

IS-IS Extension to Advertise SRv6 SIDs using SID Block

draft-cheng-lsr-isis-srv6-sid-block-00

Weiqiang Cheng (China Mobile)

Wenying Jiang (China Mobile)

Changwang Lin (New H3C Technologies)

Mengxiao Chen (New H3C Technologies)

Liyan Gong (China Mobile)

Yao Liu (ZTE Corporation)

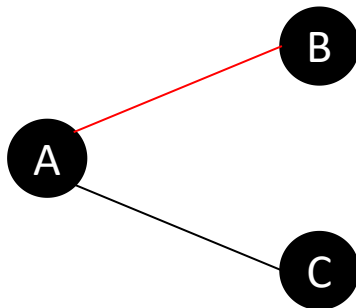
IETF-114 Meeting, July 2022

Background

- [I-D.ietf-lsr-isis-srv6-extensions] defines the advertisement of SRv6 End and End.X SIDs in IS-IS.
 - SRv6 End SID sub-TLV
 - SRv6 End.X SID sub-TLV
 - SRv6 LAN End.X SID sub-TLV
- Each sub-TLV contains a complete 128-bit SID.

Problem

- Multiple SRv6 End.X SIDs may be associated with the same point to point adjacency or the same physical LAN neighbor.
- The number of End.X SIDs is at least the number of neighbors multiplied by the number of flavors.
- If Flexible-Algorithm is applied, a node advertises a Flex-Algorithm specific locator, along with End.X SIDs for every link that has not been pruned from the Flex-Algorithm computation.
- Under some scenarios the number of End.X SIDs can be quite large. Advertising SRv6 SIDs needs considerable amounts of IS-IS LSPs and may become a burden.



Flex-Algo 128: include "red" links

Adjacency	Algorithm	Flavor	End.X SID
A-B	0	no flavor	A1::1:0
		PSP&USP&USD	A1::2:0
	128	no flavor	A1:80::1:0
		PSP&USP&USD	A1:80::2:0
A-C	0	no flavor	A1::3:0
		PSP&USP&USD	A1::4:0

SRv6 SID Local Block

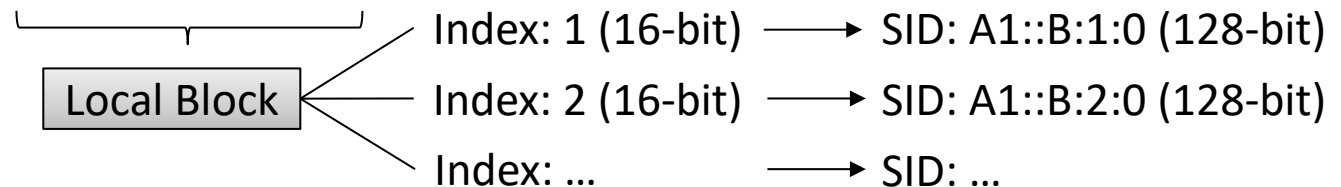
- An SRv6 SID Local Block is composed of a number of continuous SIDs within the address range of a Locator.
- SIDs assigned in an SRv6 SID Local Block is represented by its index in the block.
- Only index is advertised in IS-IS, instead of advertising complete 128-bit SID.



Address Space: A1::~A1:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF

Partition: A1::B:0:0~A1::B:FFFF:FFFF

Offset = 16-bit
SID = Index << Offset + Start-SID



IS-IS Extensions

- SRv6 SID Local Block sub-TLV (carried in the SRv6 Locator TLV)

```

+-----+-----+-----+-----+-----+-----+-----+-----+
|      Type      |      Length      |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Block-ID   |      Offset       |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                                     Start SID (128 bits)                                     |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                                     End SID (128 bits)                                     |
+-----+-----+-----+-----+-----+-----+-----+-----+
|Sub-sub-tlv-len|      Sub-sub-TLVs (variable) . . .      |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

- SRv6 End.X SID Index sub-TLV (carried in the same place with SRv6 End.X SID sub-TLV)

```

+-----+-----+-----+-----+-----+-----+-----+-----+
|      Type      |      Length      |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Flags      |      Algorithm      |      Weight      |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Block-ID      |      Index Num      |      Index Length |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Index 0 (variable)      |      Endpoint Behavior 0      |
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Index 1 (variable)      |      Endpoint Behavior 1      |
+-----+-----+-----+-----+-----+-----+-----+-----+
~                               ...                               ~
+-----+-----+-----+-----+-----+-----+-----+-----+
|      Index Num-1 (variable) |      Endpoint Behavior Num-1 |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

IS-IS Extensions (Cont.)

- SRv6 LAN End.X SID Index sub-TLV (carried in the same place with SRv6 LAN End.X SID sub-TLV)

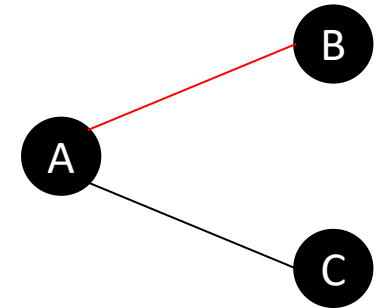
```
+-----+
|   Type   |   Length   |                                     |
+-----+-----+-----+
| Neighbor System-ID (ID length octets) |
+-----+-----+-----+
|   Flags   | Algorithm |   Weight   |
+-----+-----+-----+
| Block-ID | Index Num | Index Length |
+-----+-----+-----+
| Index 0 (variable) | Endpoint Behavior 0 |
+-----+-----+-----+
| Index 1 (variable) | Endpoint Behavior 1 |
+-----+-----+-----+
~                               ...                               ~
+-----+-----+-----+
| Index Num-1 (variable) | Endpoint Behavior Num-1 |
+-----+-----+-----+
```

- SRv6 End SID Index sub-TLV (carried in the same place with SRv6 End SID sub-TLV)

```
+-----+
|   Type   |   Length   |   Flags   |
+-----+-----+-----+
| Block-ID | Index Num | Index Length |
+-----+-----+-----+
| Index 0 (variable) | Endpoint Behavior 0 |
+-----+-----+-----+
| Index 1 (variable) | Endpoint Behavior 1 |
+-----+-----+-----+
~                               ...                               ~
+-----+-----+-----+
| Index Num-1 (variable) | Endpoint Behavior Num-1 |
+-----+-----+-----+
```

Example

Adjacency	Algorithm	Flavor	End.X SID
A-B	0	no flavor	A1::1:0
		PSP&USP&USD	A1::2:0
	128	no flavor	A1:80::1:0
		PSP&USP&USD	A1:80::2:0
A-C	0	no flavor	A1::3:0
		PSP&USP&USD	A1::4:0



Flex-Algo 128: include "red" links

- Locator TLV

Local Block sub-TLV
ID: 1
Offset: 16
Start: A1::0:0
End: A1::FFFF:0

- Locator TLV for Flex-Algo 128

Local Block sub-TLV
ID: 2
Offset: 16
Start: A1:80::0:0
End: A1:80::FFFF:0

- TLV-22 for A-B

End.X Index sub-TLV
Algorithm: 0 Block-id: 1
Index-1: 1(16-bit), End.X
Index-2: 2(16-bit), End.X with PSP&USP&USD

+

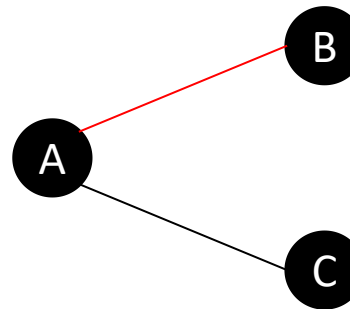
End.X Index sub-TLV
Algorithm: 128 Block-id: 2
Index-1: 1(16-bit), End.X
Index-2: 2(16-bit), End.X with PSP&USP&USD

- TLV-22 for A-C

End.X Index sub-TLV
Algorithm: 0 Block-id: 1
Index-1: 3(16-bit), End.X
Index-2: 4(16-bit), End.X with PSP&USP&USD

Comparison of TLV Size

Adjacency	Algorithm	Flavor	End.X SID
A-B	0	no flavor	A1::1:0
		PSP&USP&USD	A1::2:0
	128	no flavor	A1:80::1:0
		PSP&USP&USD	A1:80::2:0
A-C	0	no flavor	A1::3:0
		PSP&USP&USD	A1::4:0



Flex-Algo 128: include "red" links

- Advertised by End.X SID TLV:
 - ✓ Total size = 24 octets per SID * 6 = 144 octets
- Advertised by End.X SID Index sub-TLV:
 - ✓ Use one sub-TLV to carry 2 SIDs (Index) with different flavors of the same adjacency and same algorithm
 - ✓ Total size = 16 octets * 3 = 48 octets

As the the number of End.X increases, the comparison will be more obvious

Next Steps

- Term "SID Block" may be confused with "Locator Block (LB)". Need a better name.
- Extensions for OSPFv3
- Any questions or comments are Welcome
- Request further review and feedback

chengweiqiang@chinamobile.com

jiangwenying@chinamobile.com

linchangwang.04414@h3c.com

chen.mengxiao@h3c.com

gongliyan@chinamobile.com

liu.yao71@zte.com.cn

Thanks