Segment Routing Command Reference for Cisco NCS 5500 Series Routers

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CONTENTS

Preface

The *Segment Routing Command Reference for Cisco NCS 5500 Series Routers* preface contains these sections:

- [Changes to This Document, page v](#)
- [Obtaining Documentation and Submitting a Service Request, page v](#)

Changes to This Document

The following table lists the technical changes made to this document since it was first published.

Date	Summary
September 2017	Republished with documentation updates for Cisco IOS XR Release 6.3.1 features.
May 2017	Republished with documentation updates for Cisco IOS XR Release 6.1.31 features.
November 2016	Initial release of this document.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see What's New in Cisco Product Documentation.

To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the What's New in Cisco Product Documentation RSS feed. RSS feeds are a free service.

Segment Routing Commands

adjacency-sid

To manually allocate an adjacency segment ID (Adj-SID) on an interface, use the **adjacency-sid** command in IS-IS interface address family configuration mode.

adjacency-sid {**index** *adj-sid-index* | **absolute** *adj-sid-value*}[**protected**]

no adjacency-sid {**index** *adj-sid-index* | **absolute** *adj-sid-value*}[**protected**]

Syntax Description

index *adj-sid-index*	Specifies the Adj-SID for each link based on the lower boundary of the SRLB + the index.
absolute *adj-sid-value*	Specifies the specific Adj-SID for each link within the SRLB.
protected	Specify if the Adj-SID is protected. For each primary path, if the Adj-SID is protected on the primary interface and a backup path is available, a backup path is installed. By default, manual Adj-SIDs are not protected.

Command Default

Adjacency SID is not protected.

Command Modes

IS-IS interface address-family configuration

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Segment routing must be configured on the ISIS instance before configuring adjacency SID value.

Manually allocated Adj-SIDs are supported on point-to-point (P2P) interfaces.

Task ID

Task ID	Operations
isis	read, write

Examples

This example shows how to configure an Adj-SID.

```
RP/0/RSP0/CPU0:router # configure
RP/0/RSP0/CPU0:router(config)# router isis 100
RP/0/RSP0/CPU0:router(config-isis)# interface GigabitEthernet0/0/0/7
RP/0/RSP0/CPU0:router(config-isis-if)# point-to-point
RP/0/RSP0/CPU0:router(config-isis-if)# address-family ipv4 unicast
RP/0/RSP0/CPU0:router(config-isis-if-af)# adjacency-sid index 10
```

Related Commands

Command	Description
segment-routing local-block, on page 26	Configures the segment routing local block (SRLB).

attribute-set

Configures the attribute set for an LSP.

attribute-set *name* [**isis** *instance-name* | **lockdown** | **ospf** *instance-name* | **protected-by** *index* | **segment-routing**]

Syntax Description

name	Specifies an identifier for the attribute set. The identifier can be up to 64 characters in length.
isis *instance-name*	Restricts the LSP to a single IS-IS instance and area.
lockdown	Locks the LSP against reoptimization.
ospf *instance-name*	Restricts the LSP to a single OSPF instance and area.
protected-by *index*	Protects the LSP specified by the index. The index ranges from 1 to 1000.
segment-routing	Enables segment routing for the LSP.

Command Default None

Command Modes Path option interface configuration mode

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-te	read, write

Examples

This example shows how to set an attribute set for a path-option:

```
RP/0/RSP0/CPU0:router(config)# interface tunnel-te22
RP/0/RSP0/CPU0:router(config-if)# ipv4 unnumbered loopback0
RP/0/RSP0/CPU0:router(config-if)# destination 192.168.0.2
RP/0/RSP0/CPU0:router(config-if)# path-selection segment-routing adjacency protected
RP/0/RSP0/CPU0:router(config-if)# path-option 30 dynamic attribute-set example protected-by
 20
```

Related Commands

Command	Description
path-option	Configures a path option for an SR-TE policy.

autoroute announce

To specify that the Interior Gateway Protocol (IGP) should use the tunnel (if the tunnel is up) in its enhanced shortest path first (SPF) calculation, use the **autoroute announce** command in interface configuration mode. To return to the default behavior, use the **no** form of this command

autoroute announce [ip2mpls]

no autoroute announce

Syntax Description

ip2mpls	(Optional) Specifies a non-tunnel interface as the outgoing interface to avoid looping of the labeled packet back to the tunnel ingress (source).

Command Default None

Command Modes Tunnel interface configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When more than one IGP is configured, the tunnel is announced as an auto route to the IGP that is used to compute the TE tunnel path.

When the **autoroute announce** command is configured, the route metric of the tunnel path to the destination equals the route metric of the shortest IGP path to that destination.

Task ID

Task ID	Operations
mpls-te	read, write

Examples This example shows how to configure IGP to use the tunnel in its enhanced SPF calculation when the tunnel is up:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-te 1
```

```
RP/0/RSP0/CPU0:router(config-if)# autoroute announce
```

autoroute destination

To install multiple static routes in the routing information base (RIB) per tunnel, use the **autoroute destination** command in the tunnel interface TE configuration mode.

To disable **autoroute destination**, use the **no** form of this command.

autoroute destination *ip-address*

no autoroute destination *ip-address*

Syntax Description

ip-address	Specifies the host address of the route to be installed in the RIB.

Command Default

Autoroute destination is disabled.

Command Modes

Tunnel interface configuration mode.

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-te	read, write

Examples

This example shows how to install four routes in the RIB for tunnel 10:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tunnel-te 10
RP/0/RSP0/CPU0:router(config-if)# autoroute destination 192.168.1.2
RP/0/RSP0/CPU0:router(config-if)# autoroute destination 192.168.2.2
RP/0/RSP0/CPU0:router(config-if)# autoroute destination 192.168.3.2
RP/0/RSP0/CPU0:router(config-if)# autoroute destination 192.168.4.2
```

clear segment-routing local-block discrepancy all

Clears segment routing local block (SRLB) label conflicts.

clear segment-routing local-block discrepancy all

Syntax Description   This command has no keywords or arguments.

Command Default   None

Command Modes   EXEC

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When you define a new SRLB range, there might be a label conflict (for example, if labels are already allocated, statically or dynamically, in the new SRLB range). In this case, the new SRLB range will be accepted, but not applied (pending). The previous SRLB range (active) will continue to be in use until one of the following occurs:

- Reload the router to release the currently allocated labels and allocate the new SRLB

- Use the **clear segment-routing local-block discrepancy all** command to clear the label conflicts

Task ID

Task ID	Operation

Examples   This example shows how to clear SRLB label conflicts.

```
RP/0/RSP0/CPU0:router(config)# clear segment-routing local-block discrepancy all
```

Related Commands

Command	Description
show segment-routing local-block inconsistencies, on page 29	Displays SRLB label conflicts
segment-routing local-block, on page 26	Configures the SRLB

explicit-path

Configures a fixed path through the network.

explicit-path name *path_name*

Syntax Description

path_name	Specifies a name for an explicit path.

Command Default

None

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-te	read, write

Examples

This example shows how to specify a path name and enter explicit-path configuration mode:

```
RP/0/RSP0/CPU0:router(config)# explicit-path name ABCD1_Nodes
RP/0/RSP0/CPU0:router(config-expl-path)#
```

Related Commands

Command	Description
index	Determines the order of path selection.

fast-reroute

To enable Topology Independent Loop Free Alternate (TI-LFA) path for SR-TE policies using the IP Fast Reroute (FRR) mechanism, use the **fast-reroute** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

fast-reroute per-prefix ti-lfa

no fast-reroute

Syntax Description

per-prefix	Specifies an alternate path for every prefix on the specified interface.
ti-lfa	Enables link-protecting TI-LFA.

Command Default

FRR is disabled.

Link protection is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
Release 6.1.3	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When a protected link used by the fast-reroutable label switched path (LSP) fails, the traffic is rerouted to a previously assigned backup tunnel. Configuring FRR on the tunnel informs all the nodes that the LSP is traversing that this LSP desires link/bandwidth protection.

You must verify the redundancy is ready after an RP switchover before triggering FRR on standby RP to synchronize with the active RP (verified using the **show redundancy** command). All TE tunnels must be in the recovered state and the database must be in the ready state for all ingress and egress line cards. To verify this information, use the **show mpls traffic-eng tunnels** and **show mpls traffic-eng fast-reroute database** commands.

Note   We recommend that you wait approximately 60 seconds before triggering FRR after verifying the database state.

If the priority associated with the specified tiebreaker is higher than any other tiebreakers, then the specified post-convergence backup path will be selected, if it is available.

Task ID		
Task ID	**Operations**	
isis	read, write	
ospf		

Examples

The following example shows how to enable FRR on an interface:

```
RP/0/RSP0/CPU0:R1(config)# router isis 1
RP/0/RSP0/CPU0:R1(config-isis)# interface TenGigE0/0/0/2/1
RP/0/RSP0/CPU0:R1(config-isis-if)# point-to-point
RP/0/RSP0/CPU0:R1(config-isis-if)# address-family ipv4 unicast
RP/0/RSP0/CPU0:R1(config-isis-if)# fast-reroute per-prefix
RP/0/RSP0/CPU0:R1(config-isis-if)# fast-reroute per-prefix ti-lfa
RP/0/RSP0/CPU0:R1(config-isis-if)# exit
```

index

Marks an explicit path. The index determines the order of path selection.

index *index_number* {{**exclude-address** | **exclude-srlg** | **next-address** [**loose** | **strict**]} **ipv4 unicast** *ip_address*} | {**next-label** *label*}

Syntax Description

index_number	Defines priority for the path to be selected. Ranges from 1 to 65535.
exclude-address	Specifies the IP address to be excluded from the path.
exclude-srlg	Specifies the IP address from which Shared Risk Link Groups (SRLGs) are derived for exclusion.
next-address	Specifies the next IP address in the path.
loose	Specifies the next hop in the path as a flexible hop.
strict	Specifies the next hop in the path as a fixed hop
ipv4 unicast *ip_address*	Specifies the the IPv4 unicast address.
next-label *label*	Specifies the next label in the path.

Command Default   None

Command Modes   Explicit path configuration mode

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

You can include multiple addresses, labels, or both. However, once you start configuring labels, you need to continue with labels. You cannot use addresses after you use labels.

Task ID

Task ID	Operation
mpls-te	read, write

Examples

This example shows how to insert the next-address and next-label for explicit path ABCD1_Nodes:

```
RP/0/RSP0/CPU0:router(config)# explicit-path name ABCD1_Nodes
RP/0/RSP0/CPU0:router(config-expl-path)# index 10 next-address strict ipv4 unicast
  192.168.0.2
RP/0/RSP0/CPU0:router(config-expl-path)# index 20 next-label 24012
```

Related Commands

Command	Description
explicit-path	Configures a fixed path through the network.

path-option

To configure a path option for an SR-TE policy, use the **path-option** command in tunnel-te interface configuration mode. To return to the default behavior, use the **no** form of this command.

path-option *path_preference_value* {**dynamic** [**attribute-set** | **isis** | **lockdown** | **ospf** | **pce** | **protected-by**] | **explicit** {**identifier** *path-number* | **name** *path-name*} [**attribute-set** | **isis** | **lockdown** | **ospf** | **protected-by** | **verbatim**]} **segment-routing**

Syntax Description

path_preference_value	Specifies the preference for an LSP. Range is from 1 to 1000.
dynamic [**attribute-set**	**isis**	**lockdown**	**ospf**	**pce**	**protected-by**]	Configures a dynamically allocated path based on the configured options. See the **attribute-set** statement for a description of all the attributes.
explicit {**identifier** *path-number*	**name** *path-name*} [**attribute-set**	**isis**	**lockdown**	**ospf**	**protected-by**	**verbatim**]	Configures a preset path, based on the configured options. The **verbatim** option is required for disabling loop detection on the path. When you configure this option, the topology database is not referred by the source router while configuring the preset path. See the **attribute-set** statement for a description of all the attributes.
segment-routing	Configures a segment routing path, based on the configured options.

Command Default

None

Command Modes

Tunnel-te interface configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-te	read, write

Examples

This example shows how to configure the tunnel to use an explicit path for segment routing:

```
RP/0/RSP0/CPU0:router(config)# interface tunnel-te22
RP/0/RSP0/CPU0:router(config-if)# ipv4 unnumbered loopback0
RP/0/RSP0/CPU0:router(config-if)# destination 192.168.0.2
RP/0/RSP0/CPU0:router(config-if)# path-selection segment-routing adjacency protected
RP/0/RSP0/CPU0:router(config-if)# path-option 1 explicit name ABCD1_Nodes segment-routing
```

Related Commands

Command	Description
attribute-set	Configures the attribute set for an LSP.
index	Determines the order of path selection.

path-selection

Configures the LSP to be selected for the SR-TE tunnel.

path-selection [**cost-limit** *limit* | **hop-limit** *limit* | **invalidation** *timer* [**tear** | **drop**] | **metric** [**igp** | **te**] **segment-routing adjacency** [**protected** | **unprotected**] | **tiebreaker** [**max-fill** | **min-fill** | **random**]]

Syntax Description

cost-limit *limit*	Configures the cost limit for the LSP. Ranges from 1 to 4294967295.
hop-limit *limit*	Configures the hop limit for the LSP. Ranges from 1 to 255.
invalidation *timer* [**tear** | **drop**]	Configures the path invalidation timer. When the timer expires, the path is either torn down or just the segment labeled data is dropped. Ranges from 0 to 60000.
metric [**igp** | **te**]	Configures the type of metric to be used for the LSP.
segment-routing adjacency [**protected** | **unprotected**]	Configures the type of adjacency for segment routing.
tiebreaker [**max-fill** | **min-fill** | **random**]	Configures the tie breaker for path calculation of equal cost multiple paths. **Max-fill** selects the path with the most-utilized links. **Min-fill** selects the path with the least-utilized links. Random selects the path with randomly utilized links.

Command Default   None

Command Modes   Tunnel interface configuration mode

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID		
	Task ID	**Operation**
	mpls-te	read, write

Examples
This example shows how to set the path-selection for segment routing adjacency protection.

```
RP/0/RSP0/CPU0:router(config)# interface tunnel-te22
RP/0/RSP0/CPU0:router(config-if)# path-selection segment-routing adjacency protected
```

ping sr-mpls

To check the connectivity of segment routing control plane, use the **ping sr-mpls** command in XR EXEC mode.

ping sr-mpls{*ipv4-address/mask* [**fec-type** { **bgp** | **generic** | **igp**{ **ospf** | **isis**}}] | **nil-fec labels**{*label* [**,***label*...]} {**output** {**interface** *interface-path-id*} } {**nexthop** *next-hop-ip-address*}}

Syntax Description

ipv4-address/mask	Address prefix of the target and number of bits in the target address network mask.
fec-type	(Optional) Specifies FEC type to be used. Default FEC type is generic.
	bgp
	Use FEC type as BGP.
	generic
	Use FEC type as generic
	igp
	Use FEC type as OSPF or IS-IS.
labels *label,label...*	Specifies the label stack. Use commas to separate each label.
output interface *interface-path-id*	Specifies the output interface where echo request packets are sent.
nexthop *next-hop-ip-address*	Causes packets to go through the specified next-hop address.

Command Default

fec-type : generic

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
mpls-te	read, write

Examples   Example

These examples show how to use segment routing ping to test the connectivity of segment routing control plane. In the first example, FEC type is not specified. You can also specify the FEC type as shown in the second example.

```
RP/0/RP0/CPU0:router# ping sr-mpls 10.1.1.2/32

Sending 5, 100-byte MPLS Echos to 10.1.1.2/32,
      timeout is 2 seconds, send interval is 0 msec:

Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
  'L' - labeled output interface, 'B' - unlabeled output interface,
  'D' - DS Map mismatch, 'F' - no FEC mapping, 'f' - FEC mismatch,
  'M' - malformed request, 'm' - unsupported tlvs, 'N' - no rx label,
  'P' - no rx intf label prot, 'p' - premature termination of LSP,
  'R' - transit router, 'I' - unknown upstream index,
  'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.

!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/5 ms
RP/0/RP0/CPU0:router# ping sr-mpls 10.1.1.2/32 fec-type igp ospf

Sending 5, 100-byte MPLS Echos to 10.1.1.2/32,
      timeout is 2 seconds, send interval is 0 msec:

Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
  'L' - labeled output interface, 'B' - unlabeled output interface,
  'D' - DS Map mismatch, 'F' - no FEC mapping, 'f' - FEC mismatch,
  'M' - malformed request, 'm' - unsupported tlvs, 'N' - no rx label,
  'P' - no rx intf label prot, 'p' - premature termination of LSP,
  'R' - transit router, 'I' - unknown upstream index,
  'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.

!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

prefix-sid

To specify or advertise prefix (node) segment ID (SID) on all routers, use the **prefix-sid** command in IS-IS interface address family or OSPF interface configuration mode. To stop advertising prefix SID, use the **no** form of this command.

prefix-sid {**index** *sid-index* | **absolute** *sid-value*}[**n-flag-clear**][**explicit-null**]

no prefix-sid {**index** *sid-index* | **absolute** *sid-value*}[**n-flag-clear**][**explicit-null**]

Syntax Description

index *sid-index*	Specifies the prefix SID based on the lower boundary of the SRGB + the index.
absolute *sid-value*	Specifies the specific prefix SID value within the SRGB.
n-flag-clear	Specifies that the prefix-SID is not a node-SID by setting the N flag in the prefix-SID sub Type Length Value (TLV) to 0.
explicit-null	Adds an explicit-Null label by setting the E flag in the prefix-SID sub TLV to 1. Automatically disables penultimate-hop-popping (PHP) by setting the P flag (IS-IS) or NP flag (OSPF) to 1.

Command Default

Prefix SID is a node SID (N-flag is set to 1).

Explicit-Null label is not set (E-flag is set to 0).

Command Modes

IS-IS interface address-family configuration

OSPF interface configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Segment routing must be configured on the ISIS instance or on the OSPF process, area, or interface before configuring prefix SID value.

Task ID

Task ID	Operations
isis	read, write
ospf	

Examples

This example shows how to configure a prefix SID.

```
RP/0/RSP0/CPU0:router # configure
RP/0/RSP0/CPU0:router(config)# router isis 100
RP/0/RSP0/CPU0:router(config-isis)# interface loopback0
RP/0/RSP0/CPU0:router(config-isis-if)# address-family ipv4 unicast
RP/0/RSP0/CPU0:router(config-isis-if-af)# prefix-sid index 1001
```

This example shows how to configure an absolute prefix SID on an OSPF interface.

```
RP/0/RSP0/CPU0:router # configure
RP/0/RSP0/CPU0:router(config)# router ospf 1
RP/0/RSP0/CPU0:router(config-ospf)# router area 0
RP/0/RSP0/CPU0:router(config-ospf-ar)# interface loopback0
RP/0/RSP0/CPU0:router(config-ospf-ar-if)# prefix-sid absolute 16041
```

Related Commands

Command	Description
segment-routing global-block	Configures the segment routing global block (SRGB).

segment-routing global-block

To configure the segment routing global block (SRGB), use the **segment-routing global-block** command.

segment-routing global-block *starting_value ending_value*

Syntax Description

starting_value ending_value	Specifies the block of segment routing IDs that are allocated for the routers in the network. Ranges from 16000 to 1048574.

Command Default Default SRGB range is 16000 to 23999.

Command Modes Global Configuration mode

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

To keep the segment routing configuration simple and to make it easier to troubleshoot segment routing issues, we recommend that you use the default SRGB range on each node in the domain. However, there are instances when you might need to define a different range:

- The nodes of another vendor support a label range that is different from the default SRGB, and you want to use the same SRGB on all nodes.

- The default range is too small.

- To specify separate SRGBs for IS-IS and OSPF protocols, as long as the ranges do not overlap.

Because the values assigned from the range have domain-wide significance, we recommend that all routers within the domain be configured with the same range of values.

Task ID

Task ID	Operation
mpls-te	read, write

Examples   This example shows how to configure the SRGB range:

```
RP/0/RSP0/CPU0:router(config)# segment-routing global-block 17000 20000
```

Related Commands

Command	Description
prefix-sid	Configures the segment ID (SID).

segment-routing local-block

To configure the segment routing local block (SRLB), use the **segment-routing local-block** command.

segment-routing local-block *starting_value ending_value*

Syntax Description

starting_value ending_value	Specifies the block of labels that are reserved for manual allocation of adjacency segment IDs (Adj-SIDs). Ranges from 15000 to 1048574.

Command Default Default SRLB range is 15000 to 15999.

Command Modes Global Configuration mode

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When you define a new SRLB range, there might be a label conflict (for example, if labels are already allocated, statically or dynamically, in the new SRLB range). In this case, the new SRLB range will be accepted, but not applied (pending). The previous SRLB range (active) will continue to be in use until one of the following occurs:

   • Reload the router to release the currently allocated labels and allocate the new SRLB

   • Use the **clear segment-routing local-block discrepancy all** command to clear the label conflicts

The SRLB size cannot be more than 262,143.

To keep the segment routing configuration simple and to make it easier to troubleshoot segment routing issues, we recommend that you use the default SRLB range on each node in the domain. However, there are instances when you might need to define a different range:

   • The nodes of another vendor support a label range that is different from the default SRLB, and you want to use the same SRLB on all nodes.

   • The default range is too small.

Because the values assigned from the range have domain-wide significance, we recommend that all routers within the domain be configured with the same range of values.

Task ID

Task ID	Operation
mpls-te	read, write

Examples

This example shows how to configure the SRLB range:

```
RP/0/RSP0/CPU0:router(config)# segment-routing local-block 18000 19999
```

Related Commands

Command	Description
clear segment-routing local-block discrepancy all, on page 9	Clears SRLB label conflicts
show segment-routing local-block inconsistencies, on page 29	Displays SRLB label conflicts

segment-routing mpls

To enable segment routing for IPv4 addresses with MPLS data plane, use the **segment-routing mpls** command in IPv4 address family configuration mode. To disable segment routing, use the **no** form of this command.

segment-routing mpls

Syntax Description

mpls	Enables segment routing for IPv4 addresses with MPLS data plane.

Command Default   No default behavior or values.

Command Modes   IPv4 address family configuration

Router configuration

Area configuration

Command History

Release	Modification
Release 6.1.2	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-te	read, write

Examples   This example shows how to enable segment routing with MPLS data plane.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# router isis 100
RP/0/RSP0/CPU0:router(config-isis)# address-family ipv4 unicast
RP/0/RSP0/CPU0:router(config-isis-af)# segment-routing mpls
```

show segment-routing local-block inconsistencies

Displays any segment routing local block (SRLB) label inconsistencies.

show segment-routing local-block inconsistencies

Syntax Description   This command has no keywords or arguments.

Command Default   None

Command Modes   EXEC

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When a new SRLB range is defined, there might be a label conflict (for example, if labels are already allocated, statically or dynamically, in the new SRLB range). In this case, the new SRLB range will be accepted, but not applied (pending). The previous SRLB range (active) will continue to be in use until one of the following occurs:

- Reload the router to release the currently allocated labels and allocate the new SRLB

- Use the **clear segment-routing local-block discrepancy all** command to clear the label conflicts

Task ID

Task ID	Operation

Examples   This example shows how to display the SRGB inconsistencies:

```
RP/0/RSP0/CPU0:router(config)# show segment-routing local-block inconsistencies
Tue Aug 15 13:53:30.555 EDT
SRLB inconsistencies range: Start/End: 30000/30009
```

Related Commands

Command	Description
clear segment-routing local-block discrepancy all, on page 9	Clears SRLB label conflicts
segment-routing local-block, on page 26	Configures the SRLB

traceroute sr-mpls

To trace the routes to a destination in a segment routing network, use the **traceroute sr-mpls** command in XR EXEC mode.

traceroute sr-mpls { *ipv4-address/mask* [**fec-type** { **bgp**| **generic** | **igp**{ **ospf** | **isis**}}]| **multipath**{*ipv4-address/mask* [**fec-type** { **bgp**| **generic**| **igp**{ **ospf**| **isis**}}}| **nil-fec labels** {*label* [**,***label*...]} {**output** {**interface** *interface-path-id*} } {**nexthop** *next-hop-ip-address*}}

Syntax Description

address/mask	Address prefix of the target and number of bits in the target address network mask.
fec-type	(Optional) Specifies FEC type to be used. Default FEC type is generic.
	bgp
	Use FEC type as BGP.
	generic
	Use FEC type as generic.
	igp
	Use FEC type as OSPF or ISIS.
labels *label,label...*	Specifies the label stack. Use commas to separate each label.
output interface *interface-path-id*	Specifies the output interface where echo request packets are sent.
nexthop *next-hop-ip-address*	Causes packets to go through the specified next-hop address.

Command Default　**fec-type** : generic

Command Modes　XR EXEC mode

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines   To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
mpls-te	read, write

Examples   Example
These examples show how to use segment routing traceroute to trace the LSP for a specified IPv4 prefix segment routing id (SID). In the first example, FEC type is not specified. You can also specify the FEC type as shown in the second example. The third example uses multipath traceroute to discover all the possible paths for a IPv4 prefix SID.

```
RP/0/RP0/CPU0:router# traceroute sr-mpls 10.1.1.2/32

Tracing MPLS Label Switched Path to 10.1.1.2/32, timeout is 2 seconds

Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
  'L' - labeled output interface, 'B' - unlabeled output interface,
  'D' - DS Map mismatch, 'F' - no FEC mapping, 'f' - FEC mismatch,
  'M' - malformed request, 'm' - unsupported tlvs, 'N' - no rx label,
  'P' - no rx intf label prot, 'p' - premature termination of LSP,
  'R' - transit router, 'I' - unknown upstream index,
  'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.

  0 10.12.12.1 MRU 1500 [Labels: implicit-null Exp: 0]
! 1 10.12.12.2 3 ms

RP/0/RP0/CPU0:router# traceroute sr-mpls 10.1.1.2/32  fec-type  igp ospf

Tracing MPLS Label Switched Path to 10.1.1.2/32, timeout is 2 seconds

Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
  'L' - labeled output interface, 'B' - unlabeled output interface,
  'D' - DS Map mismatch, 'F' - no FEC mapping, 'f' - FEC mismatch,
  'M' - malformed request, 'm' - unsupported tlvs, 'N' - no rx label,
  'P' - no rx intf label prot, 'p' - premature termination of LSP,
  'R' - transit router, 'I' - unknown upstream index,
  'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.

  0 10.12.12.1 MRU 1500 [Labels: implicit-null Exp: 0]
! 1 10.12.12.2 2 ms

RP/0/RP0/CPU0:router# traceroute sr-mpls multipath 10.1.1.2/32

Starting LSP Path Discovery for 10.1.1.2/32

Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
  'L' - labeled output interface, 'B' - unlabeled output interface,
  'D' - DS Map mismatch, 'F' - no FEC mapping, 'f' - FEC mismatch,
  'M' - malformed request, 'm' - unsupported tlvs, 'N' - no rx label,
  'P' - no rx intf label prot, 'p' - premature termination of LSP,
  'R' - transit router, 'I' - unknown upstream index,
  'X' - unknown return code, 'x' - return code 0
```

```
Type escape sequence to abort.

!
Path 0 found,
 output interface GigabitEthernet0/0/0/2 nexthop 10.13.13.2
source 10.13.13.1 destination 127.0.0.0
!
Path 1 found,
 output interface Bundle-Ether1 nexthop 10.12.12.2
source 10.12.12.1 destination 127.0.0.0

Paths (found/broken/unexplored) (2/0/0)
Echo Request (sent/fail) (2/0)
Echo Reply (received/timeout) (2/0)
Total Time Elapsed 14 ms
```