



Configuring ERSPAN

This chapter describes how to configure an encapsulated remote switched port analyzer (ERSPAN) to transport mirrored traffic in an IP network on Cisco NX-OS devices.

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About ERSPAN

ERSPAN transports mirrored traffic over an IP network, which provides remote monitoring of multiple switches across your 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 Types

Cisco Nexus 9300 Series switches support ERSPAN Type II, and Cisco Nexus 9500 Series switches support only ERSPAN.

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 (but not subinterfaces)
- Forward drops

**Note**

A single ERSPAN session can include mixed sources in any combination of the above.

ERSPAN Sessions

You can create ERSPAN sessions that designate sources to monitor.

Localized ERSPAN Sessions

An ERSPAN session is localized when all of the source interfaces are on the same line card.

High Availability

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

For more information on high availability, see the [Cisco Nexus 9000 Series NX-OS High Availability and Redundancy Guide](#).

Prerequisites for ERSPAN

ERSPAN has the following prerequisites:

- You must first configure the ports on each device to support the desired ERSPAN configuration. For more information, see the *Cisco Nexus 9000 Series NX-OS Interfaces Configuration Guide*.

Guidelines and Limitations for ERSPAN

**Note**

For scale information, see the release-specific *Cisco Nexus 9000 Series NX-OS Verified Scalability Guide*.

ERSPAN has the following configuration guidelines and limitations:

- ERSPAN destination handles jumbo frames for MTU differently based on the platform. For the following Cisco Nexus 9300 platform switches (and supporting line cards), ERSPAN destination drops the jumbo frames:

Switches

- Cisco Nexus 9332PQ
- Cisco Nexus 9372PX
- Cisco Nexus 9372PX-E
- Cisco Nexus 9372TX
- Cisco Nexus 9372TX-E

- Cisco Nexus 93120TX

Line Cards

- Cisco Nexus 9564PX
- Cisco Nexus 9464TX
- Cisco Nexus 9464TX2
- Cisco Nexus 9564TX
- Cisco Nexus 9464PX
- Cisco Nexus 9536PQ
- Cisco Nexus 9636PQ
- Cisco Nexus 9432PQ

For the following Cisco Nexus 9200-series switches (and supporting line cards), ERSPAN truncates the packets at port MTU, and issues a TX Output error:

Switches

- Cisco Nexus 92160YC-X
- Cisco Nexus 92304QC
- Cisco Nexus 9272Q
- Cisco Nexus 9232C
- Cisco Nexus 9236C
- Cisco Nexus 92300YC
- Cisco Nexus 93108TC-EX
- Cisco Nexus 93180LC-EX
- Cisco Nexus 93180YC-EX

Line Cards

- Cisco Nexus 9736C-EX
 - Cisco Nexus 97160YC-EX
 - Cisco Nexus 9732C-EX
 - Cisco Nexus 9732C-EXM
- For ERSPAN session limits, see the *Cisco Nexus 9000 Series NX-OS Verified Scalability Guide*.
 - The number of ERSPAN sessions per line card reduces to two if the same interface is configured as a bidirectional source in more than one session.
 - Only ERSPAN source sessions are supported. Destination sessions are not supported.



Note Support for destination sessions on Cisco Nexus 9200, 9300-EX, 9300-FX, and 9300-FX2 platform switches is available in Cisco NX-OS Release 9.3(1). See the Configuring ERSPAN chapter in the *Cisco Nexus 9000 Series NX-OS System Management Configuration Guide, Release 9.3(x)* for more information.

- Configuring two SPAN or ERSPAN sessions on the same source interface with only one filter is not supported. If the same source is used in multiple SPAN or ERSPAN sessions either all the sessions must have different filters or no sessions should have filters.
- TCAM carving is not required for SPAN/ERSPAN on the following line cards:
 - Cisco Nexus 9636C-R
 - Cisco Nexus 9636Q-R
 - Cisco Nexus 9636C-RX
 - Cisco Nexus 96136YC-R



Note All other switches supporting SPAN/ERSPAN must use TCAM carving.

- Statistics are not supported for the filter access group.
- An access-group filter in an ERSPAN session must be configured as `vlan-accessmap`.
- All ERSPAN replication is performed in the hardware. The supervisor CPU is not involved.
- Control plane packets generated by the supervisor cannot be ERSPAN encapsulated or filtered by an ERSPAN access control list (ACL).
- ERSPAN is not supported for management ports.
- ERSPAN does not support destinations on Layer 3 port-channel subinterfaces.
- ERSPAN and ERSPAN ACL sessions are terminated identically at the destination router only when the ERSPAN destination IP address is resolved through Cisco Nexus 9300 platform switch uplink ports.
- Supervisor-generated stream of bytes module header (SOBMH) packets have all of the information to go out on an interface and can bypass all forwarding lookups in the hardware, including SPAN and ERSPAN. CPU-generated frames for Layer 3 interfaces and the Bridge Protocol Data Unit (BPDU) class of packets are sent using SOBMH. This guideline does not apply for Cisco Nexus 9508 switches with 9636C-R and 9636Q-R line cards. The Cisco Nexus 9636C-R and 9636Q-R line cards both support inband SPAN and local SPAN.
- A VLAN can be part of only one session when it is used as an ERSPAN source or filter.
- VLAN ERSPAN monitors only the traffic that leaves or enters Layer 2 ports in the VLAN.
- If you enable ERSPAN on a vPC and ERSPAN packets need to be routed to the destination through the vPC, packets that come through the vPC peer link cannot be captured.
- ERSPAN is not supported over a VXLAN overlay.

- ERSPAN copies for multicast packets are made prior to rewrite. Therefore, the TTL, VLAN ID, any remarking due to egress policy, and so on are not captured in the ERSPAN copy.
- Marker packet for ERSPAN is not supported on Cisco Nexus 9508 switches with an 9732C-EX line card.
- Cisco Nexus 9300-EX/FX switches cannot serve as an ERSPAN destination for Cisco Nexus 3000 and non-EX/FX Cisco Nexus 9000 switches.

The following guidelines and limitations apply to egress (Tx) ERSPAN:

- Cisco Nexus 9300 Series switches do not support Tx ERSPAN on 40G uplink ports.
- The flows for post-routed unknown unicast flooded packets are in the ERSPAN session, even if the ERSPAN session is configured to not monitor the ports on which this flow is forwarded. This limitation applies to Network Forwarding Engine (NFE) and NFE2-enabled EOR switches and ERSPAN sessions that have TX port sources.

The following guidelines and limitations apply to ingress (Rx) ERSPAN:

- VLAN sources are spanned only in the Rx direction.
- Session filtering functionality (VLAN or ACL filters) is supported only for Rx sources.
- A single forwarding engine instance supports four ERSPAN sessions. For Cisco Nexus 9300 Series switches, if the first three sessions have bidirectional sources, the fourth session has hardware resources only for Rx sources. This limitation might also apply to Cisco Nexus 9500 platform switches, depending on the ERSPAN source's forwarding engine instance mappings.
- An ERSPAN copy of Cisco Nexus 9300 platform switch 40G uplink interfaces will miss the dot1q information when spanned in the Rx direction.
- VLANs are supported as ERSPAN sources only in the ingress direction.

The following guidelines and limitations apply to FEX ports:

- If the sources used in bidirectional ERSPAN sessions are from the same FEX, the hardware resources are limited to two ERSPAN sessions.
- FEX ports are supported as ERSPAN sources in the ingress direction for all traffic and in the egress direction only for known Layer 2 unicast traffic.
- Cisco Nexus 9300 platform switches do not support ERSPAN destination being connected on a FEX interface. The ERSPAN destination must be connected to a front panel port.
- VLAN and ACL filters are not supported for FEX ports.

Priority flow control (PFC) ERSPAN has the following guidelines and limitations:

- PFC (Priority Flow Control) and LLFC (Link-Level Flow Control) are supported for all Cisco Nexus 9300 and 9500 platform switches except for the 100 Gb 9408PC line card and the 100 Gb M4PC generic expansion module (GEM).
- It is not supported on Cisco Nexus 9300 Series uplink ports.
- It cannot co-exist with filters.

- It is supported only in the Rx direction on physical or port-channel interfaces. It is not supported in the Rx direction on VLAN interfaces or in the Tx direction.

The following guidelines and limitations apply to Cisco Nexus 9200 Series switches:

- The **set-erspan-gre-proto** and **set-erspan-dscp** actions for ERSPAN ACLs are supported beginning with Cisco NX-OS Release 7.0(3)I4(1).
- UDF-based ERSPAN is supported beginning with Cisco NX-OS Release 7.0(3)I4(1).
- ERSPAN supports forward drops beginning with Cisco NX-OS Release 7.0(3)I4(1).
- Rx ERSPAN is not supported for multicast if the ERSPAN source and destination are on the same slice and no forwarding interface is on the slice. It is supported if a forwarding interface is on the slice or if the ERSPAN source and destination are on different slices.
- When multiple egress ports on the same slice are congested by egressing ERSPAN traffic, those egress ports will not get the line rate.
- The CPU ERSPAN source can be added only for the Rx direction (ERSPAN packets coming from the CPU).
- Using the ACL filter to span subinterface traffic on the parent interface is not supported.
- Multiple ACL filters are not supported on the same source.

The following guidelines and limitations apply to ERSPAN truncation:

- Truncation is supported only for Cisco Nexus 9300-EX and 9300-FX platform switches, beginning with Cisco NX-OS Release 7.0(3)I7(1).
- Truncation is supported only for local and ERSPAN source sessions. It is not supported for ERSPAN destination sessions.
- For ERSPAN sessions, the configured MTU value excludes the ERSPAN header. The egress packet for ERSPAN will have the MTU value + the number of bytes for the ERSPAN header.
- The bytes specified are retained starting from the header of the packets. The rest are truncated if the packet is longer than the MTU.
- The cyclic redundancy check (CRC) is recalculated for the truncated packet.

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



Note Be aware that the Cisco NX-OS commands for this feature may differ from those commands used in Cisco IOS.

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.



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

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | configure terminal Example: switch# configure terminal 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 [shut] Example: switch(config)# monitor session 3 type erspan-source switch(config-erspan-src)# | Configures an ERSPAN Type II source session. By default the session is bidirectional. The optional keyword shut specifies a shut state for the selected 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. |

| | Command or Action | Purpose |
|----------------|---|---|
| Step 6 | source { <i>interface type</i> [<i>tx</i> <i>rx</i> both] } Example: <pre>switch(config-erspan-src)# source interface ethernet 2/1-3, ethernet 3/1 rx</pre> Example: <pre>switch(config-erspan-src)# source interface port-channel 2</pre> | <p>You can configure one or more sources, as either a series of comma-separated entries or a range of numbers. You can specify the traffic direction to copy as ingress, egress, or both.</p> <p>For a unidirectional session, the direction of the source must match the direction specified in the session.</p> |
| Step 7 | (Optional) Repeat Step 7 to configure all ERSPAN sources. | — |
| Step 8 | destination ip <i>ip-address</i> Example: <pre>switch(config-erspan-src)# destination ip 10.1.1.1</pre> | Configures the destination IP address in the ERSPAN session. Only one destination IP address is supported per ERSPAN source session. |
| Step 9 | erspan-id <i>erspan-id</i> Example: <pre>switch(config-erspan-src)# erspan-id 5</pre> | Configures the ERSPAN ID for the ERSPAN source session. The ERSPAN range is from 1 to 1023. |
| Step 10 | vrf <i>vrf-name</i> Example: <pre>switch(config-erspan-src)# vrf default</pre> | Configures the virtual routing and forwarding (VRF) instance that the ERSPAN source session uses for traffic forwarding. The VRF name can be any case-sensitive, alphanumeric string up to 32 characters. |
| Step 11 | (Optional) ip ttl <i>ttl-number</i> Example: <pre>switch(config-erspan-src)# ip ttl 25</pre> | Configures the IP time-to-live (TTL) value for the ERSPAN traffic. The range is from 1 to 255. |
| Step 12 | (Optional) ip dscp <i>dscp-number</i> Example: <pre>switch(config-erspan-src)# ip dscp 42</pre> | Configures the differentiated services code point (DSCP) value of the packets in the ERSPAN traffic. The range is from 0 to 63. |
| Step 13 | no shut Example: <pre>switch(config-erspan-src)# no shut</pre> | Enables the ERSPAN source session. By default, the session is created in the shut state. |
| Step 14 | exit Example: <pre>switch(config-erspan-src)# exit switch(config)#</pre> | Exits the monitor configuration mode. |
| Step 15 | (Optional) show monitor session { all <i>session-number</i> <i>range session-range</i> } [brief] Example: | Displays the ERSPAN session configuration. |

| | Command or Action | Purpose |
|----------------|--|--|
| | <code>switch(config)# show monitor session 3</code> | |
| Step 16 | (Optional) show running-config monitor Example: <code>switch(config)# show running-config monitor</code> | Displays the running ERSPAN configuration. |
| Step 17 | (Optional) show startup-config monitor Example: <code>switch(config)# show startup-config monitor</code> | Displays the ERSPAN startup configuration. |
| Step 18 | (Optional) copy running-config startup-config Example: <code>switch(config)# copy running-config startup-config</code> | 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. You can shut down one 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 | configure terminal Example: <code>switch# configure terminal</code> <code>switch(config)#</code> | Enters global configuration mode. |
| Step 2 | monitor session {session-range all} shut Example: <code>switch(config)# monitor session 3 shut</code> | Shuts down the specified ERSPAN sessions. By default, sessions are created in the shut state. |
| Step 3 | no monitor session {session-range all} shut Example: <code>switch(config)# no monitor session 3 shut</code> | Resumes (enables) the specified ERSPAN sessions. By default, sessions are created in the shut state. If a monitor session is enabled but its operational status is down, then to enable the session, you must first specify the monitor |

| | Command or Action | Purpose |
|----------------|--|---|
| | | session shut command followed by the no monitor session shut command. |
| Step 4 | monitor session <i>session-number</i> type erspan-source Example: <pre>switch(config)# monitor session 3 type erspan-source switch(config-erspan-src)#</pre> | Enters the monitor configuration mode for the ERSPAN source type. The new session configuration is added to the existing session configuration. |
| Step 5 | shut Example: <pre>switch(config-erspan-src)# shut</pre> | Shuts down the ERSPAN session. By default, the session is created in the shut state. |
| Step 6 | no shut Example: <pre>switch(config-erspan-src)# no shut</pre> | Enables the ERSPAN session. By default, the session is created in the shut state. |
| Step 7 | exit Example: <pre>switch(config-erspan-src)# exit switch(config)#</pre> | Exits the monitor configuration mode. |
| Step 8 | (Optional) show monitor session all Example: <pre>switch(config)# show monitor session all</pre> | Displays the status of ERSPAN sessions. |
| Step 9 | (Optional) show running-config monitor Example: <pre>switch(config)# show running-config monitor</pre> | Displays the ERSPAN running configuration. |
| Step 10 | (Optional) show startup-config monitor Example: <pre>switch(config)# show startup-config monitor</pre> | Displays the ERSPAN startup configuration. |
| Step 11 | (Optional) copy running-config startup-config Example: <pre>switch(config)# copy running-config startup-config</pre> | 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} [brief] | 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 Over IPv6

This example shows how to configure an ERSPAN source session over IPv6:

```
switch# configure terminal
switch(config)# monitor erspan origin ipv6-address 2001::10:0:0:9 global
switch(config)# moni session 10 type erspan-source
switch(config-erspan-src)# erspan-id 10
switch(config-erspan-src)# vrf default
switch(config-erspan-src)# source interface ethernet 1/64
switch(config-erspan-src)# destination ip 9.1.1.2
```

Configuration Example for an ERSPAN ACL

This example shows how to configure an ERSPAN ACL:

```
switch# configure terminal
switch(config)# ip access-list match_11_pkts
switch(config-acl)# permit ip 11.0.0.0 0.255.255.255 any
switch(config-acl)# exit
switch(config)# ip access-list match_12_pkts
switch(config-acl)# permit ip 12.0.0.0 0.255.255.255 any
switch(config-acl)# exit
switch(config)# vlan access-map erspan_filter 5
switch(config-access-map)# match ip address match_11_pkts
switch(config-access-map)# action forward
switch(config-access-map)# exit
switch(config)# vlan access-map erspan_filter 10
switch(config-access-map)# match ip address match_12_pkts
switch(config-access-map)# action forward
switch(config-access-map)# exit
switch(config)# monitor session 1 type erspan-source
switch(config-erspan-src)# filter access_group erspan_filter
```

Additional References

Related Documents

| Related Topic | Document Title |
|---------------|--|
| FEX | <i>Cisco Nexus 2000 Series NX-OS Fabric Extender Software Configuration Guide for Cisco Nexus 9000 Series Switches</i> |