EtherChannel) can be a SPAN source, but you cannot configure active member ports of an EtherChannel as SPAN source ports. Inactive member ports of an EtherChannel can be configured as SPAN sources, but they are put into the suspended state and carry no traffic.

- You cannot configure active member ports of an EtherChannel as SPAN destination ports. Inactive member ports of an EtherChannel can be configured as SPAN destination ports but they are put into the suspended state and carry no traffic.
- These features are incompatible with SPAN destination ports:
  - Private VLANs
  - IEEE 802.1X port-based authentication
  - Port security
  - Spanning Tree Protocol (STP) and related features (PortFast, PortFast BPDU Filtering, BPDU Guard, UplinkFast, BackboneFast, EtherChannel Guard, Root Guard, Loop Guard)
  - VLAN Trunking Protocol (VTP)
  - Dynamic Trunking Protocol (DTP)
  - IEEE 802.1Q tunneling
- ES modules do not support SPAN session on Ethernet virtual circuits (EVC).

Note SPAN destination ports can participate in IEEE 802.3Z Flow Control.

Local SPAN, RSPAN, and ERSPAN Session Limits

For Release 12.2(33)SRC and later, Table 48-1 shows the PFC3 local SPAN, RSPAN, and ERSPAN session limits. Table 48-2 shows the PFC3 local SPAN, RSPAN, and ERSPAN source and destination limits.

Table 48-1 PFC3 Local SPAN, RSPAN, and ERSPAN Session LImits

	Local and Source Sessions		Destination Sessions	
Total Sessions	Local SPAN, RSPAN Source, ERSPAN Source Ingress or Egress or Both	Local SPAN Egress-Only	RSPAN Destination Sessions	ERSPAN Destination Sessions
80	2	14	64	23

Table 48-2 PFC3 Local SPAN, RSPAN, and ERSPAN Source and Destination LImits

	In Each Local SPAN Session	In Each RSPAN Source Session	In Each ERSPAN Source Session	In Each RSPAN Destination Session	In Each ERSPAN Destination Session
Egress or “both” sources	128	128	128	—	—
Ingress sources	128	128	128	—	—
RSPAN and ERSPAN destination session sources	—	—	—	1 RSPAN VLAN	1 IP address
Destinations per session	64	1 RSPAN VLAN	1 IP address	64	64

Local SPAN, RSPAN, and ERSPAN Guidelines and Restrictions

These guidelines and restrictions apply to local SPAN, RSPAN, and ERSPAN:

- A SPAN destination that is copying traffic from a single egress SPAN source port sends only egress traffic to the network analyzer. However, if you configure more than one egress SPAN source port, the traffic that is sent to the network analyzer also includes these types of ingress traffic that were received from the egress SPAN source ports:
  - Any unicast traffic that is flooded on the VLAN
  - Broadcast and multicast traffic

  This situation occurs because an egress SPAN source port receives these types of traffic from the VLAN but then recognizes itself as the source of the traffic and drops it instead of sending it back to the source from which it was received. Before the traffic is dropped, SPAN copies the traffic and sends it to the SPAN destination. (CSCds22021)
- Entering additional **monitor session** commands does not clear previously configured SPAN parameters. You must enter the **no monitor session** command to clear configured SPAN parameters.
- Connect a network analyzer to the SPAN destination.
- Within a SPAN session, all of the SPAN destinations receive all of the traffic from all of the SPAN sources, except when source-VLAN filtering is configured on the SPAN source.
- You can configure destination trunk VLAN filtering to select which traffic is transmitted from the SPAN destination.
- You can configure both Layer 2 LAN ports (LAN ports configured with the **switchport** command) and Layer 3 LAN ports (LAN ports not configured with the **switchport** command) as sources or destinations.
- You cannot mix individual source ports and source VLANs within a single session.
- If you specify multiple ingress source ports, the ports can belong to different VLANs.
- Within a session, you cannot configure both VLANs as SPAN sources and do source VLAN filtering. You can configure VLANs as SPAN sources or you can do source VLAN filtering of traffic from source ports and EtherChannels, but not both in the same session.
- You cannot configure source VLAN filtering for internal VLANs.
- When enabled, local SPAN, RSPAN, and ERSPAN use any previously entered configuration.
- When you specify sources and do not specify a traffic direction (ingress, egress, or both), “both” is used by default.
- SPAN copies Layer 2 Ethernet frames, but SPAN does not copy source trunk port Inter-Switch Link Protocol (ISL) or 802.1Q tags. You can configure destinations as trunks to send locally tagged traffic to the traffic analyzer.

  Note A destination configured as a trunk tags traffic from a Layer 3 LAN source port with the internal VLAN used by the Layer 3 LAN port.

- Local SPAN sessions, RSPAN source sessions, and ERSPAN source sessions do not copy locally sourced RSPAN VLAN traffic from source trunk ports that carry RSPAN VLANs.
- Local SPAN sessions, RSPAN source sessions, and ERSPAN source sessions do not copy locally sourced ERSPAN GRE-encapsulated traffic from source ports.

- A port or EtherChannel can be a SPAN destination for only one SPAN session. SPAN sessions cannot share destinations.
- SPAN destinations cannot be SPAN sources.
- Sub-interfaces cannot be added as source interface in SPAN sessions.
- SPAN of an interface with various sub-interfaces configured is not supported.
- Destination ports never participate in any spanning tree instance. Local SPAN includes BPDUs in the monitored traffic, so any BPDUs seen on the destination are from the source. RSPAN does not support BPDU monitoring.
- All packets sent through the router for transmission from a port configured as an egress source are copied to the destination, including packets that do not exit the router through the egress port. This is because STP has put the egress port into the blocking state or, on an egress trunk port because STP has put the VLAN into the blocking state on the trunk port.

VSPAN Guidelines and Restrictions

Note Local SPAN, RSPAN, and ERSPAN all support VSPAN.

These are VSPAN guidelines and restrictions:

- VSPAN sessions do not support VLAN filtering.
- For VSPAN sessions with both ingress and egress configured, two packets are forwarded from the destination to the analyzer if the packets get switched on the same VLAN (one as ingress traffic from the ingress port and one as egress traffic from the egress port).
- VSPAN only monitors traffic that leaves or enters Layer 2 ports in the VLAN.
  - If you configure a VLAN as an ingress source and traffic gets routed into the monitored VLAN, the routed traffic is not monitored because it never appears as ingress traffic entering a Layer 2 port in the VLAN.
  - If you configure a VLAN as an egress source and traffic gets routed out of the monitored VLAN, the routed traffic is not monitored because it never appears as egress traffic leaving a Layer 2 port in the VLAN.

RSPAN Guidelines and Restrictions

These are RSPAN guidelines and restrictions:

- All participating routers must be connected by Layer 2 trunks.
- Any network device that supports RSPAN VLANs can be an RSPAN intermediate device.
- Networks impose no limit on the number of RSPAN VLANs that the networks carry.
- Intermediate network devices might impose limits on the number of RSPAN VLANs that they can support.
- You must configure the RSPAN VLANs in all source, intermediate, and destination network devices. If enabled, the VTP can propagate configuration of VLANs numbered 1 through 1024 as RSPAN VLANs. You must manually configure VLANs numbered higher than 1024 as RSPAN VLANs on all source, intermediate, and destination network devices.

- If you enable VTP and VTP pruning, RSPAN traffic is pruned in the trunks to prevent the unwanted flooding of RSPAN traffic across the network.
- RSPAN VLANs can be used only for RSPAN traffic.
- Do not configure a VLAN used to carry management traffic as an RSPAN VLAN.
- Do not assign access ports to RSPAN VLANs. RSPAN puts access ports in an RSPAN VLAN into the suspended state.
- Do not configure any ports in an RSPAN VLAN except trunk ports selected to carry RSPAN traffic.
- MAC address learning is disabled in the RSPAN VLAN.
- You can use output access control lists (ACLs) on the RSPAN VLAN in the RSPAN source router to filter the traffic sent to an RSPAN destination.
- RSPAN does not support BPDU monitoring.
- Do not configure RSPAN VLANs as sources in VSPAN sessions.
- You can configure any VLAN as an RSPAN VLAN as long as all participating network devices support configuration of RSPAN VLANs and you use the same RSPAN VLAN for each RSPAN session in all participating network devices.

ERSPAN Guidelines and Restrictions

These are ERSPAN guidelines and restrictions:

- ERSPAN is supported on the PFC3B, PFC3BXL, PFC3C, and PFC3CXL.
- A WS-SUP720 (a Supervisor Engine 720 manufactured with a PFC3A), can only support ERSPAN if it has hardware version 3.2 or later. Enter the **show module version | include WS-SUP720-BASE** command to display the hardware version. For example:

```
Router# show module version | include WS-SUP720-BASE
 7    2  WS-SUP720-BASE     SAD075301SZ Hw :3.2
```

- For ERSPAN packets, the “protocol type” field value in the GRE header is 0x88BE.
- The payload of a Layer 3 ERSPAN packet is a copied Layer 2 Ethernet frame, excluding any ISL or 802.1Q tags.
- ERSPAN adds a 50-byte header to each copied Layer 2 Ethernet frame and replaces the 4-byte cyclic redundancy check (CRC) trailer.
- ERSPAN supports jumbo frames that contain Layer 3 packets of up to 9,202 bytes. If the length of the copied Layer 2 Ethernet frame is greater than 9,170 (9,152-byte Layer 3 packet), ERSPAN truncates the copied Layer 2 Ethernet frame to create a 9,202-byte ERSPAN Layer 3 packet.
- Regardless of any configured MTU size, ERSPAN creates Layer 3 packets that can be as long as 9,202 bytes. ERSPAN traffic might be dropped by any interface in the network that enforces an MTU size smaller than 9,202 bytes.
- With the default MTU size (1,500 bytes), if the length of the copied Layer 2 Ethernet frame is greater than 1,468 bytes (1,450-byte Layer 3 packet), the ERSPAN traffic is dropped by any interface in the network that enforces the 1,500-byte MTU size.

Note The **mtu** interface command and the **system jumbomtu** command (see the “Configuring Jumbo Frame Support” section on page 8-8) set the maximum Layer 3 packet size (default is 1,500 bytes, maximum is 9,216 bytes).

- All participating routers must be connected at Layer 3 and the network path must support the size of the ERSPAN traffic.
- ERSPAN does not support packet fragmentation. The "do not fragment" bit is set in the IP header of ERSPAN packets. ERSPAN destination sessions cannot reassemble fragmented ERSPAN packets.
- ERSPAN traffic is subject to the traffic load conditions of the network. You can set the ERSPAN packet IP precedence or Differentiated Services Code Point (DSCP) value to prioritize ERSPAN traffic for Quality of Service (QoS).
- The only supported destination for ERSPAN traffic is an ERSPAN destination session on a PFC3.
- All ERSPAN source sessions on a router must use the same origin IP address, configured with the **origin ip address** command (see the "Configuring ERSPAN Source Sessions" section on page 48-25).
- All ERSPAN destination sessions on a switch must use the same IP address on the same destination interface. You enter the destination interface IP address with the **ip address** command (see the "Configuring ERSPAN Destination Sessions" section on page 48-27).
- The ERSPAN source session's destination IP address, which must be configured on an interface on the destination router, is the source of traffic that an ERSPAN destination session sends to the destinations. You configure the same address in both the source and destination sessions with the **ip address** command.
- The ERSPAN ID differentiates the ERSPAN traffic arriving at the same destination IP address from various different ERSPAN source sessions.
- ERSPAN egress is not supported on EVC ports.

Configuring Local SPAN, RSPAN, and ERSPAN

These sections describe how to configure local SPAN, RSPAN, and ERSPAN:

- Configuring a Destination as an Unconditional Trunk (Optional), page 48-12
- Configuring Destination Trunk VLAN Filtering (Optional), page 48-12
- Configuring Destination Port Permit Lists (Optional), page 48-14
- Configuring Local SPAN, page 48-14
- Configuring RSPAN, page 48-18
- Configuring ERSPAN, page 48-25
- Configuring ERSPAN, page 48-25
- Configuring Source VLAN Filtering for Local SPAN and RSPAN, page 48-29
- Verifying the Configuration, page 48-30
- Configuration Examples, page 48-30

Configuring a Destination as an Unconditional Trunk (Optional)

To tag the monitored traffic as it leaves a destination, configure the destination as a trunk before you configure it as a destination.

To configure the destination as a trunk, perform this task in interface configuration mode:

	Command	Purpose
Step 1	`Router#` **`configure terminal`**	Enters global configuration mode.
Step 2	`Router(config)#` **`interface`** `{`*`type slot`*`/`*`port`* `|` **`port-channel`** *`number`*`}`	Selects the interface to configure. *type*—**ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**
Step 3	`Router(config-if)#` **`switchport`**	Configures the interface for Layer 2 switching (required only if the LAN port is not already configured for Layer 2 switching).
Step 4	`Router(config-if)#` **`switchport trunk encapsulation`** `{`**`isl`** `|` **`dot1q`**`}`	Configures the encapsulation, which configures the interface as either an ISL or 802.1Q trunk.
Step 5	`Router(config-if)#` **`switchport mode trunk`**	Configures the port to trunk unconditionally.

This example shows how to configure a port as an unconditional IEEE 802.1Q trunk:

```
Router# configure terminal
Router(config)# interface fastethernet 5/12
Router(config-if)# switchport
Router(config-if)# switchport trunk encapsulation dot1q
Router(config-if)# switchport mode trunk
```

Note Releases earlier than Release 12.2(33)SRC required you to enter the **switchport nonegotiate** command when you configured a destination port as an unconditional trunk. This requirement has been removed in Release 12.2(33)SRC and later.

Configuring Destination Trunk VLAN Filtering (Optional)

Note In addition to filtering VLANs on a trunk, you can also apply the allowed VLAN list to access ports.

Destination trunk VLAN filtering is applied at the destination. Destination trunk VLAN filtering does not reduce the amount of traffic being sent from the SPAN sources to the SPAN destinations.

When a destination is a trunk, you can use the list of VLANs allowed on the trunk to filter the traffic transmitted from the destination. (CSCeb01318)

Destination trunk VLAN filtering removes the restriction that, within a SPAN session, all destinations receive all the traffic from all the sources. Destination trunk VLAN filtering allows you to select, on a per-VLAN basis, the traffic that is transmitted from each destination trunk to the network analyzer.

To configure destination trunk VLAN filtering on a destination trunk, perform this task:

	Command	Purpose
Step 1	`Router# `**`configure terminal`**	Enters global configuration mode.
Step 2	`Router(config)# `**`interface`**` `*`type slot`***`/`***`port`*	Selects the destination trunk port to configure. *type*—**ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**
Step 3	`Router(config-if)# `**`switchport trunk allowed vlan`**` {`**`add`**` | `**`except`**` | `**`none`**` | `**`remove`**`} `*`vlan`*` [,`*`vlan`*`[,`*`vlan`*`[,...]]`	Configures the list of VLANs allowed on the trunk.

When configuring the list of VLANs allowed on a destination trunk port, note the following information:

- The *vlan* parameter is either a single VLAN number from 1 through 4094, or a range of VLANs described by two VLAN numbers, the lesser one first, separated by a dash. Do not enter any spaces between comma-separated *vlan* parameters or in dash-specified ranges.
- All VLANs are allowed by default.
- To remove all VLANs from the allowed list, enter the **switchport trunk allowed vlan none** command.
- To add VLANs to the allowed list, enter the **switchport trunk allowed vlan add** command.
- You can modify the allowed VLAN list without removing the SPAN configuration.

This example shows the configuration of a local SPAN session that has several VLANs as sources and several trunk ports as destinations, with destination trunk port VLAN filtering that filters the SPAN traffic so that each destination trunk port transmits the traffic from one VLAN:

```
interface GigabitEthernet1/1
description SPAN destination interface for VLAN 10
no ip address
switchport
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 10
switchport mode trunk
switchport nonegotiate
!
interface GigabitEthernet1/2
description SPAN destination interface for VLAN 11
no ip address
switchport
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 11
switchport mode trunk
switchport nonegotiate
!
interface GigabitEthernet1/3
description SPAN destination interface for VLAN 12
no ip address
switchport
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 12
switchport mode trunk
switchport nonegotiate
!
```

```
interface GigabitEthernet1/4
description SPAN destination interface for VLAN 13
no ip address
switchport
switchport trunk encapsulation dot1q
switchport trunk allowed vlan 13
switchport mode trunk
switchport nonegotiate
!
monitor session 1 source vlan 10 - 13
monitor session 1 destination interface Gi1/1 - 4
```

Configuring Destination Port Permit Lists (Optional)

To prevent accidental configuration of ports as destinations, you can create a permit list of the ports that are valid for use as destinations. With a destination port permit list configured, you can only configure the ports in the permit list as destinations.

To configure a destination port permit list, perform this task:

	Command	Purpose
Step 1	`Router#` **`configure terminal`**	Enters global configuration mode.
Step 2	`Router(config)#` **`monitor permit-list`**	Enables use of the destination port permit list.
Step 3	`Router(config)#` **`monitor permit-list destination interface`** *`type slot`***`/`***`port`*`[`**`-`***`port`*`]` `[`**`,`** *`type slot/port`* **`-`** *`port`*`]`	Configures a destination port permit list or adds to an existing destination port permit list. *type*—**ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**
Step 4	`Router(config)#` **`do show monitor permit-list`**	Verifies the configuration.

This example shows how to configure a destination port permit list that includes Gigabit Ethernet ports 5/1 through 5/4 and 6/1:

```
Router# configure terminal
Router(config)# monitor permit-list
Router(config)# monitor permit-list destination interface gigabitethernet 5/1-4,
gigabitethernet 6/1
```

This example shows how to verify the configuration:

```
Router(config)# do show monitor permit-list
 SPAN Permit-list       :Admin Enabled
 Permit-list ports      :Gi5/1-4,Gi6/1
```

Configuring Local SPAN

These sections describe how to configure local SPAN sessions:

- Configuring Local SPAN (SPAN Configuration Mode), page 48-15
- Configuring Local SPAN (Global Configuration Mode), page 48-17

Configuring Local SPAN (SPAN Configuration Mode)

Note To tag the monitored traffic as it leaves a destination, you must configure the destination to trunk unconditionally before you configure it as a destination (see the "Configuring a Destination as an Unconditional Trunk (Optional)" section on page 48-12).

To configure a local SPAN session in SPAN configuration mode, perform this task:

	Command	Purpose
Step 1	`Router# configure terminal`	Enters global configuration mode.
Step 2	`Router(config)# monitor session local_span_session_number type [local | local-tx]`	Configures a local SPAN session number and enters local SPAN session configuration mode. • Enter the **local** keyword to configure ingress or egress or both SPAN sessions. • Enter the **local-tx** keyword to configure egress-only SPAN sessions.
Step 3	`Router(config-mon-local)# description session_description`	(Optional) Describes the local SPAN session.
Step 4	`Router(config-mon-local)# source {single_interface | interface_list | interface_range | mixed_interface_list | single_vlan | vlan_list | vlan_range | mixed_vlan_list} [rx | tx | both]`	Associates the local SPAN session number with source ports or VLANs, and selects the traffic direction to be monitored. **Note** When you enter the **local-tx** keyword in the **monitor session** command, the **rx** and **both** keywords are not available and the **tx** keyword is required. To make best use of the available SPAN sessions, it is always preferable to configure **local-tx** sessions instead of **local** sessions with the **tx** keyword.
Step 5	`Router(config-mon-local)# filter {single_vlan | vlan_list | vlan_range | mixed_vlan_list}`	(Optional) Configures source VLAN filtering when the local SPAN source is a trunk port.
Step 6	`Router(config-mon-local)# destination {single_interface | interface_list | interface_range | mixed_interface_list} [ingress [learning]]`	Associates the local SPAN session number with the destinations.
Step 7	`Router(config-mon-local)# no shutdown`	Activates the local SPAN session. **Note** The **no shutdown** and **shutdown** commands are not supported for local-tx egress-only SPAN sessions.
Step 8	`Router(config-mon-local)# end`	Exits configuration mode.

When configuring monitor sessions, note the following information:

- *session_description* can be up to 240 characters and cannot contain special characters; with Release 12.2(33)SRC and later, the description can contain spaces.

Note You can enter 240 characters after the **description** command.

- *local_span_session_number* can range from 1 to 80.
- *single_interface* is:
  - **interface** *type slot/port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

    Note Destination port channel interfaces must be configured with the **channel-group** *group_num* **mode on** command and the **no channel-protocol** command. See the "Configuring EtherChannels" section on page 12-7.

- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

  Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot/first_port - last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- *single_vlan* is the ID number of a single VLAN.
- *vlan_list* is *single_vlan* , *single_vlan* , *single_vlan* ...
- *vlan_range* is *first_vlan_ID - last_vlan_ID*.
- *mixed_vlan_list* is, in any order, *single_vlan* , *vlan_range* , ...
- Enter the **ingress** keyword to configure destinations to receive traffic from attached devices.
- Enter the **learning** keyword to enable MAC address learning from the destinations, which allows the switch to transmit traffic that is addresses to devices attached to the destinations.

  When configuring destinations with the **ingress** and **learning** keywords, not the following:
  - Configure the destinations for Layer 2 switching. See the "Configuring LAN Interfaces for Layer 2 Switching" section on page 10-6.
  - If the destination is a trunk and the attached device transmits tagged traffic back to the router, you can use either ISL or 802.1Q trunking.
  - If the destination is a trunk and the attached device transmits untagged traffic back to the router, use 802.1Q trunking with the native VLAN configured to accept the traffic from the attached device.
  - Do not configure the destination with Layer 3 addresses. Use a VLAN interface to route traffic to and from devices attached to destinations.
  - Destinations are held in the down state. To route the traffic to and from attached devices, configure an additional active Layer 2 port in the VLAN to keep the VLAN interface up.

This example shows how to configure session 1 to monitor ingress traffic from Gigabit Ethernet port 1/1 and configure Gigabit Ethernet port 1/2 as the destination:

```
Router# configure terminal
Router(config)# monitor session 1 type local
Router(config-mon-local)# source interface gigabitethernet 1/1 rx
Router(config-mon-local)# destination interface gigabitethernet 1/2
Router(config-mon-local)# no shutdown
Router(config-mon-local)# end
```

For additional examples, see the "Configuration Examples" section on page 48-30 .

Configuring Local SPAN (Global Configuration Mode)

> **Note** To tag the monitored traffic as it leaves a destination, you must configure the destination to trunk unconditionally before you configure it as a destination (see the "Configuring a Destination as an Unconditional Trunk (Optional)" section on page 48-12).
>
> You can configure up to two local SPAN sessions in global configuration mode.
>
> You can use SPAN configuration mode for all SPAN configuration tasks.
>
> You must use SPAN configuration mode to configure the supported maximum number of SPAN sessions.

Local SPAN does not use separate source and destination sessions. To configure a local SPAN session, configure local SPAN sources and destinations with the same session number. To configure a local SPAN session, perform this task:

	Command	Purpose
Step 1	`Router# `**`configure terminal`**	Enters global configuration mode.
Step 2	`Router(config)# `**`monitor session`** *`local_span_session_number`* **`source`** `{`*`single_interface`*` | `*`interface_list`*` | `*`interface_range`*` | `*`mixed_interface_list`*` | `*`single_vlan`*` | `*`vlan_list`*` | `*`vlan_range`*` | `*`mixed_vlan_list`*`} [`**`rx`**` | `**`tx`**` | `**`both`**`]`	Associates the local SPAN source session number with the source ports or VLANs and selects the traffic direction to be monitored.
Step 3	`Router(config)# `**`monitor session`** *`local_span_session_number`* **`destination`** `{`*`single_interface`*` | `*`interface_list`*` | `*`interface_range`*` | `*`mixed_interface_list`*`} [`**`ingress`**` [`**`learning`**`]]`	Associates the local SPAN session number and the destinations.

When configuring local SPAN sessions, note the following information:

- *local_span_session_number* can range from 1 to 66.
- *single_interface* is:
  - **interface** *type slot*/*port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

    > **Note** Destination port channel interfaces must be configured with the **channel-group** *group_num* **mode on** command and the **no channel-protocol** command. See the "Configuring EtherChannels" section on page 12-7.

- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

  Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot/first_port - last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- *single_vlan* is the ID number of a single VLAN.
- *vlan_list* is *single_vlan* , *single_vlan* , *single_vlan* ...
- *vlan_range* is *first_vlan_ID* - *last_vlan_ID*.
- *mixed_vlan_list* is, in any order, *single_vlan* , *vlan_range* , ...
- Enter the **ingress** keyword to configure destinations to receive traffic from attached services.
- Enter the **learning** keyword to enable MAC address learning from the destinations, which allows the router to transmit traffic that is addressed to devices attached to the destinations.

  When configuring destinations with the **ingress** and **learning** keywords, note the following:

  - Configure the destinations for Layer 2 switching. See the "Configuring LAN Interfaces for Layer 2 Switching" section on page 8-6.
  - If the destination is a trunk and the attached device transmits tagged traffic back to the router, you can use either ISL or 802.1Q trunking.
  - If the destination is a trunk and the attached device transmits untagged traffic back to the router, use 802.1Q trunking with the native VLAN configured to accept the traffic from the attached device.
  - Do not configure the destination with Layer 3 addresses. Use a VLAN interface to route traffic to and from devices attached to destinations.
  - Destinations are held in the down state. To route the traffic to and from attached devices, configure an additional active Layer 2 port in the VLAN to keep the VLAN interface up.

This example shows how to configure Fast Ethernet port 5/1 as a bidirectional source for session 1:

```
Router(config)# monitor session 1 source interface fastethernet 5/1
```

This example shows how to configure Fast Ethernet port 5/48 as the destination for SPAN session 1:

```
Router(config)# monitor session 1 destination interface fastethernet 5/48
```

For additional examples, see the "Configuration Examples" section on page 48-30.

Configuring RSPAN

RSPAN uses a source session on one router and a destination session on a different router. These sections describe how to configure RSPAN sessions:

- Configuring RSPAN VLANs, page 48-19
- Configuring RSPAN Sessions (SPAN Configuration Mode), page 48-19
- Configuring RSPAN Sessions (Global Configuration Mode), page 48-22

Configuring RSPAN VLANs

To configure a VLAN as an RSPAN VLAN, perform this task:

	Command	Purpose
Step 1	`Router# configure terminal`	Enters global configuration mode.
Step 2	`Router(config)# vlan vlan_ID{[-vlan_ID]|[,vlan_ID])`	Creates or modifies an Ethernet VLAN, a range of Ethernet VLANs, or several Ethernet VLANs specified in a comma-separated list (do not enter space characters).
Step 3	`Router(config-vlan)# remote-span`	Configures the VLAN as an RSPAN VLAN.
Step 4	`Router(config-vlan)# end`	Updates the VLAN database and returns to privileged EXEC mode.

Configuring RSPAN Sessions (SPAN Configuration Mode)

These sections describe how to configure RSPAN sessions in SPAN configuration mode:

- Configuring RSPAN Source Sessions in SPAN Configuration Mode, page 48-19
- Configuring RSPAN Destination Sessions in SPAN Configuration Mode, page 48-20

Configuring RSPAN Source Sessions in SPAN Configuration Mode

To configure an RSPAN source session in SPAN configuration mode, perform this task:

	Command	Purpose
Step 1	`Router# configure terminal`	Enters global configuration mode.
Step 2	`Router(config)# monitor session RSPAN_source_session_number type rspan-source`	Configures an RSPAN source session number and enters RSPAN source session configuration mode for the session.
Step 3	`Router(config-mon-rspan-src)# description session_description`	(Optional) Describes the RSPAN source session.
Step 4	`Router(config-mon-rspan-src)# source {single_interface | interface_list | interface_range | mixed_interface_list | single_vlan | vlan_list | vlan_range | mixed_vlan_list [rx | tx | both]}`	Associates the RSPAN source session number with source ports or VLANs, and selects the traffic direction to be monitored.
Step 5	`Router(config-mon-rspan-src)# filter {single_vlan | vlan_list | vlan_range | mixed_vlan_list}`	(Optional) Configures source VLAN filtering when the RSPAN source is a trunk port.
Step 6	`Router(config-mon-rspan-src)# destination remote vlan rspan_vlan_ID`	Associates the RSPAN source session number session number with the RSPAN VLAN.
Step 7	`Router(config-mon-rspan-src)# no shutdown`	Activates the RSPAN source session.
Step 8	`Router(config-mon-rspan-src)# end`	Exits configuration mode.

When configuring RSPAN source sessions, note the following information:

- *session_description* can be up to 240 characters and cannot contain special characters; with Release 12.2(33)SRC and later, the description can contain spaces.

Note You can enter 240 characters after the **description** command.

- *RSPAN_source_span_session_number* can range from 1 to 80.
- *single_interface* is:
  - **interface** *type slot/port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port_channel** *number*
- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot/first_port* - *last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- *single_vlan* is the ID number of a single VLAN.
- *vlan_list* is *single_vlan* , *single_vlan* , *single_vlan* ...
- *vlan_range* is *first_vlan_ID* - *last_vlan_ID*.
- *mixed_vlan_list* is, in any order, *single_vlan* , *vlan_range* , ...
- See the "Configuring RSPAN VLANs" section on page 48-19 for information about the RSPAN VLAN ID.

This example shows how to configure session 1 to monitor bidirectional traffic from Gigabit Ethernet port 1/1:

```
Router# configure terminal
Router(config)# monitor session 1 type rspan-source
Router(config-mon-rspan-src)# source interface gigabitethernet 1/1
Router(config-mon-rspan-src)# destination remote vlan 2
Router(config-mon-rspan-src)# no shutdown
Router(config-mon-rspan-src)# end
```

For additional examples, see the "Configuration Examples" section on page 48-30.

Configuring RSPAN Destination Sessions in SPAN Configuration Mode

Note To tag the monitored traffic, you must configure the port to trunk unconditionally before you configure it as a destination (see the "Configuring a Destination as an Unconditional Trunk (Optional)" section on page 48-12).

You can configure an RSPAN destination session on the RSPAN source session router to monitor RSPAN traffic locally.

To configure an RSPAN destination session, perform this task:

	Command	Purpose
Step 1	Router# **configure terminal**	Enters global configuration mode.
Step 2	Router(config)# **monitor session** *RSPAN_source_session_number* **type rspan-destination**	Configures an RSPAN destination session number and enters RSPAN destination session configuration mode for the session.
Step 3	Router(config-mon-rspan-dst)# **description** *session_description*	(Optional) Describes the RSPAN destination session.
Step 4	Router(config-mon-rspan-dst)# **source remote vlan** rspan_vlan_ID	Associates the RSPAN destination session number RSPAN VLAN.
Step 5	Router(config-mon-rspan-dst)# **destination** {single_interface | interface_list | interface_range | mixed_interface_list} [**ingress** [**learning**]]	Associates the RSPAN destination session number with the RSPAN VLAN.
Step 6	Router(config-mon-rspan-dst)# **end**	Exits configuration mode.

When configuring RSPAN destination sessions, note the following information:

- *RSPAN_destination_session_number* can range from 1 to 80.
- *single_interface* is:
  - **interface** *type slot*/*port*; type is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

    Note Destination port channel interfaces must be configured with the **channel-group** *group_num* **mode on** command and the **no channel-protocol** command. See the "Configuring EtherChannels" section on page 12-7.

- *interface_list* is *single_interface* **,** *single_interface* **,** *single_interface* ...

  Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot*/*first_port* - *last_port*.
- *mixed_interface_list* is, in any order, *single_interface* **,** *interface_range* **,** ...
- Enter the **ingress** keyword to configure destinations to receive traffic from attached devices.
- Enter the **learning** keyword to enable MAC address learning from the destinations, which allows the switch to transmit traffic that is addressed to devices attached to the destinations.

  When configuring destinations with the **ingress** and **learning** keywords, note the following:

  - Configure the destinations for Layer 2 switching. See the "Configuring LAN Interfaces for Layer 2 Switching" section on page 10-6.
  - If the destination is a trunk and the attached device transmits tagged traffic back to the switch, you can use either ISL or 802.1Q trunking.
  - If the destination is a trunk and the attached device transmits untagged traffic back to the switch, use 802.1Q trunking with the native VLAN configured to accept the traffic from the attached device.

  - Do not configure the destinations with Layer 3 addresses. Use a VLAN interface to route traffic to and from devices attached to destinations.
  - Destinations are held in the down state. To route the traffic to and from attached devices, configure an additional active Layer 2 port in the VLAN to keep the VLAN interface up.
- The **no shutdown** and **shutdown** commands are not supported for RSPAN destination sessions.

This example shows how to configure RSPAN VLAN 2 as the source for session 1 and Gigabit Ethernet port 1/2 as the destination:

```
Router# configure terminal
Router(config)# monitor session 1 type rspan-destination
Router(config-rspan-dst)# source remote vlan2
Router(config-rspan-dst)# destination interface gigabitethernet 1/2
Router(config-rspan-dst)# end
```

For additional examples, see the “Configuration Examples” section on page 48-30.

Configuring RSPAN Sessions (Global Configuration Mode)

These sections describe how to configure RSPAN sessions in global configuration mode

- Configuring RSPAN Source Sessions in Global Configuration Mode, page 48-22
- Configuring RSPAN Destination Sessions in Global Configuration Mode, page 48-23

Configuring RSPAN Source Sessions in Global Configuration Mode

To configure an RSPAN source session in global configuration mode, perform this task:

	Command	Purpose
Step 1	Router# **configure terminal**	Enters global configuration mode.
Step 2	Router(config)# **monitor session** *RSPAN_source_session_number* **source** {*single_interface* | *interface_list* | *interface_range* | *mixed_interface_list* | *single_vlan* | *vlan_list* | *vlan_range* | *mixed_vlan_list*} [**rx** | **tx** | **both**]	Associates the RSPAN source number with the source ports or VLANs, and selects the traffic direction to be monitored.
Step 3	Router(config)# **monitor session** *RSPAN_source_session_number* **destination remote vlan** *rspan_vlan_ID*	Associates the RSPAN source session number session number wit the RSPAN VLAN.

When configuring RSPAN source sessions, note the following information:

- To configure RSPAN VLANs, see the “Configuring RSPAN VLANs” section on page 48-19.
- *RSPAN_source_session_number* can range from 1 to 66.
- *single_interface* is:
  - **interface** *type slot/port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*
- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot/first_port - last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- *single_vlan* is the ID number of a single VLAN.
- *vlan_list* is *single_vlan* , *single_vlan* , *single_vlan* ...
- *vlan_range* is *first_vlan_ID - last_vlan_ID*.
- *mixed_vlan_list* is, in any order, *single_vlan* , *vlan_range* , ...
- See the "Configuring RSPAN VLANs" section on page 48-19 for information about the RSPAN VLAN ID.

This example shows how to configure Fast Ethernet port 5/2 as the source for session 2:

```
Router(config)# monitor session 2 source interface fastethernet 5/2
```

This example shows how to configure RSPAN VLAN 200 as the destination for session 2:

```
Router(config)# monitor session 2 destination remote vlan 200
```

For additional examples, see the "Configuration Examples" section on page 48-30.

Configuring RSPAN Destination Sessions in Global Configuration Mode

Note To tag the monitored traffic, you must configure the port to trunk unconditionally before you configure it as a destination (see the "Configuring a Destination as an Unconditional Trunk (Optional)" section on page 48-12).

You can configure an RSPAN destination session on the RSPAN source session router to monitor RSPAN traffic locally.

To configure an RSPAN destination session in global configuration mode, perform this task:

	Command	Purpose
Step 1	Router# **configure terminal**	Enters global configuration mode.
Step 2	Router(config)# **monitor session** *RSPAN_destination_session_number* **source remote vlan** *rspan_vlan_ID*	Associates the RSPAN destination session number with the RSPAN VLAN.
Step 3	Router(config)# **monitor session** *RSPAN_destination_session_number* **destination** {*single_interface* | *interface_list* | *interface_range* | *mixed_interface_list*} [**ingress** {**learning**]]	Associates the RSPAN destination session number with the destinations.

When configuring monitor sessions, not the following information:

- *RSPAN_destination_session_number* can range from 1 to 66.
- See the "Configuring RSPAN VLANs" section on page 48-19 for information about the RSPAN VLAN ID.
- *single_interface* is:
  - **interface** *type slot/port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

    Note Destination port channel interfaces must be configured with the **channel-group** *group_num* **mode on** command and the **no channel-protocol** command. See the "Configuring EtherChannels" section on page 12-7.

- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

  Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot/first_port - last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- Enter the **ingress** keyword to configure destinations to receive traffic from attached devices.
- Enter the **learning** keyword to enable MAC address learning from the destinations, which allows the switch to transmit traffic that is addresses to devices attached to the destinations.

  When configuring destinations with the **ingress** and **learning** keywords, note the following:
  - Configure the destinations for Layer 2 switching. See the "Configuring LAN Interfaces for Layer 2 Switching" section on page 10-6.
  - If the destination is a trunk and the attached device transmits untagged traffic back to the switch, you can use either ISL or 802.1Q trunking.
  - If the destination is a trunk and the attached device transmits untagged traffic back to the switch, use 802.1Q trunking with the native VLAN configured to accept the traffic from the attached device.
  - Do not configure the destinations with Layer 3 addresses. Use a VLAN interface to route traffic to and from devices attached to destinations.
  - Destinations are held in the down state. To route the traffic to and from attached devices, configure an additional active Layer 2 port in the VLAN to keep the VLAN interface up.

This example shows how to configure RSPAN VLAN 200 as the source for session 3:

```
Router(config)# monitor session 3 source remote vlan 200
```

This example shows how to configure Fast Ethernet port 5/47 as the destination for session 3:

```
Router(config)# monitor session 3 destination interface fastethernet 5/4
```

For additional examples, see the "Configuration Examples" section on page 48-30.

Configuring ERSPAN

ERSPAN uses separate source and destination sessions. You configure the source and destination sessions on different routers. These sections describe how to configure ERSPAN sessions:

- Configuring ERSPAN Source Sessions, page 48-25
- Configuring ERSPAN Destination Sessions, page 48-27

Note The PFC3 supports ERSPAN (see the "ERSPAN Guidelines and Restrictions" section on page 48-10).

Configuring ERSPAN Source Sessions

To configure an ERSPAN source session, perform this task:

	Command	Purpose
Step 1	Router# **configure terminal**	Enters global configuration mode.
Step 2	Router(config)# **monitor session** *ERSPAN_source_session_number* **type erspan-source**	Configures an ERSPAN source session number and enters ERSPAN source session configuration mode for the session.
Step 3	Router(config-mon-erspan-src)# **description** *session_description*	(Optional) Describes the ERSPAN source session.
Step 4	Router(config-mon-erspan-src)# **source** {*single_interface* | *interface_list* | *interface_range* | *mixed_interface_list* | *single_vlan* | *vlan_list* | *vlan_range* | *mixed_vlan_list*} [**rx** | **tx** | **both**]	Associates the ERSPAN source session number with the CPU, the source ports, or VLANs, and selects the traffic direction to be monitored.
Step 5	Router(config-mon-erspan-src)# **filter** {*single_vlan* | *vlan_list* | *vlan_range* | *mixed_vlan_list*}	(Optional) Configures source VLAN filtering when the ERSPAN source is a trunk port.
Step 6	Router(config-mon-erspan-src)# **destination**	Enters ERSPAN source session destination configuration mode.
Step 7	Router(config-mon-erspan-src-dst)# **ip address** *ip_address*	Configures the ERSPAN flow destination IP address, which must also be configured on an interface on the destination router and be entered in the ERSPAN destination session configuration (see the "Configuring ERSPAN Destination Sessions" section on page 48-27, Step 6).
Step 8	Router(config-mon-erspan-src-dst)# **erspan-id** *ERSPAN_flow_id*	Configures the ID number used by the source and destination sessions to identify the ERSPAN traffic, which must also be entered in the ERSPAN destination session configuration (see the "Configuring ERSPAN Destination Sessions" section on page 48-27, Step 7).
Step 9	Router(config-mon-erspan-src-dst)# **origin ip address** *ip_address* [**force**]	Configures the IP address used as the source of the ERSPAN traffic.
Step 10	Router(config-mon-erspan-src-dst)# **ip ttl** *ttl_value*	(Optional) Configures the IP time-to-live (TTL) value of the packets in the ERSPAN traffic.
Step 11	Router(config-mon-erspan-src-dst)# **ip prec** *ipp_value*	(Optional) Configures the IP precedence value of the packets in the ERSPAN traffic.

	Command	Purpose
Step 12	`Router(config-mon-erspan-src-dst)# ip dscp dscp_value`	(Optional) Configures the IP DSCP value of the packets in the ERSPAN traffic.
Step 13	`Router(config-mon-erspan-src-dst)# vrf vrf_name`	(Optional) Configures the VRF name to use instead of the global routing table.
Step 14	`Router(config-mon-erspan-src)# no shutdown`	Activates the ERSPAN source session.
Step 15	`Router(config-mon-erspan-src-dst)# end`	Exits configuration mode.

When configuring monitor sessions, note the following information:

- *session_description* can be up to 240 characters and cannot contain special characters. With Release 12.2(33)SRC and later, the description can contain spaces.

  Note You can enter 240 characters after the **description** command.

- *ERSPAN_source_session_number* can range from 1 to 66.
- *single_interface* is:
  - **interface** *type slot*/*port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

    Note Port channel interfaces must be configured with the **channel-group** *group_num* **mode on** command and the **no channel-protocol** command. See the"Configuring EtherChannels" section on page 12-7.

- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

  Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot*/*first_port* - *last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- *single_vlan* is the ID number of a single VLAN.
- *vlan_list* is *single_vlan* , *single_vlan* , *single_vlan* ...
- *vlan_range* is *first_vlan_ID* - *last_vlan_ID*.
- *mixed_vlan_list* is, in any order, *single_vlan* , *vlan_range* , ...
- *ERSPAN_flow_id* can range from 1 to 1023.
- All ERSPAN source sessions on a switch must use the same source IP address. Enter the **origin ip address** *ip_address* **force** command to change the origin IP address configured in all ERSPAN source sessions on the router.
- *ttl_value* can range from 1 to 255.
- *ipp_value* can range from 0 to 7.
- *dscp_value* can range from 0 to 63.

This example shows how to configure session 3 to monitor bidirectional traffic from Gigabit Ethernet port 4/1:

```
Router# configure terminal
Router(config)# monitor session 3 type erspan-source
Router(config-mon-erspan-src)# source interface gigabitethernet 4/1
Router(config-mon-erspan-src)# destination
Router(config-mon-erspan-src-dst)# ip address 10.1.1.1
Router(config-mon-erspan-src-dst)# origin ip address 20.1.1.1
Router(config-mon-erspan-src-dst)# erspan-id 101
Router(config-mon-erspan-src-dst)# end
```

For additional examples, see the "Configuration Examples" section on page 48-30.

Configuring ERSPAN Destination Sessions

Note You cannot monitor ERSPAN traffic locally.

To configure an ERSPAN destination session, perform this task:

	Command	Purpose
Step 1	`Router#` **`configure terminal`**	Enters global configuration mode.
Step 2	`Router(config)#` **`monitor session`** *`ERSPAN_destination_session_number`* **`type erspan-destination`**	Configures an ERSPAN destination session number and enters ERSPAN destination session configuration mode for the session.
Step 3	`Router(config-mon-erspan-dst)#` **`description`** *`session_description`*	(Optional) Describes the ERSPAN destination session.
Step 4	`Router(config-mon-erspan-dst)#` **`destination`** `{`*`single_interface`* `|` *`interface_list`* `|` *`interface_range`* `|` *`mixed_interface_list`*`}` `[`**`ingress`** `[`**`learning`**`]`	Associates the ERSPAN destination session number with the destination ports.
Step 5	`Router(config-mon-erspan-dst)#` **`source`**	Enters ERSPAN destination session source configuration mode.
Step 6	`Router(config-mon-erspan-dst-src)#` **`ip address`** *`ip_address`* `[`**`force`**`]`	Configures the ERSPAN flow destination IP address. This must be an address on a local interface and match the address that you entered in the "Configuring ERSPAN Source Sessions" section on page 48-25, Step 7.
Step 7	`Router(config-mon-erspan-dst-src)#` **`erspan-id`** *`ERSPAN_flow_id`*	Configures the ID number used by the destination and destination sessions to identify the ERSPAN traffic. This must match the ID that you entered in the "Configuring ERSPAN Source Sessions" section on page 48-25, Step 8.
Step 8	`Router(config-mon-erspan-dst-src)#` **`vrf`** *`vrf_name`*	(Optional) Configures the VRF name used instead of the global routing table.
Step 9	`Router(config-mon-erspan-dst)# no shutdown`	Activates the ERSPAN destination session.
Step 10	`Router(config-mon-erspan-dst-src)#` **`end`**	Exits configuration mode.

When configuring monitor sessions, note the following information:

- *ERSPAN_destination_session_number* can range from 1 to 66.
- *single_interface* is:
  - **interface** *type slot/port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

    Note Destination port channel interfaces must be configured with the **channel-group** *group_num* **mode on** command and the **no channel-protocol** command. See the "Configuring EtherChannels" section on page 12-7.

- *interface_list* is *single_interface* , *single_interface* , *single_interface* ...

  Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface_range* is **interface** *type slot/first_port - last_port*.
- *mixed_interface_list* is, in any order, *single_interface* , *interface_range* , ...
- All ERSPAN destination sessions on a switch must use the same IP address on the same destination interface. Enter the **ip address** *ip_address* **force** command to change the IP address configured in all ERSPAN destination sessions on the router.

  Note You must also change all ERSPAN source session destination IP addresses (see the "Configuring ERSPAN Source Sessions" section on page 48-25, Step 7).

- *ERSPAN_flow_id* can range from 1 to 1023.
- Enter the **ingress** keyword to configure destinations to receive traffic from attached devices.
- Enter the **learning** keyword to enable MAC address learning from the destinations, which allows the router to transmit traffic that is addressed to devices attached to the destinations.

  When configuring destinations with the **ingress** and **learning** keywords, note the following:
  - Configure the destinations for Layer 2 switching. See the "Configuring LAN Interfaces for Layer 2 Switching" section on page 10-6.
  - If the destination is a trunk and the attached device transmits traffic back to the router, you can use either ISL or 802.1Q trunking.
  - If the destination is a trunk and the attached device transmits untagged traffic back to the router, use 802.1Q trunking with native VLAN configured to accept the traffic from the attached device.
  - Do not configure the destinations with Layer 3 addresses. Use a VLAN interface to route traffic to and from devices attached to destinations.
  - Destinations are held in the down state. To route the traffic to and from attached devices, configure an additional active Layer 2 port in the VLAN to keep the VLAN interface up.

This example shows how to configure an ERSPAN destination session to send ERSPAN ID 101 traffic arriving at IP address 10.1.1.1 to Gigabit Ethernet port 2/1:

```
Router# configure terminal
Router(config)# monitor session 3 type erspan-destination
Router(config-erspan-dst)# destination interface gigabitethernet 2/1
Router(config-erspan-dst)# source
Router(config-erspan-dst-src)# ip address 10.1.1.1
Router(config-erspan-dst-src)# erspan-id 101
```

For additional examples, see the "Configuration Examples" section on page 48-30.

Configuring Source VLAN Filtering for Local SPAN and RSPAN

Source VLAN filtering monitors specific VLANs when the source is a trunk port.

Note To configure source VLAN filtering for ERSPAN, see the "Configuring ERSPAN" section on page 48-25.

To configure source VLAN filtering when the local SPAN or RSPAN source is a trunk port, perform this task:

	Command	Purpose
Step 1	`Router# `**`configure terminal`**	Enters global configuration mode.
Step 2	`Router(config)# `**`monitor session`** *`session_number`* **`filter`** *`single_vlan`* `|` *`vlan_list`* `|` *`vlan_range`* `|` *`mixed_vlan_list`*	Configures source VLAN filtering when the local SPAN or RSPAN source is a trunk port.

When configuring source VLAN filtering, note the following information:

- *single_vlan* is the ID number of a single VLAN.
- *vlan_list* is *single_vlan* , *single_vlan* , *single_vlan* ...
- *vlan_range* is *first_vlan_ID* - *last_vlan_ID*.
- *mixed_vlan_list* is, in any order, *single_vlan* , *vlan_range* , ...

This example shows how to monitor VLANs 1 through 5 and VLAN 9 when the source is a trunk port:

```
Router(config)# monitor session 2 filter vlan 1 - 5 , 9
```

Verifying the Configuration

To verify the configuration, enter the **show monitor session** command.

This example shows how to verify the configuration of session 2:

```
Router# show monitor session 2
Session 2
------------
Type : Remote Source Session

Source Ports:
    RX Only:       Fa3/1
Dest RSPAN VLAN:   901
Router#
```

This example shows how to display the full details of session 2:

```
Router# show monitor session 2 detail
Session 2
------------
Type : Remote Source Session

Source Ports:
    RX Only:       Fa1/1-3
    TX Only:       None
    Both:          None
Source VLANs:
    RX Only:       None
    TX Only:       None
    Both:          None
Source RSPAN VLAN: None
Destination Ports: None
Filter VLANs:      None
Dest RSPAN VLAN:   901
```

Configuration Examples

This example shows the configuration of RSPAN source session 2:

```
Router(config)# monitor session 2 source interface fastethernet1/1 - 3 rx
Router(config)# monitor session 2 destination remote vlan 901
```

This example shows how to clear the configuration for sessions 1 and 2:

```
Router(config)# no monitor session range 1-2
```

This example shows the configuration of an RSPAN source session with multiple sources:

```
Router(config)# monitor session 2 source interface fastethernet 5/15 , 7/3 rx
Router(config)# monitor session 2 source interface gigabitethernet 1/2 tx
Router(config)# monitor session 2 source interface port-channel 102
Router(config)# monitor session 2 source filter vlan 2 - 3
Router(config)# monitor session 2 destination remote vlan 901
```

This example shows how to remove sources for a session:

```
Router(config)# no monitor session 2 source interface fastethernet 5/15 , 7/3
```

This example shows how to remove options for sources for a session:

```
Router(config)# no monitor session 2 source interface gigabitethernet 1/2
Router(config)# no monitor session 2 source interface port-channel 102 tx
```

This example shows how to remove VLAN filtering for a session:

```
Router(config)# no monitor session 2 filter vlan 3
```

This example shows the configuration of RSPAN destination session 8:

```
Router(config)# monitor session 8 source remote vlan 901
Router(config)# monitor session 8 destination interface fastethernet 1/2 , 2/3
```

This example shows the configuration of ERSPAN source session 12:

```
monitor session 12 type erspan-source
 description SOURCE_SESSION_FOR_VRF_GRAY
 source interface Gi8/48 rx
 destination
  erspan-id 120
  ip address 10.8.1.2
  origin ip address 32.1.1.1
  vrf gray
```

This example shows the configuration of ERSPAN destination session 12:

```
monitor session 12 type erspan-destination
 description DEST_SESSION_FOR_VRF_GRAY
 destination interface Gi4/48
 source
  erspan-id 120
  ip address 10.8.1.2
  vrf gray
```

This example shows the configuration of ERSPAN source session 13:

```
monitor session 13 type erspan-source
 source interface Gi6/1 tx
 destination
  erspan-id 130
  ip address 10.11.1.1
  origin ip address 32.1.1.1
```

This example shows the configuration of ERSPAN destination session 13:

```
monitor session 13 type erspan-destination
 destination interface Gi6/1
 source
  erspan-id 130
  ip address 10.11.1.1
```