Configuring ERSPAN

This chapter includes the following sections:

Information About ERSPAN

The Cisco NX-OS system supports the Encapsulated Remote Switching Port Analyser (ERSPAN) feature on both source and destination ports. ERSPAN transports mirrored traffic over an IP network. The traffic is encapsulated at the source router and is transferred across the network. The packet is decapsulated at the destination router and then sent to the destination interface.

ERSPAN consists of an ERSPAN source session, routable ERSPAN generic routing encapsulation (GRE)-encapsulated traffic, and an ERSPAN destination session. You separately configure ERSPAN source sessions and destination sessions on different switches.

ERSPAN Sources

The interfaces from which traffic can be monitored are called ERSPAN sources. Sources designate the traffic to monitor and whether to copy ingress, egress, or both directions of traffic. ERSPAN sources include the following:

- Ethernet ports and port channels.
- VLANs—When a VLAN is specified as an ERSPAN source, all supported interfaces in the VLAN are ERSPAN sources.

ERSPAN source ports have the following characteristics:

- A port configured as a source port cannot also be configured as a destination port.
- ERSPAN does not monitor any packets that are generated by the supervisor, regardless of their source.

ERSPAN Destinations

Destination ports receive the copied traffic from ERSPAN sources.

ERSPAN destination ports have the following characteristics:

- Destinations for an ERSPAN session include Ethernet ports or port-channel interfaces in either access or trunk mode.
- A port configured as a destination port cannot also be configured as a source port.
- A destination port can be configured in only one ERSPAN session at a time.
- Destination ports do not participate in any spanning tree instance or any Layer 3 protocols.
- Ingress and ingress learning options are not supported on monitor destination ports
- HIF port channels, and fabric port channel ports are not supported as SPAN destination ports.

ERSPAN Sessions

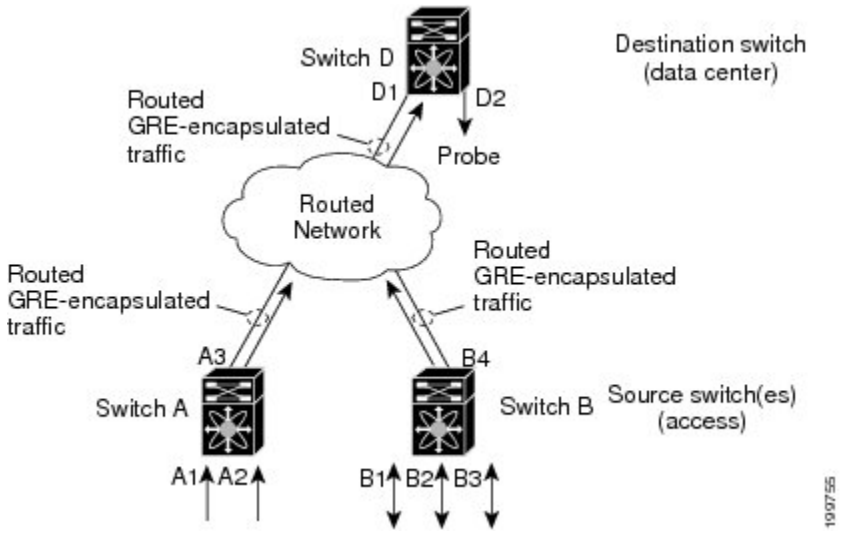
You can create ERSPAN sessions that designate sources and destinations to monitor.

When configuring ERSPAN source sessions, you need to configure the destination IP address. When configuring ERSPAN destination sessions, you need to configure the source IP address. See ERSPAN Sources, on page 1 for the properties of source sessions and ERSPAN Destinations, on page 2 for the properties of destination sessions.

Note Only two ERSPAN or SPAN source sessions can run simultaneously across all switches. Only 23 ERSPAN destination sessions can run simultaneously across all switches.

The following figure shows an ERSPAN configuration.

Figure 1: ERSPAN Configuration



Multiple ERSPAN Sessions

Although you can define up to 48 ERSPAN sessions, only two ERSPAN or SPAN sessions can be running simultaneously. You can shut down any unused ERSPAN sessions.

For information about shutting down ERSPAN sessions, see the Shutting Down or Activating an ERSPAN Session, on page 10.

High Availability

The ERSPAN feature supports stateless and stateful restarts. After a reboot or supervisor switchover, the running configuration is applied.

Licensing Requirements for ERSPAN

The following table shows the licensing requirements for this feature:

Product	License Requirement
Cisco NX-OS	ERSPAN requires no license. Any feature not included in a license package is bundled with the Cisco NX-OS system images and is provided at no extra charge to you. For a complete explanation of the Cisco NX-OS licensing scheme, see the *License and Copyright Information for Cisco NX-OS Software* available at the following URL: http://www.cisco.com/en/US/docs/switches/datacenter/sw/4_0/nx-os/license_agreement/nx-ossw_lisns.html.

Prerequisites for ERSPAN

ERSPAN has the following prerequisite:

•You must first configure the Ethernet interfaces for ports on each device to support the desired ERSPAN configuration.

Guidelines and Limitations for ERSPAN

ERSPAN has the following configuration guidelines and limitations:

- ERSPAN supports the following:
  - From 4 to 6 tunnels
  - Non-tunnel packets
  - IP-in-IP tunnels
  - IPv4 tunnels (limited)
  - ERSPAN source session type (Packets are encapsulated as GRE-tunnel packets and sent on the IP network. However, unlike other Cisco devices, the ERSPAN header is not added to the packet.)
  - ERSPAN destination session type (However, support for decapsulating the ERSPAN packet is not available. The entire encapsulated packet is spanned to a front panel port at the ERSPAN terminating point.)
- ERSPAN packets are dropped if the encapsulated mirror packet fails Layer 2 MTU checks.
- There is a 112-byte limit for egress encapsulation. Packets exceeding this limit are dropped. This scenario might be encountered when tunnels and mirroring are intermixed.
- ERSPAN sessions are shared with local sessions. A maximum of 18 sessions can be configured; however only a maximum of four sessions can be operational at the same time. If both receive and transmit sources are configured in the same session, then only two sessions can be operational.
- If you install NX-OS 5.0(3)U2(2), configure ERSPAN, and then downgrade to a lower version of software, the ERSPAN configuration is lost. This situation occurs because ERSPAN is not supported in versions before NX-OS 5.0(3)U2(2).

For information about a similar SPAN limitation, see Guidelines and Limitations for SPAN for SPAN.

- ERSPAN and ERSPAN ACLs are not supported for packets generated by the supervisor.
- ERSPAN and ERSPAN ACL sessions are terminated identically at the destination router.
- ERSPAN is not supported for management ports.
- A destination port can be configured in only one ERSPAN session at a time.
- You cannot configure a port as both a source and destination port.
- A single ERSPAN session can include mixed sources in any combination of the following:
  - Ethernet ports or port channels but not subinterfaces.
  - VLANs or port channels, which can be assigned to port channel subinterfaces.
  - The port channels to the control plane CPU.

Note ERSPAN does not monitor any packets that are generated by the supervisor, regardless of their source.

- Destination ports do not participate in any spanning tree instance or Layer 3 protocols.
- When an ERSPAN session contains source ports that are monitored in the transmit or transmit and receive direction, packets that these ports receive may be replicated to the ERSPAN destination port even though the packets are not actually transmitted on the source ports. Some examples of this behavior on source ports include:
  - Traffic that results from flooding
  - Broadcast and multicast traffic
- For VLAN ERSPAN sessions with both ingress and egress configured, two packets (one from ingress and one from egress) are forwarded from the destination port if the packets get switched on the same VLAN.
- VLAN ERSPAN monitors only the traffic that leaves or enters Layer 2 ports in the VLAN.
- When packets are mirrored and sent to the ERSPAN destination port, GRE headers are not stripped off. Packets are sent along with the GRE headers as GRE packets with the original packet as the GRE payload.

Default Settings

The following table lists the default settings for ERSPAN parameters.

Table 1: Default ERSPAN Parameters

Parameters	Default
ERSPAN sessions	Created in the shut state.

Configuring ERSPAN

Configuring an ERSPAN Source Session

You can configure an ERSPAN session on the local device only. By default, ERSPAN sessions are created in the shut state.

For sources, you can specify Ethernet ports, port channels, and VLANs. A single ERSPAN session can include mixed sources in any combination of Ethernet ports or VLANs.

Note ERSPAN does not monitor any packets that are generated by the supervisor, regardless of their source.

Procedure

	Command or Action	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**monitor erspan origin ip-address** *ip-address* **global** **Example:** `switch(config)# monitor erspan origin ip-address 10.0.0.1 global`	Configures the ERSPAN global origin IP address.
Step 3	**no monitor session** {*session-number* | **all**} **Example:** `switch(config)# no monitor session 3`	Clears the configuration of the specified ERSPAN session. The new session configuration is added to the existing session configuration.

Step 4	**monitor session** {*session-number* | **all**} **type erspan-source**
	
	Example:
	`switch(config)# monitor session 3 type erspan-source`
	`switch(config-erspan-src)#`
		Configures an ERSPAN source session.

Step 5	**description** *description* **Example:** `switch(config-erspan-src)# description erspan_src_session_3`	Configures a description for the session. By default, no description is defined. The description can be up to 32 alphanumeric characters.
Step 6	**source** {[**interface** [*type slot/port*[*-port*][*, type slot/port[-port*]]] [**port-channel** *channel-number*]] | [**vlan** {*number* | *range*}]} [**rx** | **tx** | **both**]	Configures the sources and traffic direction in which to copy packets. You can enter a range of Ethernet ports, a port channel, or a range of VLANs.

	Command or Action	Purpose

	Example:
	`switch(config-erspan-src)# source interface ethernet 2/1-3, ethernet 3/1 rx`
	Example:
	`switch(config-erspan-src)# source interface port-channel 2`
	Example:
	`switch(config-erspan-src)# source interface sup-eth 0 both`
	Example:
	`switch(config-erspan-src)# source vlan 3, 6-8 tx`
	Example:
	`switch(config-monitor)# source interface ethernet 101/1/1-3`
		You can configure one or more sources, as either a series of comma-separated entries or a range of numbers. You can specify up to 128 interfaces. For information on the VLAN range, see the *Cisco Nexus 3000 Series NX-OS Layer 2 Switching Configuration Guide, Release 5.x*.
		You can specify the traffic direction to copy as ingress, egress, or both. The default direction is both.

Step 7	Repeat Step 6 to configure all ERSPAN sources.	(Optional) —
Step 8	**destination ip** *ip-address* **Example:** `switch(config-erspan-src)# destination ip 10.1.1.1`	Configures the destination IP address in the ERSPAN session. Only one destination IP address is supported per ERSPAN source session.
Step 9	**vrf** *vrf-name* **Example:** `switch(config-erspan-src)# vrf default`	Configures the VRF that the ERSPAN source session uses for traffic forwarding.
Step 10	**ip ttl** *ttl-number* **Example:** `switch(config-erspan-src)# ip ttl 25`	(Optional) Configures the IP time-to-live (TTL) value for the ERSPAN traffic. The range is from 1 to 255.
Step 11	**ip dscp** *dscp-number* **Example:** `switch(config-erspan-src)# ip dscp 42`	(Optional) Configures the differentiated services code point (DSCP) value of the packets in the ERSPAN traffic. The range is from 0 to 63.
Step 12	**no shut** **Example:** `switch(config-erspan-src)# no shut`	Enables the ERSPAN source session. By default, the session is created in the shut state. **Note** Only two ERSPAN source sessions can be running simultaneously.

	Command or Action	Purpose
Step 13	**show monitor session** {**all** | *session-number* | **range** *session-range*} **Example:** `switch(config-erspan-src)# show monitor session 3`	(Optional) Displays the ERSPAN session configuration.
Step 14	**show running-config monitor** **Example:** `switch(config-erspan-src)# show running-config monitor`	(Optional) Displays the running ERSPAN configuration.
Step 15	**show startup-config monitor** **Example:** `switch(config-erspan-src)# show startup-config monitor`	(Optional) Displays the ERSPAN startup configuration.
Step 16	**copy running-config startup-config** **Example:** `switch(config-erspan-src)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.

Configuring an ERSPAN Destination Session

You can configure an ERSPAN destination session to copy packets from a source IP address to destination ports on the local device. By default, ERSPAN destination sessions are created in the shut state.

Before You Begin

Ensure that you have already configured the destination ports in monitor mode.

Procedure

	Command or Action	Purpose

Step 1	**config t**
	
	Example:
	`switch# config t`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**interface ethernet** *slot/port*[*-port*]
	
	Example:
	`switch(config)# interface ethernet 2/5`
	`switch(config-if)#`
		Enters interface configuration mode on the selected slot and port or range of ports.

	Command or Action	Purpose
Step 3	**switchport** **Example:** `switch(config-if)# switchport`	Configures switchport parameters for the selected slot and port or range of ports.
Step 4	**switchport mode** [**access** | **trunk**] **Example:** `switch(config-if)# switchport mode trunk`	Configures the following switchport modes for the selected slot and port or range of ports: • access • trunk
Step 5	**switchport monitor** **Example:** `switch(config-if)# switchport monitor`	Configures the switchport interface as an ERSPAN destination.
Step 6	Repeat Steps 2 to 5 to configure monitoring on additional ERSPAN destinations.	—
Step 7	**no monitor session** {*session-number* | **all**} **Example:** `switch(config-if)# no monitor session 3`	Clears the configuration of the specified ERSPAN session. The new session configuration is added to the existing session configuration.

Step 8	**monitor session** {*session-number* | **all**} **type erspan-destination**
	
	Example:
	`switch(config-if)# monitor session 3 type erspan-destination`
	`switch(config-erspan-dst)#`
		Configures an ERSPAN destination session.

Step 9	**description** *description* **Example:** `switch(config-erspan-dst)# description erspan_dst_session_3`	Configures a description for the session. By default, no description is defined. The description can be up to 32 alphanumeric characters.
Step 10	**source ip** *ip-address* **Example:** `switch(config-erspan-dst)# source ip 10.1.1.1`	Configures the source IP address in the ERSPAN session. Only one source IP address is supported per ERSPAN destination session.
Step 11	**destination** {[**interface** [*type slot/port*[*-port*][*, type slot/port[-port*]]] [**port-channel** *channel-number*]]} **Example:** `switch(config-erspan-dst)# destination interface ethernet 2/5, ethernet 3/7`	Configures a destination for copied source packets. You can configure one or more interfaces as a series of comma-separated entries. **Note** You can configure destination ports as trunk ports.

	Command or Action	Purpose
Step 12	Repeat Step 11 to configure all ERSPAN destinations.	(Optional) —
Step 13	**no shut** **Example:** `switch(config)# no shut`	Enables the ERSPAN destination session. By default, the session is created in the shut state. **Note** Only 23 ERSPAN destination sessions can be running simultaneously.
Step 14	**show monitor session** {**all** | *session-number* | **range** *session-range*} **Example:** `switch(config)# show monitor session 3`	(Optional) Displays the ERSPAN session configuration.
Step 15	**show running-config monitor** **Example:** `switch(config-erspan-src)# show running-config monitor`	(Optional) Displays the running ERSPAN configuration.
Step 16	**show startup-config monitor** **Example:** `switch(config-erspan-src)# show startup-config monitor`	(Optional) Displays the ERSPAN startup configuration.
Step 17	**copy running-config startup-config** **Example:** `switch(config-erspan-src)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.

Shutting Down or Activating an ERSPAN Session

You can shut down ERSPAN sessions to discontinue the copying of packets from sources to destinations. Because only two ERSPAN sessions can be running simultaneously, you can shut down a session in order to free hardware resources to enable another session. By default, ERSPAN sessions are created in the shut state.

You can enable ERSPAN sessions to activate the copying of packets from sources to destinations. To enable an ERSPAN session that is already enabled but operationally down, you must first shut it down and then enable it. You can shut down and enable the ERSPAN session states with either a global or monitor configuration mode command.

Procedure

	Command or Action	Purpose

Step 1	**configuration terminal**
	
	Example:
	`switch# configuration terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**monitor session** {*session-range* | **all**} **shut** **Example:** `switch(config)# monitor session 3 shut`	Shuts down the specified ERSPAN sessions. The session range is from 1 to 48. By default, sessions are created in the shut state. Only two sessions can be running at a time.
Step 3	**no monitor session** {*session-range* | **all**} **shut** **Example:** `switch(config)# no monitor session 3 shut`	Resumes (enables) the specified ERSPAN sessions. The session range is from 1 to 48. By default, sessions are created in the shut state. Only two sessions can be running at a time. **Note** If a monitor session is enabled but its operational status is down, then to enable the session, you must first specify the **monitor session shut** command followed by the **no monitor session shut** command.

Step 4	**monitor session** *session-number* **type erspan-source**
	
	Example:
	`switch(config)# monitor session 3 type erspan-source`
	`switch(config-erspan-src)#`
		Enters the monitor configuration mode for the ERSPAN source type. The new session configuration is added to the existing session configuration.

Step 5	**monitor session** *session-number* **type erspan-destination** **Example:** `switch(config-erspan-src)# monitor session 3 type erspan-destination`	Enters the monitor configuration mode for the ERSPAN destination type.
Step 6	**shut** **Example:** `switch(config-erspan-src)# shut`	Shuts down the ERSPAN session. By default, the session is created in the shut state.
Step 7	**no shut** **Example:** `switch(config-erspan-src)# no shut`	Enables the ERSPAN session. By default, the session is created in the shut state.
Step 8	**show monitor session all** **Example:** `switch(config-erspan-src)# show monitor session all`	(Optional) Displays the status of ERSPAN sessions.

	Command or Action	Purpose
Step 9	**show running-config monitor** **Example:** `switch(config-erspan-src)# show running-config monitor`	(Optional) Displays the running ERSPAN configuration.
Step 10	**show startup-config monitor** **Example:** `switch(config-erspan-src)# show startup-config monitor`	(Optional) Displays the ERSPAN startup configuration.
Step 11	**copy running-config startup-config** **Example:** `switch(config-erspan-src)# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.

Verifying the ERSPAN Configuration

To display the ERSPAN configuration, perform one of the following tasks:

Command	Purpose
show monitor session {**all** | *session-number* | **range** *session-range*}	Displays the ERSPAN session configuration.
show running-config monitor	Displays the running ERSPAN configuration.
show startup-config monitor	Displays the ERSPAN startup configuration.

Configuration Examples for ERSPAN

Configuration Example for an ERSPAN Source Session

This example shows how to configure an ERSPAN source session:

```
switch# config t
switch(config)# interface e14/30
switch(config-if)# no shut
switch(config-if)# exit
switch(config)# monitor erspan origin ip-address 3.3.3.3 global
switch(config)# monitor session 1 type erspan-source
switch(config-erspan-src)# source interface e14/30
switch(config-erspan-src)# ip ttl 16
switch(config-erspan-src)# ip dscp 5
switch(config-erspan-src)# vrf default
```

```
switch(config-erspan-src)# destination ip 9.1.1.2
switch(config-erspan-src)# no shut
switch(config-erspan-src)# exit
switch(config)# show monitor session 1
```

Configuration Example for an ERSPAN Destination Session

This example shows how to configure an ERSPAN destination session:

```
switch# config t
switch(config)# interface e14/29
switch(config-if)# no shut
switch(config-if)# switchport
switch(config-if)# switchport monitor
switch(config-if)# exit
switch(config)# monitor session 2 type erspan-destination
switch(config-erspan-dst)# source ip 9.1.1.2
switch(config-erspan-dst)# destination interface e14/29
switch(config-erspan-dst)# no shut
switch(config-erspan-dst)# exit
switch(config)# show monitor session 2
```

Additional References

Related Documents

Related Topic	Document Title
ERSPAN commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	*Cisco Nexus 3000 Series NX-OS System Management Command ReferenceCisco Nexus 5000 Series NX-OS System Management Command Reference*