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 Catalyst 6500 series switches.

Note

- For complete syntax and usage information for the commands used in this chapter, refer to the *Catalyst Supervisor Engine 32 PISA Cisco IOS Command Reference*, Release 12.2ZY, at this URL:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2ZY/command/reference/cmdref.html
- OSM WAN 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

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

Local SPAN, RSPAN, and ERSPAN Overview

Local SPAN, RSPAN, and ERSPAN sessions allow you to monitor traffic on one or more ports, or one or more VLANs, and send the monitored traffic to one or more destination ports. You can configure per-VLAN filtering on destination trunk ports.

Local SPAN, RSPAN, and ERSPAN all send traffic to a network analyzer such as a SwitchProbe device or other Remote Monitoring (RMON) probe. SPAN does not affect the switching of traffic on source ports or VLANs. SPAN sends a copy of the packets received or transmitted by the source ports and VLANs to the destination port. You must dedicate the destination port for SPAN use.

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

Local SPAN Overview

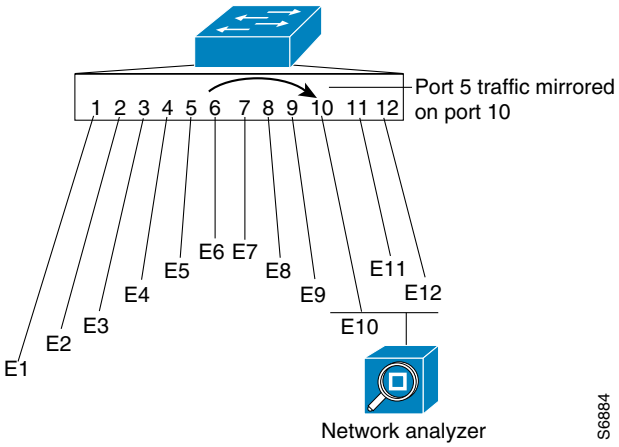
A local SPAN session is an association of source ports and source VLANs with one or more destination ports. You configure a local SPAN session on a single switch. Local SPAN does not have separate source and destination sessions.

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 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 port 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 destination ports on different switches, which provides remote monitoring of multiple switches across your network (see Figure 48-2).

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 switches. To configure an RSPAN source session on one switch, you associate a set of source ports or VLANs with an RSPAN VLAN. To configure an RSPAN destination session on another switch, you associate the destination ports with the RSPAN VLAN.

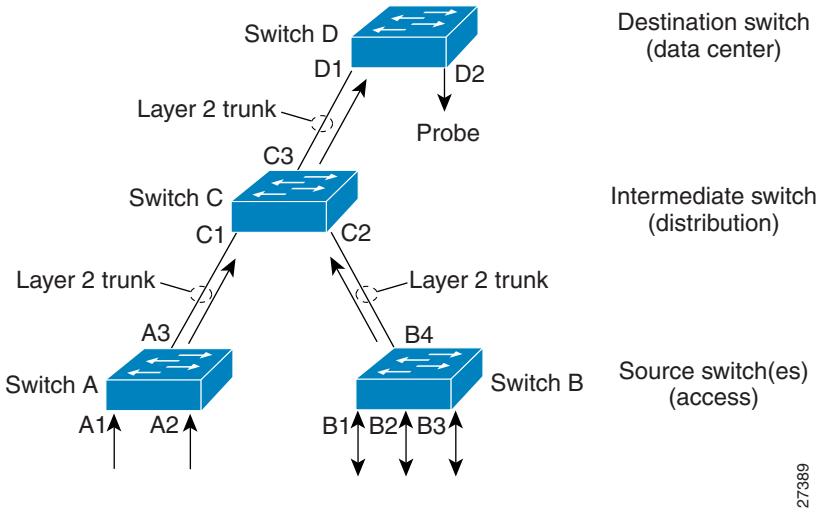
The traffic for each RSPAN session is carried as Layer 2 nonroutable traffic over a user-specified RSPAN VLAN that is dedicated for that RSPAN session in all participating switches. All participating switches must be trunk-connected at Layer 2.

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 destination ports on different switches, which provides remote monitoring of multiple switches across your network (see Figure 48-3).

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 switches.

To configure an ERSPAN source session on one switch, you associate a set of source ports or VLANs with a destination IP address, ERSPAN ID number, and optionally with a VRF name. To configure an ERSPAN destination session on another switch, 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 destination ports.

Figure 48-3 ERSPAN Configuration

Monitored Traffic

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

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

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 port. 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 port, called d1, if a packet enters the switch 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

A source port is a port monitored for traffic analysis. You can configure both switched and routed ports as SPAN source ports. SPAN can monitor one or more source ports in a single SPAN session. You can configure source ports in any VLAN. Trunk ports can be configured as source ports and mixed with nontrunk source ports. 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 in the source VLANs become source ports.

Local SPAN, RSPAN, and ERSPAN Destination Ports

A destination port is a Layer 2 or Layer 3 LAN port to which local SPAN, RSPAN, or ERSPAN sends traffic for analysis.

When you configure a port as a destination port, it can no longer receive any traffic. When you configure a port as a destination port, the port is dedicated for use only by the SPAN feature. A SPAN destination port does not forward any traffic except that required for the SPAN session.

You can configure trunk ports as destination ports, which allows destination trunk ports to transmit encapsulated traffic. For local SPAN, you can configure per-VLAN filtering on destination trunk ports using allowed VLAN lists (see the "Configuring Destination Trunk Port VLAN Filtering" section on page 48-21).

Local SPAN, RSPAN, and ERSPAN Configuration Guidelines and Restrictions

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

Feature Incompatiblities

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

- With a PFC3, 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.
- A port-channel interface (an EtherChannel) cannot be a SPAN destination.
- 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.
- Because SPAN destination ports drop ingress 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 trunk protocol (VTP)
  - Dynamic trunking protocol (DTP)
  - IEEE 802.1Q tunneling

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

Local SPAN, RSPAN, and ERSPAN Session Limits

These are the PFC3 local SPAN, RSPAN, and ERSPAN session limits:

Total Sessions	Local SPAN, RSPAN Source, or ERSPAN Source Sessions	RSPAN Destination Sessions	ERSPAN Destination Sessions
66	2 (ingress or egress or both)	64	23

These are the 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 port that is copying traffic from a single egress SPAN source port sends only egress traffic to the network analyzer. 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 port. (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 ports.
- All the SPAN destination ports receive all of the traffic from all the SPAN sources.

Note You can configure destination trunk port VLAN filtering using allowed VLAN lists (see the “Configuring Destination Trunk Port VLAN Filtering” section on page 48-21).

For local SPAN and RSPAN, you can configure Source VLAN Filtering (see the “Configuring Source VLAN Filtering for Local SPAN and RSPAN” section on page 48-20).

- 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.
- You cannot mix source VLANs and filter VLANs within a session. You can have source VLANs or filter VLANs, but not both at the same time.
- 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 ISL or 802.1Q tags. You can configure destination ports as trunks to send locally tagged traffic to the traffic analyzer.

Note A destination port 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 specified as a destination port in one SPAN session cannot be a destination port for another SPAN session.
- A port configured as a destination port cannot be configured as a source port.
- Destination ports never participate in any spanning tree instance. Local SPAN includes BPDUs in the monitored traffic, so any BPDUs seen on the destination port are from the source port. RSPAN does not support BPDU monitoring.
- All packets sent through the switch for transmission from a port configured as an egress source are copied to the destination port, including packets that do not exit the switch through the port because STP has put the port into the blocking state, or on a 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:

- For VSPAN sessions with both ingress and egress configured, two packets are forwarded from the destination port 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:

- Supervisor Engine 2 does not support RSPAN if you configure an egress SPAN source for a local SPAN session.
- Supervisor Engine 2 does not support egress SPAN sources for local SPAN if you configure RSPAN.
- All participating switches must be trunk-connected at Layer 2.
- 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 VLAN Trunking Protocol (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 switch 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:

- 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 7-10) set the maximum Layer 3 packet size (default is 1,500 bytes, maximum is 9,216 bytes).

- All participating switches 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 DSCP value to prioritize ERSPAN traffic for QoS.
- The only supported destination for ERSPAN traffic is an ERSPAN destination session on a PFC3.
- All ERSPAN source sessions on a switch must use the same origin IP address, configured with the **origin ip address** command (see the "Configuring ERSPAN Source Sessions" section on page 48-16).
- 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 48-18).
- The ERSPAN source session's destination IP address, which must be configured on an interface on the destination switch, is the source of traffic that an ERSPAN destination session sends to the destination ports. 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.

Configuring Local SPAN, RSPAN, and ERSPAN

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

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)# no monitor permit-list`	Disables use of the destination port permit list.
Step 4	`Router(config)# monitor permit-list destination interface` *type*[1] *slot/port*`[-`*port*`] [, `*type*[1] *slot/port* `- `*port*`]`	Configures a destination port permit list or adds to an existing destination port permit list.
Step 5	`Router(config)# no monitor permit-list destination interface` *type*[1] *slot/port*`[-`*port*`] [, `*type*[1] *slot/port* `- `*port*`]`	Deletes from or clears an existing destination port permit list.
Step 6	`Router(config)# do show monitor permit-list`	Verifies the configuration.

1. *type* = **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

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

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*}	Associates the local SPAN session number and the destination ports.
	`Router(config)# no monitor session` {*session_number* | **all** | **local** | **range** *session_range*[[,*session_range*],...]}	Clears the monitor configuration.

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 **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
- *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* , ...
- To tag the monitored traffic as it leaves a destination port, you must configure the destination port to trunk unconditionally before you configure it as a destination (see the "Configuring a Destination Port as an Unconditional Trunk" section on page 48-21).

When clearing monitor sessions, note the following information:

- The **no monitor session** *number* command entered with no other parameters clears session *session_number*.
- *session_range* is *first_session_number-last_session_number*.

Note In the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

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 48-23.

Configuring RSPAN

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

- Configuring RSPAN VLANs, page 48-13
- Configuring RSPAN Source Sessions, page 48-14
- Configuring RSPAN Destination Sessions, page 48-15

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` `Router(config-vlan)# no remote-span`	Configures the VLAN as an RSPAN VLAN. Clears the RSPAN VLAN configuration.
Step 4	`Router(config-vlan)# end`	Updates the VLAN database and returns to privileged EXEC mode.

Configuring RSPAN Source Sessions

To configure an RSPAN source 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* `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 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 with the RSPAN VLAN.
Step 4	`Router(config)# no monitor session {`*session_number* `| all	range` *session_range*`[[,`*session_range*`],...]	remote}`	Clears the monitor configuration.

When configuring monitor sessions, note the following information:

- To configure RSPAN VLANs, see the "Configuring RSPAN VLANs" section on page 48-13.
- *RSPAN_source_span_session_number* can range from 1 to 66.
- *single_interface* is **interface** *type slot/port*; *type* is **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
- *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* , ...

When clearing monitor sessions, note the following information:

- The **no monitor session** *number* command entered with no other parameters clears session *session_number*.
- *session_range* is *first_session_number-last_session_number*.

Note In the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

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 48-23.

Configuring RSPAN Destination Sessions

Note You can configure an RSPAN destination session on the RSPAN source session switch 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_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*`}`	Associates the RSPAN destination session number with the destination ports.
Step 4	`Router(config)# no monitor session {`*session_number* `|` `all | range` *session_range*`[[,`*session_range*`],...] | remote}`	Clears the monitor configuration.

When configuring monitor sessions, note the following information:

- 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 Port as an Unconditional Trunk" section on page 48-21).
- *RSPAN_destination_span_session_number* can range from 1 to 66.
- *single_interface* is **interface** *type slot/port*; *type* is **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
- *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* , ...

When clearing monitor sessions, note the following information:

- Enter the **no monitor session** *number* command with no other parameters to clear session *session_number*.
- *session_range* is *first_session_number-last_session_number*.

Note In the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

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 5/47
```

For additional examples, see the "Configuration Examples" section on page 48-23.

Configuring ERSPAN

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

- Configuring ERSPAN Source Sessions, page 48-16
- Configuring ERSPAN Destination Sessions, page 48-18

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.
	`Router(config)# no monitor session` {*session_number* | `all` | `range` *session_range*[[,*session_range*],...]}	Clears the monitor configuration.
Step 3	`Router(config-mon-erspan-src)# description` *session_description*	(Optional) Describes the ERSPAN source session.
Step 4	`Router(config-mon-erspan-src)# shutdown`	(Default) Inactivates the ERSPAN source session.
	`Router(config-mon-erspan-src)# no shutdown`	Activates the ERSPAN source session.
Step 5	`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 source ports or VLANs, and selects the traffic direction to be monitored.
Step 6	`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.

	Command	Purpose
Step 7	`Router(config-mon-erspan-src)# destination`	Enters ERSPAN source session destination configuration mode.
Step 8	`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 switch and be entered in the ERSPAN destination session configuration (see the "Configuring ERSPAN Destination Sessions" section on page 48-18, Step 7).
Step 9	`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 48-18, Step 8).
Step 10	`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 11	`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 12	`Router(config-mon-erspan-src-dst)# ip prec ipp_value`	(Optional) Configures the IP precedence value of the packets in the ERSPAN traffic.
Step 13	`Router(config-mon-erspan-src-dst)# ip dscp dscp_value`	(Optional) Configures the IP DSCP value of the packets in the ERSPAN traffic.
Step 14	`Router(config-mon-erspan-src-dst)# vrf vrf_name`	(Optional) Configures the VRF name to use instead of the global routing table.
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 or spaces.

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

- *ERSPAN_source_span_session_number* can range from 1 to 66.
- *single_interface* is **interface** *type slot/port*; *type* is **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
- *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 switch.
- *ttl_value* can range from 1 to 255.
- *ipp_value* can range from 0 to 7.
- *dscp_value* can range from 0 to 63.

When clearing monitor sessions, note the following information:

- The **no monitor session** *number* command entered with no other parameters clears session *session_number.*
- *session_range* is *first_session_number-last_session_number.*

Note In the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

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

```
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
```

For additional examples, see the "Configuration Examples" section on page 48-23.

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.
	`Router(config)# no monitor session {`*session_number* `| all | range` *session_range*`[[,`*session_range*`],...]}`	Clears the monitor configuration.
Step 3	`Router(config-mon-erspan-dst)# description` *session_description*	(Optional) Describes the ERSPAN destination session.

	Command	Purpose
Step 4	`Router(config-mon-erspan-dst)# shutdown` `Router(config-mon-erspan-dst)# no shutdown`	(Default) Inactivates the ERSPAN destination session. Activates the ERSPAN destination session.
Step 5	`Router(config-mon-erspan-dst)# destination {single_interface | interface_list | interface_range | mixed_interface_list}`	Associates the ERSPAN destination session number with the destination ports.
Step 6	`Router(config-mon-erspan-dst)# source`	Enters ERSPAN destination session source configuration mode.
Step 7	`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 48-16, Step 8.
Step 8	`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 48-16, Step 9.
Step 9	`Router(config-mon-erspan-dst-src)# vrf vrf_name`	(Optional) Configures the VRF name used instead of the global routing table.
Step 10	`Router(config-mon-erspan-dst-src)# end`	Exits configuration mode.

When configuring monitor sessions, note the following information:

- *ERSPAN_destination_span_session_number* can range from 1 to 66.
- *single_interface* is **interface** *type slot/port*; *type* is **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
- *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 switch.

Note You must also change all ERSPAN source session destination IP addresses (see the "Configuring ERSPAN Source Sessions" section on page 48-16, Step 8).

- *ERSPAN_flow_id* can range from 1 to 1023.

When clearing monitor sessions, note the following information:

- The **no monitor session** *number* command entered with no other parameters clears session *session_number*.
- *session_range* is *first_session_number-last_session_number*.

Note In the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

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(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 48-23.

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 48-16.

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.
	`Router(config)# no monitor session` *session_number* `filter` *single_vlan* | *vlan_list* | *vlan_range* | *mixed_vlan_list*	Clears source VLAN filtering.

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
```

Configuring a Destination Port as an Unconditional Trunk

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

To configure the destination port as a trunk, perform this task:

	Command	Purpose
Step 1	`Router# configure terminal`	Enters global configuration mode.
Step 2	`Router(config)# interface` *type*[1] *slot/port*	Selects the LAN port to configure.
Step 3	`Router(config-if)# switchport`	Configures the LAN port 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 Layer 2 switching port as either an ISL or 802.1Q trunk.
Step 5	`Router(config-if)# switchport mode trunk`	Configures the port to trunk unconditionally.
Step 6	`Router(config-if)# switchport nonegotiate`	Configures the trunk not to use DTP.

1. *type* = **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

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

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

Configuring Destination Trunk Port VLAN Filtering

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

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

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

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

	Command	Purpose
Step 1	`Router# configure terminal`	Enters global configuration mode.
Step 2	`Router(config)# interface` *type*[1] *slot/port*	Selects the destination trunk port to configure.
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.

1. *type* = **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

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
```

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
```