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# Network Management Configuration Guide, Cisco Catalyst IE9300 Rugged Series Switches

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#### **Americas Headquarters**

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# ERSPAN

The Cisco Encapsulated Remote Switched Port Analyzer (ERSPAN) feature allows you to monitor traffic on ports or VLANs, and send the monitored traffic to destination ports over a Layer 3 (IP) network using Generic Routing Encapsulation (GRE) encapsulation. ERSPAN sends traffic to a network analyzer, such as a Switch Probe device or a Remote Monitoring (RMON) probe. ERSPAN supports source ports, source VLANs, and destination ports on different devices, which help remote monitoring of multiple devices across a network.

ERSPAN supports encapsulated packets of up to 9180 bytes. ERSPAN consists of an ERSPAN source session, routable ERSPAN GRE-encapsulated traffic, and an ERSPAN destination session.

You can configure an ERSPAN source session, an ERSPAN destination session, or both on a device. A device on which only an ERSPAN source session is configured is called an ERSPAN source device. A device on which only an ERSPAN destination session is configured is called an ERSPAN termination device. A device can act as both; an ERSPAN source device and a termination device.

Over-subscription of traffic can lead to a drop in management traffic on the destination device. To avoid over-subscription, ensure that the destination session is configured and is working on the destination device, before configuring a source session on the source device.

For a source port or a source VLAN, the ERSPAN can monitor the ingress, egress, or both ingress and egress traffic. By default, ERSPAN monitors all traffic, including multicast, and Bridge Protocol Data Unit (BPDU) frames.

A device supports up to 66 sessions. A maximum of eight source sessions can be configured and the remaining sessions can be configured as RSPAN destinations sessions. A source session can be a local SPAN source session or an RSPAN source session or an RSPAN source session.

An ERSPAN source session is defined by the following parameters:

- A session ID.
- ERSPAN flow ID.

- List of source ports or source VLANs that are monitored by the session.
- Optional attributes, such as, IP type of service (ToS) and IP Time to Live (TTL), related to the Generic Routing Encapsulation (GRE) envelope.
- The destination and origin IP addresses. These are used as the destination and source IP addresses of the GRE envelope for the captured traffic, respectively.

Note

- ERSPAN source sessions do not copy ERSPAN GRE-encapsulated traffic from source ports. Each ERSPAN source session can have either ports or VLANs as sources, but not both.
  - IPv4 delivery and transport headers are supported; including Type-II and Type-III headers.

Port channel and switch virtual interface (SVI) are supported.





# **Information About Configuring ERSPAN**

The following sections provide information about configuring ERSPAN.

## **Restrictions for Configuring ERSPAN**

The following restrictions apply for this feature:

- Truncation is supported only on IPv4 spanned packets and not on Layer 2 packets without an IP header.
- An ERSPAN destination interface can be part of only one session. The same destination interface cannot be configured for multiple ERSPANs/SPANs.
- You can configure either a list of ports or a list of VLANs as a source, but cannot configure both for a given session.
- Filter IP/MAC/VLAN access-group and filter SGT cannot be configured at the same time.

- When a session is configured through the ERSPAN CLI, the session ID and the session type cannot be changed. To change them, you must use the **no** form of the commands to remove the session and then reconfigure it.
- 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 Generic routing encapsulation (GRE)-encapsulated traffic from source ports.
- Disabling the ip routing command for IPv4 connections stops ERSPAN traffic flow to the destination port.

## **ERSPAN Sources**

The Cisco ERSPAN feature supports the following sources:

- Source ports: A source port that is monitored for traffic analysis. Source ports in any VLAN can be configured and trunk ports can be configured as source ports along with nontrunk source ports.
- Source VLANs: A VLAN that is monitored for traffic analysis.

## **ERSPAN Destination Ports**

A destination port is a Layer 2 or Layer 3 port to which ERSPAN source sends traffic for analysis.

When you configure a port as a destination port, it can no longer receive any traffic. The port is dedicated for use only by the ERSPAN feature. An ERSPAN destination port does not forward any traffic except that required for the ERSPAN session. You can configure trunk ports as destination ports, which allows destination trunk ports to transmit encapsulated traffic.

## **SGT-Based ERSPAN**

A Security Group Tag (SGT) is a 16-bit value that the Cisco Identity Services Engine (ISE) assigns to the user or endpoint session upon login. The network infrastructure views the SGT as another attribute to assign to the session and inserts the Layer 2 tag to all traffic from that session. A platform can support a maximum of 50 SGT policies per session.

On an existing flow-based SPAN (FSPAN) or VLAN filter session, SGT filtering configurations are not allowed.

## Prerequisites for Configuring ERSPAN

Apply the Access control list (ACL) filter before sending the monitored traffic on to the tunnel.

# **How to Configure ERSPAN**

The following sections provide information about how to configure ERSPAN.

## **Configuring an ERSPAN Source Session**

The ERSPAN source session defines the session configuration parameters and the ports or VLANs to be monitored. To define an IPv4 ERSPAN source session, complete the following procedure:

#### **SUMMARY STEPS**

- 1. enable
- **2**. configure terminal
- 3. monitor session span-session-number type erspan-source
- 4. description string
- 5. [no] header-type 3
- **6.** source {interface interface-type interface-number  $| vlan vlan-id \} [, | | both | rx | tx]$
- 7. filter {ip access-group {*standard-access-list* | *expanded-access-list* | *acl-name* } | mac access-group *acl-name* | sgt *sgt-ID* [, | -] | vlan *vlan-ID* [, | -] }
- 8. destination
- 9. erspan-id erspan-flow-id
- **10.** ip address *ip-address*
- **11. ip dscp** *dscp-value*
- **12.** ip ttl ttl-value
- 13. mtu mtu-size
- 14. origin ip-address ip-address
- 15. vrf vrf-id
- **16.** exit
- 17. no shutdown
- 18. end

#### **DETAILED STEPS**

Command or Action	Purpose	
enable	Enables privileged EXEC mode.	
Example:	Enter your password if prompted.	
Device> enable		
configure terminal	Enters global configuration mode.	
Example:		
Device# configure terminal		
monitor session span-session-number type	Defines an ERSPAN source session using the session ID	
erspan-source	session configuration mode.	
Example:	• The <i>span-session-number</i> argument range is from 1	
erspan-source	to 66. The same session number cannot be used more than once.	
	Command or Action enable Example: Device> enable configure terminal Example: Device# configure terminal monitor session span-session-number type erspan-source Example: Device(config)# monitor session 1 type erspan-source	

	Command or Action	Purpose
		• The session IDs for source sessions or destination sessions are in the same global ID space, so each session ID is globally unique for both session types.
		• The session ID (configured by the <i>span-session-number</i> argument) and the session type (configured by the <b>erspan-source</b> keyword) cannot be changed once entered. Use the <b>no</b> form of this command to remove the session and then re-create the session, with a new session ID or a new session type.
Step 4	description string	(Optional) Describes the ERSPAN source session.
	<pre>Example: Device(config-mon-erspan-src)# description source1</pre>	• The <i>string</i> argument can be up to 240 characters and cannot contain special characters or spaces.
Step 5	<pre>[no] header-type 3 Example: Device(config-mon-erspan-src)# header-type 3</pre>	(Optional) Configures a switch to Type-III ERSPAN header. The default type is Type-II ERSPAN header.
Step 6	<pre>source {interface interface-type interface-number   vlan vlan-id} [,   -   both   rx   tx] Example:</pre>	Configures the source interface or the VLAN, and the traffic direction to be monitored.
	Device(config-mon-erspan-src)# source interface fastethernet 0/1 rx	
Step 7	<pre>filter {ip access-group {standard-access-list   expanded-access-list   acl-name }   mac access-group</pre>	(Optional) Configures source VLAN filtering when the ERSPAN source is a trunk port.
	<pre>acl-name   sgt sgt-ID [,   -]   vlan vlan-ID [,   -]} Example: Switch(config-mon-erspan-src)# filter vlan 3</pre>	Note You cannot include source VLANs and filter VLANs in the same session.
Step 8	<pre>destination Example: Device(config-mon-erspan-src)# destination</pre>	Enters ERSPAN source session destination configuration mode.
Step 9	erspan-id erspan-flow-id Example: Device(config-mon-erspan-src-dst)# erspan-id 100	Configures the ID used by source and destination sessions to identify the ERSPAN traffic, which must also be entered in the ERSPAN destination session configuration.
Step 10	<pre>ip address ip-address Example: Device(config-mon-erspan-src-dst)# ip address 10.1.0.2</pre>	Configures the IP address that is used as the destination of the ERSPAN traffic.

	Command or Action	Purpose
Step 11	<pre>ip dscp dscp-value Example: Device(config-mon-erspan-src-dst)# ip dscp 10</pre>	(Optional) Enables the use of IP differentiated services code point (DSCP) for packets that originate from a circuit emulation (CEM) channel.
Step 12	<pre>ip ttl ttl-value Example: Device(config-mon-erspan-src-dst)# ip ttl 32</pre>	(Optional) Configures the IP TTL value of packets in the ERSPAN traffic.
Step 13	<pre>mtu mtu-size Example: Device(config-mon-erspan-src-dst)# mtu 512</pre>	Configures the MTU size for truncation. Any ERSPAN packet that is larger than the configured MTU size is truncated to the configured size. The MTU size range is 176 to 9000 bytes. The default value is 9000 bytes.
Step 14	<pre>origin ip-address ip-address Example: Device(config-mon-erspan-src-dst)# origin ip address 10.10.0.1</pre>	Configures the IP address used as the source of the ERSPAN traffic.
Step 15	<pre>vrf vrf-id Example: Device(config-mon-erspan-src-dst)# vrf 1</pre>	(Optional) Configures the VRF name to use instead of the global routing table.
Step 16	<pre>exit Example: Device(config-mon-erspan-src-dst)# exit</pre>	Exits ERSPAN source session destination configuration mode, and returns to ERSPAN source session configuration mode.
Step 17	<pre>no shutdown Example: Device(config-mon-erspan-src)# no shutdown</pre>	Enables the configured sessions on an interface.
Step 18	<pre>end Example: Device(config-mon-erspan-src)# end</pre>	Exits ERSPAN source session configuration mode, and returns to privileged EXEC mode.

# **Configuring an ERSPAN Destination Session**

The ERSPAN destination session defines the session configuration parameters and the ports that receive the monitored traffic. To define an IPv4 ERSPAN destination session, complete the following procedure:

#### **SUMMARY STEPS**

- 1. enable
- 2. configure terminal
- 3. monitor session session-number type erspan-destination
- 4. description string

- **5. destination interface** *interface-type interface-number*
- 6. source
- 7. erspan-id erspan-flow-id
- 8. ip address ip-address [force]
- 9. vrf vrf-id
- 10. no shutdown
- **11**. end

#### **DETAILED STEPS**

Command or Action	Purpose
enable	Enables privileged EXEC mode.
Example:	Enter your password if prompted.
Device> enable	
configure terminal	Enters global configuration mode.
Example:	
Device# configure terminal	
monitor session session-number type erspan-destination	Defines an ERSPAN destination session using the session
Example:	ID and the session type, and enters ERSPAN monitor destination session configuration mode
Device(config) # monitor session 1 type erspan-destination	<ul> <li>The <i>session-number</i> argument range is from 1 – 66. The session number must be unique and cannot be used more than once.</li> <li>The session IDs for source sessions or destination sessions are in the same global ID space, so each session ID is globally unique for both session types.</li> <li>The session ID (configured by the <i>session-number</i> argument) and the session type (configured by the erspan-destination) cannot be changed once entered. Use the no form of this command to remove the session, and then recreate the session with a new session ID or a new session type.</li> </ul>
description string	(Optional) Describes the ERSPAN destination session.
Example:	• The <i>string</i> argument can be up to 240 characters in
Device(config-mon-erspan-dst)# description source1	length and cannot contain special characters or spaces.
<pre>destination interface interface-type interface-number Example: Device(config-mon-erspan-dst)# destination interface GigabitEthernet1/0/1</pre>	Associates the ERSPAN destination session number with source ports, and selects the traffic direction to be monitored.
	Command or Action         enable         Example:         Device> enable         configure terminal         Example:         Device# configure terminal         monitor session session-number type erspan-destination         Example:         Device(config)# monitor session 1 type         erspan-destination         description string         Example:         Device(config-mon-erspan-dst)# description source1         destination interface interface-type interface-number         Example:         Device(config-mon-erspan-dst)# destination interface GigabitEthernet1/0/1

	Command or Action	Purpose
Step 6	<pre>source Example: Device(config-mon-erspan-dst)# source</pre>	Enters ERSPAN destination session source configuration mode.
Step 7	erspan-id erspan-flow-id Example: Device(config-mon-erspan-dst-src)# erspan-id 100	Configures the ID used by source and destination sessions to identify the ERSPAN traffic, which must also be entered in the ERSPAN source session configuration.
Step 8	<pre>ip address ip-address [force] Example: Device(config-mon-erspan-dst-src)# ip address 10.1.0.2</pre>	<ul> <li>Configures the IP address that is used as the destination of the ERSPAN traffic.</li> <li>This IP address must be an address on a local interface or loopback interface, and match the address on the destination switch.</li> <li>The <b>ip address</b> <i>ip-address</i> <b>force</b> command changes the destination IP address for all ERSPAN destination sessions.</li> </ul>
Step 9 Step 10	<pre>vrf vrf-id Example: Device(config-mon-erspan-dst-src)# vrf 1 no shutdown Example:</pre>	<ul><li>(Optional) Configures the VRF name to use instead of the global routing table.</li><li>Enables the configured sessions on an interface.</li></ul>
Step 11	end Example: Device(config-mon-erspan-dst-src)# no shutdown Example: Device(config-mon-erspan-dst-src)# end	Exits ERSPAN destination session source configuration mode, and returns to privileged EXEC mode.

# **Configuration Examples for ERSPAN**

The following sections provide configuration examples for ERSPAN.

### **Example: Configuring an ERSPAN Source Session**

The following example shows how to configure an ERSPAN source session:

```
Device> enable

Device# configure terminal

Device(config)# monitor session 1 type erspan-source

Device(config-mon-erspan-src)# description source1

Device(config-mon-erspan-src)# source interface GigabitEthernet 1/0/1 rx

Device(config-mon-erspan-src)# source interface GigabitEthernet 1/0/4 - 8 tx

Device(config-mon-erspan-src)# source interface GigabitEthernet 1/0/3

Device(config-mon-erspan-src)# destination

Device(config-mon-erspan-src-dst)# erspan-id 100

Device(config-mon-erspan-src-dst)# ip address 10.1.0.2
```

```
Device(config-mon-erspan-src-dst)# ip dscp 10
Device(config-mon-erspan-src-dst)# ip ttl 32
Device(config-mon-erspan-src-dst)# mtu 512
Device(config-mon-erspan-src-dst)# origin ip address 10.10.0.1
Device(config-mon-erspan-src-dst)# vrf monitoring
Device(config-mon-erspan-src-dst)# exit
Device(config-mon-erspan-src)# no shutdown
Device(config-mon-erspan-src)# end
```

#### Example: Configuring an ERSPAN Destination Session

The following example shows how to configure an ERSPAN destination session:

```
Device(config) # monitor session 2 type erspan-destination
Device(config-mon-erspan-dst) # destination interface GigabitEthernet1/0/11
Device(config-mon-erspan-dst) # destination interface GigabitEthernet1/0/1
Device(config-mon-erspan-dst) # source
Device(config-mon-erspan-dst-src) # erspan-id 100
Device(config-mon-erspan-dst-src) # ip address 10.1.0.2
```

The following example shows how to configure a source VRF for an ERSPAN destination session:

```
Device(config)# monitor session 2 type erspan-destination
Device(config-mon-erspan-dst)# destination interface GigabitEthernet1/0/11
Device(config-mon-erspan-dst)# destination interface GigabitEthernet1/0/1
Device(config-mon-erspan-dst)# source
Device(config-mon-erspan-dst-src)# erspan-id 100
Device(config-mon-erspan-dst-src)# ip address 10.1.0.2
Device(config-mon-erspan-dst-src)# vrf 1
```

## Verifying ERSPAN

To verify the ERSPAN configuration, use the following commands:

The following is sample output from the show monitor session command:

Device# show monitor session 53

. . .

Session 53	
Type	: ERSPAN Source Session
Status	: Admin Enabled
Source Ports	:
MTU	: 9000

The following is sample output from the **show platform software monitor session** command:

Device# show platform software monitor session 53

```
Span Session 53 (FED Session 0):
Type: ERSPAN Source
Prev type: Unknown
Ingress Src Ports:
Egress Src Ports:
Ingress Local Src Ports: (null)
Egress Local Src Ports: (null)
```

```
Destination Ports:
Ingress Src Vlans:
Egress Src Vlans:
Ingress Up Src Vlans: (null)
Egress Up Src Vlans: (null)
Src Trunk filter Vlans:
RSPAN dst vlan: 0
RSPAN src vlan: 0
RSPAN src vlan sav: 0
Dest port encap = 0 \times 0000
Dest port ingress encap = 0 \times 0000
Dest port ingress vlan = 0x0
SrcSess: 1 DstSess: 0 DstPortCfgd: 0 RspnDstCfg: 0 RspnSrcVld: 0
DstCliCfg: 0 DstPrtInit: 0 PsLclCfgd: 0
Flags: 0x0000000
Remote dest port: 0 Dest port group: 0
FSPAN disabled
FSPAN not notified
ERSPAN Id : 0
ERSPAN Org Ip: 0.0.0.0
ERSPAN Dst Ip: 0.0.0.0
ERSPAN Ip Ttl: 255
ERSPAN DSCP : 0
ERSPAN MTU : 1500 >>>>
ERSPAN VRFID : 0
ERSPAN State : Disabled
ERSPAN Tun id: 61
ERSPAN header-type: 2
ERSPAN SGT :
```

The following is sample output from the show monitor session erspan-source detail command:

Туре		:	ERSPAN	N Source	Session
Status		:	Admin	Enabled	
Descript	tion	:	-		
Source 1	Ports	:			
RX (	Only	:	None		
TX (	Only	:	None		
Botl	n	:	None		
Source S	Subinterfaces	:			
RX (	Only	:	None		
TX (	Only	:	None		
Botl	n	:	None		
Source V	VLANs	:			
RX (	Only	:	None		
TX (	Only	:	None		
Botl	n	:	None		
Source 1	Drop-cause	:	None		
Source 1	EFPs	:			
RX (	Only	:	None		
TX (	Only	:	None		
Botl	n	:	None		
Source 1	RSPAN VLAN	:	None		
Destinat	tion Ports	:	None		
Filter V	VLANs	:	None		
Filter S	SGT	:	None		
Dest RSI	PAN VLAN	:	None		
IP Acces	ss-group	:	None		
MAC Acce	ess-group	:	None		
IPv6 Ac	cess-group	:	None		
Filter a	access-group :Non	е			
smac fo:	r wan interface	:	None		

Device# show monitor session erspan-source detail

dmac for wan interface	:	None
Destination IP Address	:	192.0.2.1
Destination IPv6 Address	:	None
Destination IP VRF	:	None
MTU	:	1500
Destination ERSPAN ID	:	251
Origin IP Address	:	10.10.10.216
Origin IPv6 Address	:	None
IP QOS PREC	:	0
IPv6 Flow Label	:	None
IP TTL	:	255
ERSPAN header-type	:	3

The following output from the **show capability feature monitor erspan-source** command displays information about the configured ERSPAN source sessions:

Device# show capability feature monitor erspan-source

```
ERSPAN Source Session:ERSPAN Source Session Supported: TRUE
No of Rx ERSPAN source session: 8
No of Tx ERSPAN source session: 8
ERSPAN Header Type supported: II and III
ACL filter Supported: TRUE
SGT filter Supported: TRUE
Fragmentation Supported: TRUE
Truncation Supported: FALSE
Sequence number Supported: FALSE
QOS Supported: TRUE
```

The following output from the **show capability feature monitor erspan-destination** command displays all the configured global built-in templates:

Device# show capability feature monitor erspan-destination

ERSPAN Destination Session:ERSPAN Destination Session Supported: TRUE Maximum No of ERSPAN destination session: 8 ERSPAN Header Type supported: II and III

# **Additional References**

#### RFCs

Standard/RFC	Title
RFC 2784	Generic Routing Encapsulation (GRE)

#### **Technical Assistance**

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.	http://www.cisco.com/support
To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.	
Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	

# **Feature History for Configuring ERSPAN**

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for Configuring ERSPAN

Feature Name	Releases	Feature Information
ERSPAN	Cisco IOS XE Cupertino 17.7.1	This feature was introduced for Cisco Catalyst IE9300 Rugged Series Switches.