



Enable Traffic Steering with SRv6 Locators

This chapter focuses on SRv6 locators, which are fundamental IPv6 address prefixes used to identify blocks of Segment Identifiers within an SRv6 network. It examines the structure and various types of locators, including Base Format, uSID, and Anycast locators, and discusses their specific applications and limitations.

- [SRv6 Locators, on page 1](#)
- [Limitations for locators, on page 2](#)
- [Configure SRv6 locators, on page 3](#)

SRv6 Locators

An SRv6 locator is a unique IPv6 address prefix that

- identifies a block of Segment Identifiers (SIDs) in an SRv6-enabled network
- belongs to a specific node in an SRv6-enabled network, and
- enables routing and forwarding based on SRv6 SIDs.

A SID is a 128-bit value in SRv6 networks that represents a specific instruction or path in the network. For more information, see [Segment Identifiers](#).

Structure of a SRv6 locator

The structure of an SRv6 locator consists of the most significant bits of the SID and serves as the address of a specific SRv6 node. The locator can be further divided into:

- **SID block:** The most significant portion that designates the SRv6 domain. This field is the SRv6 network designator and is a fixed or known address space for an SRv6 domain. This is the most significant bit (MSB) portion of a locator subnet.
- **Node Id:** This field is the node designator in an SRv6 network and is the least significant bit (LSB) portion of a locator subnet.

Types of locators

SRv6 supports several locator types to identify nodes and services within an SRv6 domain. Each locator type addresses specific requirements in network design and operation. The main SRv6 locator types are Base Format locator (F1), uSID locator (F3216), and Anycast locator.

Table 1: Comparison of SRv6 locator types

Feature	Base Format Locator (F1)	uSID Locator (F3216)	Anycast Locator
Definition	The Base Format locator is a standard SRv6 locator that identifies a specific router or node within the SRv6 domain. It uses a prefix to indicate the node and a function identifier (Func ID) to specify what action the node should perform.	The uSID locator is an advanced SRv6 locator that compresses multiple SRv6 segments into a single IPv6 address.	An anycast locator is a shared locator that identifies a group of nodes (Anycast group). All nodes in the group advertise the same locator, allowing traffic to be routed to the nearest node.
Components	Locator prefix and Function identifier (Func ID)	Locator prefix Micro-SID stack (uSIDs)	Anycast locator Prefix Function identifier (Func ID)
Format	<Locator Prefix>::<Function ID>	<Locator Prefix>::<uSID>:<uSID>:<uSID>	<Anycast Locator Prefix>::<Function ID>
Example	2001:db8:1::1 Prefix: 2001:db8:1::/48 Func ID: 1	2001:db8:2::100:200:300 Prefix: 2001:db8:2::/48 uSIDs: 100, 200, 300	2001:db8:3::2 Prefix: 2001:db8:3::/48 advertised by multiple nodes Func ID: 2
Usecase	Node Identification Simple SRv6 Deployments	Efficient Path Encoding Service Chaining	Redundancy and Load Balancing Exit Points in SRv6 Domains

Limitations for locators

Limitations for uSID locators

- Cisco IOS XR supports uSIDs with 32-bit uSID blocks and 16-bit uSID IDs (3216). You must use a single UCF format for uSID locators in an SRv6 uSID domain.
- Cisco IOS XR supports up to 16 uSID locator prefixes. Configure multiple locator prefixes when using anycast locators or SRv6 Flexible Algorithm instances.
- Cisco IOS XR supports uSID locator prefixes from different uSID blocks. You can configure up to 256 uSID blocks across all uSID locators in the network.

Limitations for anycast locators

- ISIS: Unlike a normal locator, IS-IS does not program or advertise uA SIDs associated with an anycast locator.
- TI-LFA backup: uN SIDs allocated from anycast locators will not be used in constructing TI-LFA backup paths or Microloop Avoidance primary paths. TI-LFA backup and Microloop Avoidance paths for an Anycast locator prefix may terminate on any node advertising that locator, which may be different from the node terminating the original primary path.
- Flexible algorithm: SRv6 anycast locators may have non-zero algorithm (Flexible Algorithm) values.

Configure SRv6 locators

Define and configure SRv6 locators, which represent IPv6 address spaces and behaviors used for SRv6. A locator configuration is essential for enabling SRv6 routing and forwarding within your network.

Follow these steps to configure SRv6 locators:

Procedure

Step 1 Enable SRv6 and configure a locator globally.

Example:

```
Router(config)# segment-routing srv6
Router(config-srv6)# locators
Router(config-srv6-locators)# locator myLoc1
Router(config-srv6-locator)# micro-segment behavior unode psp-usd
Router(config-srv6-locator)# prefix 2001:0:8::/48
```

You need to configure the locator prefix value, specify the locator as a micro-segment (uSID) locator and specify that IGP underlay uSID (uN/uA) variant is PSP-USD for this locator.

- To configure a locator with a flexible algorithm:

```
Router(config)# segment-routing srv6
Router(config-srv6)# locators
Router(config-srv6-locators)# locator myLocAlgo128
Router(config-srv6-locator)# algorithm 128
Router(config-srv6-locator)# micro-segment behavior unode psp-usd
Router(config-srv6-locator)# prefix 2001:0:88::/48
```

- To configure an anycast locator:

```
Router(config)# segment-routing srv6
Router(config-srv6)# locators
Router(config-srv6-locators)# locator myLocAnycast
Router(config-srv6-locator)# anycast
Router(config-srv6-locator)# micro-segment behavior unode psp-usd
Router(config-srv6-locator)# prefix 2001:0:100::/48
```

- To advertise anycast prefixes on an interface

```
Router(config)# router isis core
Router(config-isis)# interface Loopback100
Router(config-isis-if)# prefix-attributes anycast level 1
```

- To configure an SRv6-TE locator and binding SID:

```
Router#configure
Router(config)#segment-routing traffic-eng
Router(config-sr-te)#srv6 locator loc1 binding-sid dynamic behavior ub6-encaps-reduced
```

Step 2 (Optional) Customize SRv6 logging and SID allocation parameters.

Example:

```
Router(config)# segment-routing srv6
Router(config-srv6)# logging locator status
Router(config-srv6)# sid holdtime 10
RP/0/RSP0/CPU0:Node1(config-srv6)#
```

Step 3 Verify overall SRv6 state and platform capabilities using SRv6 manager.

Example:

```
Router# SF-D#sh segment-routing srv6 manager
Parameters:
  SRv6 Enabled: No
  SRv6 Operational Mode: None
  Encapsulation:
    Source Address:
      Configured: ::
      Default: 77::77
    Hop-Limit: Default
    Traffic-class: Default
  SID Formats:
    f3216 <32B/16NFA> (2)
  uSID LIB Range:
    LIB Start : 0xe000
    ELIB Start : 0xfe00
  uSID WLIB Range:
    EWLIB Start : 0xfff7
Summary:
  Number of Locators: 0 (0 operational)
  Number of SIDs: 0 (0 stale)
  Max SID resources: 24000
  Number of free SID resources: 24000
  OOR:
    Thresholds (resources): Green 1200, Warning 720
    Status: Resource Available
    History: (0 cleared, 0 warnings, 0 full)
Platform Capabilities:
  SRv6: Yes
  TILFA: Yes
  Microloop-Avoidance: Yes
  Endpoint behaviors:
    End.DT6
    End.DT4
    End.DT46
    End (PSP/USD)
    End.X (PSP/USD)
    uN (PSP/USD)
    uA (PSP/USD)
    uDT6
    uDT4
    uDT46
  Headend behaviors:
    H.Insert.Red
    H.Encaps.Red
  Security rules:
```

```

SEC-1
SEC-2
SEC-3
Counters:
  None
Signaled parameters:
  Max-SL : 3
  Max-End-Pop-SRH : 3
  Max-H-Insert : 0 sids
  Max-H-Encap : 2 sids
  Max-End-D : 5
Configurable parameters (under srv6):
  Ranges:
    LIB : Yes
    WLIB : Yes
  Encapsulation:
    Source Address: Yes
    Hop-Limit : value=No, propagate=Yes
    Traffic-class : value=No, propagate=Yes
    Default parameters (under srv6):
      Encapsulation:
        Hop-Limit : value=128, propagate=No
        Traffic-class : value=0, propagate=No
        Max Locators: 16
        Max SIDs: 24000
        SID Holdtime: 3 mins
Router# :SF-D#

```

Step 4 Verify the locator configuration and its operational status.

Example:

Router# **show segment-routing srv6 locator myLoc1 detail**

Name	ID	Algo	Prefix	Status	Flags
myLoc1	3	0	2001:0:8::/48	Up	U

(U): Micro-segment (behavior: uN (PSP/USD))

Interface:

Name: srv6-myLoc1

IFH : 0x02000120

IPv6 address: 2001:0:8::/48

Number of SIDs: 1

Created: Dec 10 21:26:54.407 (02:52:26 ago)

Step 5 Verify local SID allocation from locators.

Displays allocation information for SIDs belonging to a locator

Example:

Router# **show segment-routing srv6 locator myLoc1 sid**

SID	Behavior	Context	Owner
2001:0:8::	uN (PSP/USD)	'default':1	sidmgr

InUse Y

Step 6 View the detailed information for a specific SRv6 local SID.

Example:

```

Router# show segment-routing srv6 locator myLoc1 sid 2001:0:8:: detail
SID                               Behavior      Context                               Owner
State  RW
-----
-----
2001:0:8::                        uN (PSP/USD)  'default':8                          sidmgr
InUse  Y
SID Function: 0x8
SID context: { table-id=0xe0800000 ('default':IPv6/Unicast), opaque-id=8 }
Locator: 'myLoc1'
Allocation type: Dynamic
Created: Dec 10 22:10:51.596 (02:10:05 ago)

```

What to do next

You can use these **show** commands to verify the SRv6 global and locator configuration:

Command	Description
show segment-routing srv6 manager	Displays the summary information from SRv6 manager, including platform capabilities.
show segment-routing srv6 locator <i>locator-name</i> [detail]	Displays the SRv6 locator information on the router.
show segment-routing srv6 locator <i>locator-name</i> sid [<i>sid-ipv6-address</i> [detail]]	Displays the information regarding SRv6 local SID(s) allocated from a given locator.
show segment-routing srv6 sid [<i>sid-ipv6-address</i> all stale] [detail]	Displays SID information across locators. By default, only “active” (i.e. non-stale) SIDs are displayed.
show route ipv6 local-srv6	Displays all SRv6 local-SID prefixes in IPv6 RIB.