



L2VPN over SR-TE Preferred Path

Table 1: Feature History

Feature Name	Release Information	Description
L2VPN Traffic Steering Using SR-TE Preferred Path with Flexible Algorithm	Cisco IOS XE Bengaluru 17.6.1	This feature allows you to configure an SR policy with as the preferred path for a VPWS or VPLS pseudowire, with Flexible Algorithm. VPWS or VPLS pseudowires between same PEs can be routed over different SR policies based on the requirements. Prior to this release, you could only steer the traffic using the SR policy for routing IPv4 traffic to a destination pseudowire (over IGP or BGP-LU).

Virtual Private LAN Services (VPLS) enables enterprises to link together multiple Ethernet-based LANs via the infrastructure provided by their service provider.

VPLS uses the service provider core to join multiple attachment circuits of an enterprise to simulate a virtual bridge. From the enterprise point of view, there is no topology for VPLS. All customer edge (CE) devices appear to connect to a logical bridge emulated by the service provider core.

Prior to Cisco IOS XE Bengaluru Release 17.6.1, L2VPN (VPLS or VPWS) traffic over SR policies could not be steered. You could only steer IPv4 traffic using the SR policy for routing IPv4 traffic to a destination pseudowire (over IGP or BGP-LU).

Now you configure an SR policy as the preferred path for a VPWS or VPLS pseudowire, with Flexible Algorithm. VPWS or VPLS pseudowires between same PEs can also be routed over different SR policies.

Disable Fallback Option

The disable fallback option disables the router from using the default path when the preferred path SR policy goes down.

- [Restrictions, on page 2](#)
- [Configuring L2VPN Traffic Steering Using SR-TE Preferred Path with Flexible Algorithm, on page 2](#)
- [Configuration Example 1: VPWS Psuedowire over SR-TE Preferred Path, on page 4](#)
- [Configuration Example 2: VPWS Psuedowire over SR-TE Preferred Path, on page 4](#)

- [Configuration Example 3: VPLS Psuedowire over SR-TE Preferred Path, on page 5](#)
- [Verification of L2VPN over SR-TE Preferred Path Configuration, on page 5](#)

Restrictions

- You cannot add On-Demand (ODN) policies to the preferred path.
- L2VPN over SR-TE preferred path is only supported on SR Per Destination Policy (PDP); and not on the SR Per-Flow Policy (PFP).
- L2VPN over SR-TE preferred path can only be configured using the pseudowire interface.
- This feature is supported only on IS-IS protocol

Configuring L2VPN Traffic Steering Using SR-TE Preferred Path with Flexible Algorithm

To configure IS-IS with Flex Algo:

```
router isis 1

affinity-map green bit-position 0
affinity-map red bit-position 1
affinity-map yello bit-position 2
flex-algo 128
  advertise-definition
  metric-type delay
  priority 200
  affinity
    exclude-any
    name red
    name yellow
!
flex-algo 129
  advertise-definition
  priority 200
  affinity
    exclude-any
    name green
    name red

interface Tunnel100
isis affinity flex-algo
  name green
!
interface Tunnel101
isis affinity flex-algo
  name yellow
!
interface Tunnel102
isis affinity flex-algo
  name red
```

```

segment-routing traffic-eng
policy p-2000
  color 2000 end-point 10.4.4.4
  performance-measurement
  delay-measurement
  candidate-paths
  preference 10
  constraints
  segments
    dataplane mpls
    algorithm 128
  !
  !
  !
dynamic

```

To create SR static policy for MPLS label:

```

configure terminal segment-routing traffic-eng
segment-list name segment-name
index 1 mpls label first hop label
index 2 mpls label second hop label !
policy policy-name
color color-code end-point destination IP Address candidate-paths
preference preference
explicit segment-list segment-name
constraints
segments dataplane mpls

```

You can also create SR static policy for the following:

- MPLS adjacency
- MPLS prefix

L2VPN over SR-TE preferred path can be configured in the following ways:

- Non-Template based Configuration
- Template-based Configuration

Non-template Based Configuration:

- **Create Pseudowire**

To create pseudowire:

```

interface pseudowire 1
  encapsulation mpls
  neighbor peer-address vc-id

```

- **Attach Policy Using Preferred Path**

To attach a policy using the preferred path:

```

interface pseudowire1
  preferred-path segment-routing traffic-eng policy policy-name [disable-fallback]

```

Template-based Configuration:

- **Create Template Type Pseudowire**

To create template type pseudowire:

```

template type pseudowire name
  encapsulation mpls
  preferred-path segment-routing traffic-eng policy name [disable-fallback]

```

• Attach Policy Using Preferred Path

To attach a policy using the preferred path:

```

interface pseudowire 1
  source template type pseudowire name

```

Configuration Example 1: VPWS Psuedowire over SR-TE Preferred Path

```

!
interface
gi0/0/1
service instance 1000
ethernet encapsulation
dot1q 1000 !
template type pseudowire l2vpntest
  encapsulation mpls
preferred-path Segment-Routing traffic-eng policy p106
l2vpn xconnect context l2vpn-test
member 10.6.6.6 1000 template
l2vpntest member gi0/0/1
service-instance 1000 !

```

Configuration Example 2: VPWS Psuedowire over SR-TE Preferred Path

```

!
!
interface gi0/0/1
service instance 1000 ethernet
  encapsulation dot1q 1000
!
template type pseudowire
l2vpntest encapsulation mpls
preferred-path Segment-Routing traffic-eng policy p106 !

interface pseudowire1000
  source template type pseudowire l2vpntest
  encapsulation mpls neighbor 10.1.1.1 1000 !

l2vpn xconnect context l2vpn-test
member pseudowire 1000
  member gi0/0/1 service-instance 1000

```

Configuration Example 3: VPLS Psuedowire over SR-TE Preferred Path

```

interface gi0/0/1

service instance 1000
ethernet encapsulation
dot1q 1000 !

interface pseudowire106
encapsulation mpls
neighbor 10.6.6.6 1000

preferred-path Segment-Routing traffic-eng policy p106 !
interface pseudowire104
encapsulation mpls
neighbor 10.4.4.4 1000

preferred-path Segment-Routing traffic-eng policy p104
!
l2vpn vfi context VC_1000 vpn id 1000 member
pseudowire106 member pseudowire104
!

bridge-domain 1000

member gi0/0/1 service-instance
1000 member vfi VC_1000

```

Verification of L2VPN over SR-TE Preferred Path Configuration

Use the **show segment-routing traffic-eng policy name *policy name* detail** command to verify the policy configuration:

```

Router#show segment-routing traffic-eng policy name CE11-PE12 detail

Name: CE11-PE12 (Color: 50 End-point: 10.12.12.12)
Owners : CLI
Status:
  Admin: up, Operational: up for 70:04:00 (since 08-17 07:55:36.536)
Candidate-paths:
  Preference 100 (CLI):
    Explicit: segment-list IntraDomain (active)
    Weight: 1, Metric Type: TE
16005
16008
16010
Attributes:
  Binding SID: 20
  Allocation mode: dynamic
  State: Programmed
Tunnel ID: 65538 (Interface Handle: 0x20)
Per owner configs:
  CLI
  Binding SID: dynamic
Stats:
  Packets: 0 Bytes: 0

```

Event history:	Client	Event type	Context:
Timestamp			
Value			
-----	-----	-----	
-----:-----			
10-28 04:05:37.028	L2VPN	Policy created	Name: L2VPN
10-28 04:05:37.048	L2VPN	BSID allocated	FWD: label
20 10-28 04:05:37.494	L2VPN	Client removed	Owner:
Destroyed			
10-28 04:05:37.494	CLI	Set colour	Colour:
230 10-28 04:05:37.494	CLI	Set end point	End-point:
12.12.12.12			
10-28 04:05:37.496	CLI	Set explicit path	Path option:
IntraDomain			
10-28 04:08:22.873	FH Resolution	Policy state UP	Status:
PATH RESOLVED			
10-28 04:08:45.630	FH Resolution	REOPT triggered	Status:
REOPTIMIZED			

Use **show mpls l2transport vc 1000 detail** command to verify the L2VPN over SR-TE preferred path:

```
Router#show mpls l2transport vc 1000 detail
Local interface: VFI VC_1000 vfi up
Interworking type is Ethernet
Destination address: 10.12.12.12, VC ID: 1000, VC status: up
  Output interface: tu65538, imposed label stack {16005 16008 16010 32}
  Preferred path: not configured
  Default path: active
  Next hop: 10.168.1.1
Create time: 1w4d, last status change time: 22:50:57
Last label FSM state change time: 22:51:46
Signaling protocol: LDP, peer 10.1.1.1:0 up
Targeted Hello: 10.2.2.2(LDP Id) -> 10.1.1.1, LDP is UP
Graceful restart: not configured and not enabled
Non stop routing: not configured and not enabled
Status TLV support (local/remote) : enabled/supported
  LDP route watch : enabled
  Label/status state machine : established, LruRru
  Last local dataplane status rcvd: No fault
  Last BFD dataplane status rcvd: Not sent
  Last BFD peer monitor status rcvd: No fault
  Last local AC circuit status rcvd: No fault
  Last local AC circuit status sent: No fault
  Last local PW i/f circ status rcvd: No fault
  Last local LDP TLV status sent: No fault
  Last remote LDP TLV status rcvd: No fault
  Last remote LDP ADJ status rcvd: No fault
MPLS VC labels: local 26, remote 21
Group ID: local n/a, remote 16
MTU: local 9000, remote 9000
Remote interface description:
MAC Withdraw: sent:0, received:301
Sequencing: receive disabled, send disabled
Control Word: On (configured: autosense)
```