

Using SSPF with Segment Routing

The Segment Routing TE feature provides information support for the Strict Shortest Path First (SPF).

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Feature Information for SSPF with Segment Routing

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 https://cfnng.cisco.com/. An account on Cisco.com is not required.

Table 1: Feature Information for Segment Routing SSPF Feature

Feature Name	Releases	Feature Information
Segment Routing TE Feature	Cisco IOS XE Amsterdam 17.3.2	The Segment Routing TE feature provides information support for the Strict Shortest Path First (SPF).. The following commands were introduced or modified: **address-family ipv4 strict-spf**, **bfd-template single-hop**, **index range**, **sbfd local-discriminator**, **show bfd neighbor**, **show isis segment-routing**, **show mpls forwarding-table**, **show mpls traffic tunnel**, **show mpls traffic-engineering**.

Information About SSPF with Segment Routing

Strict Shortest Path First

Segment Routing supports the following two algorithms:

- Algorithm 0: This is a Shortest Path First (SPF) algorithm based on link metric. This shortest path algorithm is computed by the Interior gateway protocol (IGP).
- Algorithm 1: This is a Strict Shortest Path First (SSPF) algorithm based on link metric. The algorithm 1 is identical to algorithm 0 but requires that all nodes along the path honor the SPF routing decision. Local policy does not alter the forwarding decision. For example, a packet is not forwarded through locally engineered path.

Different SIDs are associated with the same prefix for each algorithm.

Strict Shortest Path First is supported by default - but strict SIDs must be configured for at least one node address on each node supporting Segment Routing.

Approaches for Configure Strict Shortest Path First

The two approaches to configure Strict SFP are as follows:

- Using the **connect-prefix-sid-map** command—Strict SFP is configured globally on all the nodes. For a network to be Strict SFP-aware (that is, for ISIS to populate Strict SPF), all nodes must be configured with a local Strict SFP SID.
- Using Segment-routing Mapping Server—One node in the network is configured as mapping server and the remaining nodes act as a client.

How to Configure SSPF with Segment Routing

Configuring Strict Shortest Path First (SPF)

Enabling Strict Shortest Path First Using the connect-prefix-sid-map command

Enabling Shortest Path First on a Provider-Edge Device

When enabling Strict Shortest Path First using the **connect-prefix-sid-map** command, the Strict Shortest Path First (SPF) must be configured on the provider-edge device first and then on the node devices. The following is a sample configuration code snippet to enable Strict Shortest Path First on a provider-edge device.

```
segment-routing mpls
connected-prefix-sid-map
  address-family ipv4
   10.10.10.10/32 index 100 range 1
  exit-address-family
  address-family ipv4 strict-spf
   10.10.10.10/32 index 1000 range 1 ------------------configure strict SPF locally
  exit-address-family
```

Enabling Shortest Path First on a Node Device

The following is a sample configuration code snippet to enable Strict Shortest Path First on a node in the network and must be enabled on all nodes in a network.

```
segment-routing mpls
```

```
connected-prefix-sid-map
  address-family ipv4
   10.20.20.20/32 index 110 range 1
  exit-address-family
  address-family ipv4 strict-spf
   10.20.20.20/32 index 1100 range 1
  exit-address-family
```

Enabling Strict Shortest Path First Using Segment Routing Mapping Server

Configuring a Node as Segment Routing Mapping Server

The following is a sample configuration code snippet to configure a node as Segment Routing Mapping Server.

```
segment-routing mpls
mapping-server
  prefix-sid-map
   address-family ipv4
    10.10.10.10/32 index 100 range 1
    10.20.20.20/32 index 110 range 1
    10.30.30.30/32 index 120 range 1
    10.40.40.40/32 index 130 range 1
    10.50.50.50/32 index 140 range 1
   exit-address-family
   address-family ipv4 strict-spf
    10.10.10.10/32 index 1000 range 1
    10.20.20.20/32 index 1100 range 1
    10.30.30.30/32 index 1200 range 1
    10.40.40.40/32 index 1300 range 1
    10.50.50.50/32 index 1400 range 1
    10.100.100.100/32 index 2000 range 1
   exit-address-family
```

Configuring the Segment Routing Mapping Server to Advertise and Receive Local Prefixes

The following is a sample configuration code snippet to configure a Segment Routing Mapping Server to advertise and receive local prefixes.

```
router isis SR
segment-routing mpls
 segment-routing prefix-sid-map advertise-local
 segment-routing prefix-sid-map receive
```

Verifying ISIS Advertises the SIDs

The following is a sample configuration code snippet to verify that ISIS advertises the SIDs.

```
Router# show isis segment-routing prefix-sid-map advertise strict-spf
Tag SR:
IS-IS Level-1 advertise prefix-sid maps:
Prefix               SID Index    Range        Flags
10.10.10.10/32       1000         1
10.20.20.20/32       1100         1
10.30.30.30/32       1200         1
10.40.40.40/32       1300         1
10.50.50.50/32       1400         1
10.100.100.100/32    2000         1
Tag SR:
IS-IS Level-2 advertise prefix-sid maps:
Prefix               SID Index    Range        Flags
10.10.10.10/32       1000         1
10.20.20.20/32       1100         1
10.30.30.30/32       1200         1
```

```
10.40.40.40/32       1300         1
10.50.50.50/32       1400         1
10.100.100.100/32    2000         1
```

The following is a sample configuration code snippet to verify that a provider-edge device receives Strict Shortest Path First SID from SRMS Server.

```
Router# show isis segment-routing prefix-sid-map receive strict-spf

Tag SR:
IS-IS Level-1 receive prefix-sid maps:
Host                  Prefix              SID Index    Range        Flags
P1                    10.10.10.10/32      1000         1
                      10.20.20.20/32      1100         1
                      10.30.30.30/32      1200         1
                      10.40.40.40/32      1300         1
                      10.50.50.50/32      1400         1
                      10.100.100.100/32   2000         1
Tag SR:
IS-IS Level-2 receive prefix-sid maps:
Host                  Prefix              SID Index    Range        Flags
P1                    10.10.10.10/32      1000         1
                      10.20.20.20/32      1100         1
                      10.30.30.30/32      1200         1
                      10.40.40.40/32      1300         1
                      10.50.50.50/32      1400         1
                      10.100.100.100/32   2000         1
```

Additional References for SSPF with Segment Routing

Related Documents

Related Topic	Document Title
Segment Routing Traffic Engineering configuration	*Segment Routing -Traffic Engineering*