CHAPTER 57

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 57-10).

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 57-1
- Local SPAN, RSPAN, and ERSPAN Configuration Guidelines and Restrictions, page 57-6
- Configuring Local SPAN, RSPAN, and ERSPAN, page 57-11

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 57-1
- Local SPAN, RSPAN, and ERSPAN Sources, page 57-5
- Local SPAN, RSPAN, and ERSPAN Destinations, page 57-6

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

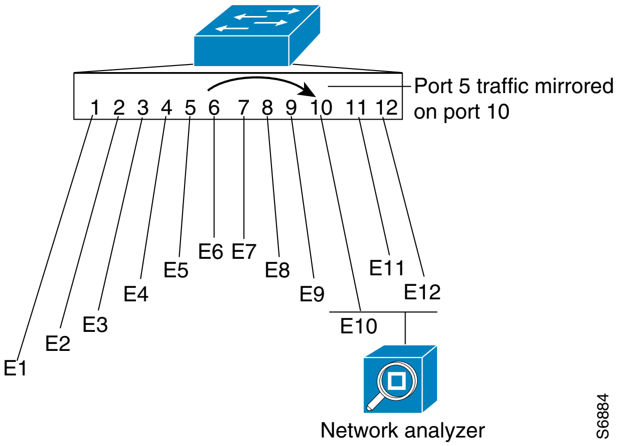
A local SPAN session is an association of source ports and source VLANs with one or more destinations. You configure a local SPAN session on a single router. Local SPAN does not have separate source and destination sessions.

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 57-1). For example, as shown in Figure 57-1, 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 57-1 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 57-2). 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.

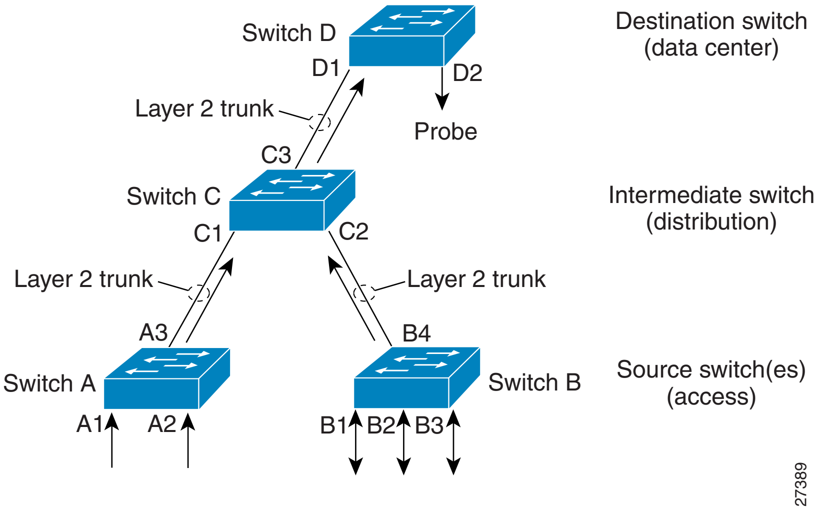
The traffic for each RSPAN session is carried as Layer 2 nonroutable traffic over a user-specified RSPAN VLAN that is dedicated for that RSPAN session in all participating routers. All participating routers must be trunk-connected at Layer 2.

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 57-2 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 57-3). 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.

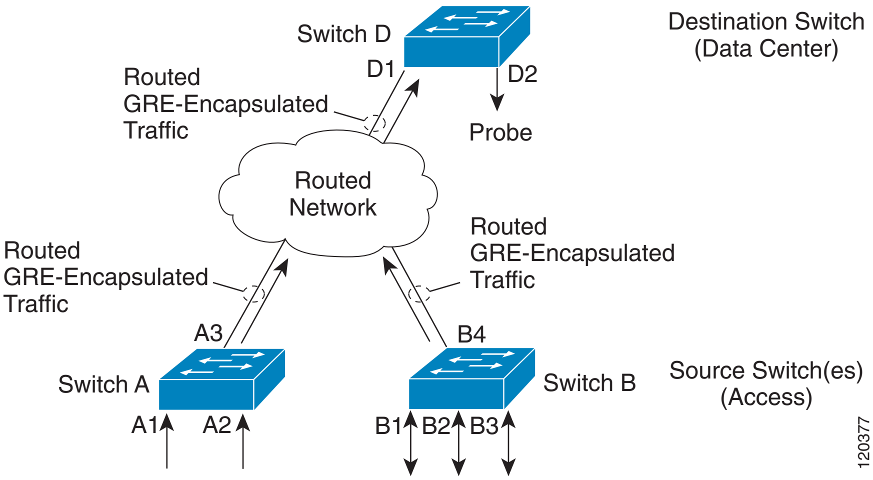
To configure an ERSPAN source session on one router, you associate a set of source ports or VLANs with a destination IP address, ERSPAN ID number, and optionally with a VPN routing and forwarding (VRF) name. To configure an ERSPAN destination session on another router, you associate the destination ports 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 57-3 ERSPAN Configuration


Switch D
D1
D2
Destination Switch (Data Center)
Routed GRE-Encapsulated Traffic
Probe
Routed Network
Routed GRE-Encapsulated Traffic
Routed GRE-Encapsulated Traffic
A3
B4
Switch A
Switch B
Source Switch(es) (Access)
A1
A2
B1
B2
B3
120377

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 57-4
- Monitored Traffic Type, page 57-4
- Duplicate Traffic, page 57-4

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 57-5
- Source VLANs, page 57-5

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, page 57-6
- Local SPAN, RSPAN, and ERSPAN Session Limits, page 57-7
- Local SPAN, RSPAN, and ERSPAN Guidelines and Restrictions, page 57-8
- VSPAN Guidelines and Restrictions, page 57-9
- RSPAN Guidelines and Restrictions, page 57-9
- ERSPAN Guidelines and Restrictions, page 57-10

Feature Incompatibilities

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

- 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

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 57-1 shows the PFC3 local SPAN, RSPAN, and ERSPAN session limits. Table 57-2 shows the PFC3 local SPAN, RSPAN, and ERSPAN source and destination limits.

Table 57-1 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 57-2 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:

- ERSPAN destination IP address should be used for the sole purpose of terminating ERSPAN traffic.
- 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 57-25).
- 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 57-27).
- 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 57-12
- Configuring Destination Trunk VLAN Filtering (Optional), page 57-12
- Configuring Destination Port Permit Lists (Optional), page 57-14
- Configuring Local SPAN, page 57-14
- Configuring RSPAN, page 57-19
- Configuring ERSPAN, page 57-25
- Configuring ERSPAN, page 57-25
- Configuring Source VLAN Filtering for Local SPAN and RSPAN, page 57-34
- Verifying the Configuration, page 57-34
- Configuration Examples, page 57-35

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 57-15
- Configuring Local SPAN (Global Configuration Mode), page 57-17

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 57-12).

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

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

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, 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 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.

Note On ES+ line cards, if local SPAN destination is configured with ingress and learning mode the replicated traffic is not egressing on the SPAN. Effective with Cisco IOS 15.2(4) release, even if you configure the local destination with ingress and learning mode the replicated traffic will egress on the SPAN destination.

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 57-35 .

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 57-12).

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 57-35.

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 57-19
- Configuring RSPAN Sessions (SPAN Configuration Mode), page 57-19
- Configuring RSPAN Sessions (Global Configuration Mode), page 57-22

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 57-19
- Configuring RSPAN Destination Sessions in SPAN Configuration Mode, page 57-21

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.

	Command	Purpose
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 57-19 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 57-35.

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 57-12).

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 57-35.

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 57-22
- Configuring RSPAN Destination Sessions in Global Configuration Mode, page 57-23

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 57-19.

- *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 57-19 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 57-35.

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 57-12).

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 57-19 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 57-35.

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 57-25
- Configuring ERSPAN Destination Sessions, page 57-27

Note The PFC3 supports ERSPAN (see the "ERSPAN Guidelines and Restrictions" section on page 57-10).

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 57-27, 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 57-27, 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 57-35.

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 57-25, 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 57-25, 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 57-25, 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 57-35.

Information About ERSPAN on EVC

Cisco 7600 routers support the Encapsulated Remote Switched Port Analyzer (ERSPAN) feature on a per service instance basis. It is the Ethernet Virtual Circuits (EVC) infrastructure that supports remote monitoring and troubleshooting on a per service instance basis. ERSPAN on EVC is supported on ES+ line cards.

Interception of traffic on EVC can be configured in the following ways:

- ERSPAN on Port: The configuration includes traffic on EVCs, switchports and routed traffic on the port.
- ERSPAN on VLAN: The configuration includes traffic on all EVC BDs in the box (on port or port channel) with the same VLAN for a SPAN session along with other switch ports on the same VLAN.
- ERSPAN on EVC: The configuration includes traffic on a given EFP or a set of EFPs (on port or port channel) for a SPAN session.

SPAN, sometimes called port mirroring or port monitoring, allows network traffic to be analyzed by a network analyzer such as a Cisco Switch Probe or other Remote Monitoring (RMON) probes. SPAN lets you monitor traffic on one or more ports, or one or more VLANs, and send the monitored traffic to one or more destination ports where the network analyzer is attached.

ERSPAN monitors traffic on multiple network devices across an IP network, and sends that traffic in an encapsulated envelope to destination analyzers. ERSPAN can be used to monitor traffic remotely.

ERSPAN monitors ingress, egress, or both kinds of network traffic. Encapsulated ERSPAN packets are routed from a host through the routed network to the destination device where they are decapsulated and forwarded to the attached network analyzer. The destination may also be on the same Layer 2 or Layer 3 network as the source.

ERSPAN consists of an ERSPAN source session, routable ERSPAN GRE encapsulated traffic, and an ERSPAN destination session.

EVCs define a Layer 2 bridging architecture that supports Ethernet services. EVC supports service convergence over Ethernet. An EVC is a conceptual service pipe within a service provider network. Metro-Ethernet Forum (MEF) defines EVC as an association between two or more user network interfaces that identifies a point-to-point or multipoint-to-multipoint path within the service provider network.

EVC is the device local object (container) for network-wide service parameters and provides one-to-many mapping from EVC to Service Instance. Its support extends to a mix of Layer 2 and Layer 3 services on the same physical port.

EVC allows routers to reach multiple intranet and extranet locations from a single physical port. Routers see subinterfaces through which they access other routers.

Bridge Domain (BD) is the Ethernet Broadcast Domain local to a device. It exists separately from VLANs. BD provides a one-to-many mapping from BD to service instances.

An Ethernet service instance is a transport-agnostic abstraction of an Ethernet service on an interface. A service instance classifies frames belonging to a particular Ethernet service. It applies features selectively to service frames, and defines forwarding actions and behavior.

Restrictions for ERSPAN on EVC Configuration

- EVC ERSPAN is effective only if the EVC is on an ES+ line card.
- EVC is not supported as ERSPAN destination.
- Egress ERSPAN packets do not undergo QoS processing.
- For egress SPAN configurations with a VLAN as the source, where the VLAN is also part of BD and switchport for the router, all traffic that goes on the VLAN is replicated and spanned.
- Many service instances having the same BD results in a mix of BDs. In such situations, for egress SPAN configurations with VLAN as source, there is random selection and spanning. All EVCs are not spanned; single EVCs are randomly selected and spanned.
- Existing implementations restrict the configuring of SPAN source as both interface and VLANs. The same restriction applies to EFP configurations. If the SPAN source is VLAN, then the interface or EFP cannot be the source.
- Encapsulation requires a dedicated tunnel. When egress monitored traffic moves out of the tunnel interface to the remote router it allows no other traffic on the router.

Configuring the Source Session for ERSPAN on EVC

DETAILED STEPS

	Command	Purpose

Step 1	**enable**
	`Example`
	`rtr1# enable`
		Enables the privileged EXEC mode. Enter your password, if prompted.

Step 2	**configure terminal**
	`Example`
	`rtr1# configure terminal`
		Enters the global configuration mode.

Step 3	**monitor session** *session number* **type** *erspan-source*
	`Example`
	`rtr1(config)#monitor session 1 type erspan-source`
		Configures an ERSPAN source session number, and enters the ERSPAN source session configuration mode for the session.

Step 4	**service instance** *range of EFPs* **interface** *source interface*
	`Example`
	`rtr1(config-mon-erspan-src)#source service instance 1 - 12 GigabitEthernet9/1`
		Configures the service instance range, and specifies the sub-interface with slot and port number.
		Creates a service instance (an instantiation of an EVC) on an interface, and sets the device into the service instance submode.

	Command	Purpose
Step 5	**no shutdown** Example `rtr1(config-mon-erspan-src)#no shutdown`	Enables the ERSPAN session, and saves it in the running configuration. By default, the session is created in the shut state.
Step 6	**destination** Example `rtr1(config-mon-erspan-src)#destination`	Enters the ERSPAN source session destination configuration mode, and associates the SPAN session number with the destination.
Step 7	**ip address** *ip address* Example `rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2`	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.
Step 8	**origin ip address** *ip address* Example `rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10`	Configures the encapsulated packet Layer 3 source address.
Step 9	**erspan-id** *erspan identifier* Example `rtr1(config-mon-erspan-src-dst)#erspan-id 100`	Adds an ERSPAN ID to the session configuration. Configures the ID number used by the source and the destination sessions to identify the ERSPAN traffic. This number is unique and within the limits permitted. It is identical for the source and the destination.

Step 10	**end**
	Example
	`rtr1(config-mon-erspan-src-dst)#end`
		Exits the configuration mode.

Configuration Examples for ERSPAN on EVC Source Session

```
rtr1(config)#monitor session 1 type erspan-source
rtr1(config-mon-erspan-src)#source service instance 1 - 12 GigabitEthernet9/1
rtr1(config-mon-erspan-src)#no shutdown
rtr1(config-mon-erspan-src)#destination
rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2
rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10
rtr1(config-mon-erspan-src-dst)#erspan-id 100
rtr1(config-mon-erspan-src-dst)#end
```

Note If the configurations exclude TX or RX, ERSPAN monitors both ingress and egress traffic.

The configuration examples for ERSPAN source session for ingress and egress traffic are as follows:

```
rtr1(config)#monitor session 1 type erspan-source
rtr1(config-mon-erspan-src)#source service instance 1 - 12 GigabitEthernet9/1 TX
rtr1(config-mon-erspan-src)#no shutdown
rtr1(config-mon-erspan-src)#destination
rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2
rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10
rtr1(config-mon-erspan-src-dst)#erspan-id 100
rtr1(config-mon-erspan-src-dst)#end

rtr1(config)#monitor session 1 type erspan-source
rtr1(config-mon-erspan-src)#source service instance 1 - 12 GigabitEthernet9/1 RX
rtr1(config-mon-erspan-src)#no shutdown
rtr1(config-mon-erspan-src)#destination
```

```
rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2
rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10
rtr1(config-mon-erspan-src-dst)#erspan-id 100
rtr1(config-mon-erspan-src-dst)#end
```

The following examples show ERSPAN on port channel configurations:

```
ERSPAN on Port-channel
rtr1(config)#monitor session 1 type erspan-source
rtr1(config-mon-erspan-src)#source service instance 1 - 12 port-channel 1
rtr1(config-mon-erspan-src)#no shutdown
rtr1(config-mon-erspan-src)#destination
rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2
rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10
rtr1(config-mon-erspan-src-dst)#erspan-id 100
rtr1(config-mon-erspan-src-dst)#end

ERSPAN on Port-channel(tx)
rtr1(config)#monitor session 1 type erspan-source
rtr1(config-mon-erspan-src)#source service instance 1 - 12 port-channel 1 tx
rtr1(config-mon-erspan-src)#no shutdown
rtr1(config-mon-erspan-src)#destination
rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2
rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10
rtr1(config-mon-erspan-src-dst)#erspan-id 100
rtr1(config-mon-erspan-src-dst)#end

Port-channel (rx)
rtr1(config)#monitor session 1 type erspan-source
rtr1(config-mon-erspan-src)#source service instance 1 - 12 port-channel 1 rx
rtr1(config-mon-erspan-src)#no shutdown
rtr1(config-mon-erspan-src)#destination
rtr1(config-mon-erspan-src-dst)#ip address 40.40.40.2
rtr1(config-mon-erspan-src-dst)#origin ip address 10.10.10.10
rtr1(config-mon-erspan-src-dst)#erspan-id 100
rtr1(config-mon-erspan-src-dst)#end
```

Configuring the Destination Session for ERSPAN on EVC

DETAILED STEPS

	Command	Purpose

Step 1	**enable**
	`Example`
	`rtr3# enable`
		Enables the privileged EXEC mode. Enter your password if prompted.

Step 2	**configure terminal**
	`Example`
	`rtr3# configure terminal`
		Enters the global configuration mode.

Step 3	**monitor session** *session number* **type** *erspan-destination*
	`Example`
	`rtr3(config)#monitor session 1 type erspan-destination`
		Configures an ERSPAN destination session number, and enters the ERSPAN destination session configuration mode for the session.

	Command	Purpose

Step 4	**destination interface** *interface slot/port*
	`Example`
	`rtr3(config-mon-erspan-dst)#destination interface GigabitEthernet7/19`
		Enters the ERSPAN destination session destination configuration mode, associates the SPAN session number with the destination, and specifies the sub-interface with slot and port number.

Step 5	**no shutdown**
	`Example`
	`rtr3(config-mon-erspan-dst)#no shutdown`
		Enables the ERSPAN session and saves it in the running configuration.
		By default, the session is created in the shut state.

Step 6	**source**
	`Example`
	`rtr3(config-mon-erspan-dst)#source`
		Enters the ERSPAN destination session source configuration mode.

Step 7	**ip address** *ip address*
	`Example`
	`rtr3(config-mon-erspan-dst-src)#ip address 40.40.40.2`
		Configures the ERSPAN flow destination IP address, which must also be configured on an interface on the destination router, and entered in the ERSPAN destination session configuration.

Step 8	**erspan-id** *erspan identifier*
	`Example`
	`rtr3(config-mon-erspan-dst-src)#erspan-id 100`
		Adds an ERSPAN ID to the session configuration. Configures the ID number used by the source and destination sessions to identify the ERSPAN traffic.
		This number is unique and within the prescribed limits. It is identical for the source and the destination.

Step 9	**end**
	`Example`
	`rtr3(config-mon-erspan-dst-src)#end`
		Exits the configuration mode.

ERSPAN on EVC: Destination Session Configuration Example

```
rtr3(config)#monitor session 1 type erspan-destination
rtr3(config-mon-erspan-dst)#destination interface GigabitEthernet7/19
rtr3(config-mon-erspan-dst)#no shutdown
rtr3(config-mon-erspan-dst)#source
rtr3(config-mon-erspan-dst-src)#ip address 40.40.40.2
rtr3(config-mon-erspan-dst-src)#erspan-id 100
rtr3(config-mon-erspan-dst-src)#end
```

Verification of ERSPAN on EVC Configuration

Use the following command to verify the ERSPAN on EVC configurations:

show monitor session all

Verification Example for ERSPAN on EVC

```
rtr1#show monitor  session  all
Session 1
---------
Type                   : ERSPAN Destination Session
Status                 : Admin Disabled
Source IP Address      : 1.1.1.1
Source ERSPAN ID       : 100
```

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 57-25.

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
```

Configuring SPAN on EVC

Currently, traffic mirroring, lawful intercept, or Switched Port Analyzer (SPAN) on a per service instance is unavailable.

The existing command line interface supports configuring interface and VLAN as the local SPAN source. The same command line interface is enhanced to accept service instance IDs along with the interface. Since an EVC is support only for the local session SPAN, service instance options for the SPAN source are added in the local SPAN configuration submode.

You configure SPAN to intercept traffic in three ways:

- SPAN on Port: The traffic on all EVCs on the port or port channel is included for a SPAN session along with routed traffic on that port.
- SPAN on VLAN: The traffic on all EVC bridge-domains with the same VLAN is included for a SPAN session along with other switchports on the same VLAN.
- SPAN on EVC: The traffic on a given EFP or a set of EFPs is included for a SPAN session.

Restrictions and Usage Guidelines

Follow these restrictions and usage guidelines while configuring SPAN on EVC, follow these restrictions and usage guidelines:

- Only Local SPAN is supported.
- EVC SPAN is effective only if the EVC is on the ES+ line card.
- EVC as a SPAN destination is not supported.
- Egress SPAN packet does not undergo QoS processing.
- If a combination of switchports and EVC bridge-domain exists, then for flood case packet on both is spanned. VLAN and SPAN are configured in the transmit direction on the source port.
- If a combination of different EVC bridge-domain exists, then for flood case packet on all the EVCs is spanned. VLAN and SPAN are configured in the transmit direction on the source port.
- EVC SPAN does not work with multiple destination ports.

- For EVCs configured as a part of more than one SPAN session (EVC, VLAN, or port), traffic is monitored on only one session.
- EFPs and VLAN cannot be configured as source in the same monitor session.
- For a 10G port, the aggregate of ingress traffic and SPAN traffic cannot exceed 10G.
- For a 10G port with port-shaper, the aggregate of port traffic and SPAN traffic cannot exceed the port-shaper.
- For a 1G port, the total SPAN traffic can be as high as 10G, but due to network processor limitations and fabric bottleneck, the net traffic can be reduced.

Configuring SPAN on EVC

Complete the following steps to configure SPAN on EVC.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface port-channel** *number*
4. [**no**] **ip address**
5. [**no**] **service instance** *id* **Ethernet** [*service-name*]
6. **encapsulation** {**default|untagged|dot1q** *vlan-id* [**second-dot1q** *vlan-id*]}
7. **rewrite ingress tag** {**push** {**dot1q** *vlan-id* | **dot1q** *vlan-id* **second-dot1q** *vlan-id* | **dot1ad** *vlan-id* **dot1q** *vlan-id*} | **pop** {**1** | **2**} | **translate** {**1-to-1** {**dot1q** *vlan-id* | **dot1ad** *vlan-id*}| **2-to-1 dot1q** *vlan-id* | **dot1ad** *vlan-id*}| **1-to-2** {dot1q *vlan-id* **second-dot1q** *vlan-id* | **dot1ad** *vlan-id* **dot1q** *vlan-id*} | **2-to-2** {**dot1q** *vlan-id* **second-dot1q** *vlan-id* | **dot1ad** *vlan-id* **dot1q** *vlan-id*}} **symmetric**
8. **exit**
9. **monitor session** local_span_session_number **type [local | local-tx]**
10. **source** {interface | service instance | vlan}{GigabitEthernet |Port-channel | TenGigabitEthernet} [**rx | tx | both**]
11. **destination interface**{GigabitEthernet |Port-channel | TenGigabitEthernet}
12. [**no**] **shutdown**
13. **end**

DETAILED STEPS

	Command	Purpose
Step 1	**enable**	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal**	Enters global configuration mode.
Step 3	interface port-channel *number*	Creates the port-channel interface.
Step 4	[no] ip address	Assigns a subnet mask to the ethernet channel.

	Command	Purpose
Step 5	[**no**] **service instance** *id* **Ethernet** [service-name}	Creates a service instance (an instantiation of an EVC) on an interface and sets the device to the ethernet service configuration submode.
Step 6	**encapsulation** {**default|untagged|dot1q** *vlan-id* [**second-dot1q** *vlan-id*]}	Defines the matching criteria to map ingress dot1q frames on an interface to the appropriate service instance.
Step 7	**rewrite ingress tag** {**push** {**dot1q** *vlan-id* | **dot1q** *vlan-id* **second-dot1q** *vlan-id* | **dot1ad** *vlan-id* **dot1q** *vlan-id*} | **pop** {**1** | **2**} | **translate** {**1-to-1** {**dot1q** *vlan-id* | **dot1ad** *vlan-id*}| **2-to-1 dot1q** *vlan-id* | **dot1ad** *vlan-id*}| **1-to-2** {dot1q *vlan-id* **second-dot1q** *vlan-id* | **dot1ad** *vlan-id* **dot1q** *vlan-id*} | **2-to-2** {**dot1q** *vlan-id* **second-dot1q** *vlan-id* | **dot1ad** *vlan-id* **dot1q** *vlan-id*}} **symmetric**	Specifies the tag manipulation on the frame ingress to the service instance.
Step 8	**exit**	Exits to global configuration mode.
Step 9	**monitor session** local_span_session_number **type [local | local-tx]**	Configures a monitor session using a SPAN session number and enters the SPAN session configuration mode.
Step 10	**source** {interface | service instance | vlan}{GigabitEthernet |Port-channel | TenGigabitEthernet} [**rx** | **tx** | **both**]	Associates the SPAN session number with source ports, VLANs, or EVC, and selects the traffic direction to be monitored.
Step 11	**destination interface**{GigabitEthernet |Port-channel | TenGigabitEthernet}	Associates the SPAN session number with the destinations.
Step 12	**no shutdown**	Activates the SPAN session.
Step 13	**end**	Exits configuration mode.

Sample Configuration

This is an example for configuring SPAN on EVC.

```
Router# enable
Router# configure terminal
Router(config)# interface port-channel 11
Router(config-if)# no ip address
Router(config-if)# service instance 101 ethernet
Router(config-if-srv)# encapsulation dot1q 13
Router(config-if-srv)# rewrite ingress tag push dot1q 20 symmetric
Router(config-if-srv)# exit
Router(config)# monitor session 1 type local
Router(config-mon-local)# source service instance 2 - 100 Port-channel 1 both
Router(config-mon-local)# destination interface Port-channel 3
Router(config-mon-local)# no shut
Router(config-mon-local)# end
```

Verifying SPAN on EVC

This section provides the commands to verify the SPAN configuration.

```
Router# show monitor session 1
    Session 1
    ---------
    Type                    : Local Session
    Status                  : Admin Enabled
    Source EFPs             :
        Both                : Po1:   2-100
    Destination Ports       : Po3

Router# show run | section monitor
    monitor session 1 type local
     source service instance 2 - 100 Port-channel1
     destination interface Po3
```

Troubleshooting

For specific troubleshooting information, contact Cisco Technical Assistance Center (TAC) at this location:

http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html

Distributed Egress SPAN

In Centralized Egress SPAN, every packet that needs replication has to go through the supervisor engine. This reduces the performance of the router. In Distributed Egress SPAN (DES), the Transmit (Tx) SPAN replicates locally on the line card instead of relying on the supervisor engine.

Effective with Release 15.2(2)S, DES is supported on the Cisco 7600 routers.

Restrictions for the DES Feature

Following restrictions apply for DES:

- Hyperion ASIC revision levels 5.0 and higher, and all versions of the Metropolis ASIC support DES mode for ERSPAN sources.
- Switching modules with Hyperion ASIC revision levels lower than 5.0 do not support DES mode for ERSPAN sources.
- For Local SPAN and RSPAN sessions, the presence of DES incapable cards revert the system to Centralized Egress mode.
- The non-DFC line cards and the line cards that do not have Titan, Hyperion, or Metropolis are DES incapable cards.
- The DES should be configured using the sub-mode command, and not using the legacy global configuration command.

Configuring Distributed Egress SPAN

This section describes how to configure the Egress Replication mode:

SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. **no monitor session egress replication-mode centralized**
4. **end**

DETAILED STEPS

	Command	Purpose
Step 1	**enable**	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal**	Enters global configuration mode.
Step 3	**no monitor session egress replication-mode centralized**	Enables Distributed Egress SPAN mode. By default, the SPAN mode is Centralized. **Note** Enter the **monitor session egress replication-mode centralized** command to enable Centralized Egress SPAN mode.
Step 4	**end**	Exits configuration mode.

Configuration Examples

This example shows how to enable Egress Replication mode:

```
Router# configure terminal
Router(config)# no monitor session egress replication-mode centralized
Router(config)# end
```

This example shows how to disable Egress Replication mode:

```
Router# configure terminal
Router(config)# monitor session egress replication-mode centralized
Router(config)# end
```

Verifying the Configuration

These examples show how to display the Egress Replication mode:

```
Router# show monitor session egress replication-mode
Egress SPAN Replication Mode Session State:
-------------------------------------------
Session          : 1
Session Type     : Local Session
Operational mode : Distributed
Configured mode  : Distributed/Default

Session          : 2
Session Type     : Local Session
Operational mode : Distributed
Configured mode  : Distributed/Default

-------------------------------------------------------
Global Egress SPAN Replication Mode Capability:

Slot          Egress Replication Capability
```

```
 No       LSPAN           RSPAN             ERSPAN
-------------------------------------------------------
 2     Centralized      Centralized        Centralized
 7     Distributed      Distributed        Distributed
 8     Distributed      Distributed        Distributed
 12     Distributed      Distributed         Distributed

Router# show monitor session 1
Session 1
---------
Type                   : Local Session
Status                 : Admin Enabled
Source Ports           :
    Both               : Fa2/3
Destination Ports      : Fa2/1
    Ingress & Learn    : Fa2/1

Egress SPAN Replication State:
Operational mode       : Distributed
Configured mode        : Distributed

Router# show monitor session 1 detail
Session 1
---------
Type                   : Local Session
Status                 : Admin Enabled
Description            : -
Source Ports           :
    RX Only            : None
    TX Only            : None
    Both               : Fa2/3
Source VLANs           :
    RX Only            : None
    TX Only            : None
    Both               : None
Source EFPs            :
    RX Only            : None
    TX Only            : None
    Both               : None
Source RSPAN VLAN      : None
Destination Ports      : Fa2/1
    Ingress & Learn    : Fa2/1
Filter VLANs           : None
Dest RSPAN VLAN             : None
Source IP Address      : None
Source IP VRF          : None
Source ERSPAN ID       : None
Destination IP Address : None
Destination IP VRF     : None
Destination ERSPAN ID  : None
Origin IP Address      : None
IP QOS PREC            : 0
IP TTL                 : 255

Egress SPAN Replication State:
Operational mode       : Distributed
Configured mode        : Distributed
```

Troubleshooting

For specific troubleshooting information, contact Cisco Technical Assistance Center (TAC) at this location:

http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html