

配置基于SRv6的BGP全局IPv6

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简介

本文档介绍将IPv6封装段路由(SRv6)应用于BGP IPv6单播会话时的控制平面流。

背景信息

有关详细信息，请参阅[Cisco ASR 9000系列路由器IOS XR版本24.1.x、24.2.x、24.3.x、24.4.x的网段路由配置指南](#)。

拓扑

本文档中使用的拓扑如图1所示。SRv6域由三台路由器组成，所有这些路由器都在Cisco IOS-XR上运行。SRv6底层基础设施使用带uSID SRv6的IS-IS实施。BGP IPv6单播对等在路由器R1和R3之间建立，而路由器R2不参与BGP，在此配置中作为P路由器运行。R1和R3上的Loopback 6接口代表必须在两个BGP IPv6单播对等体之间交换的IPv6前缀。

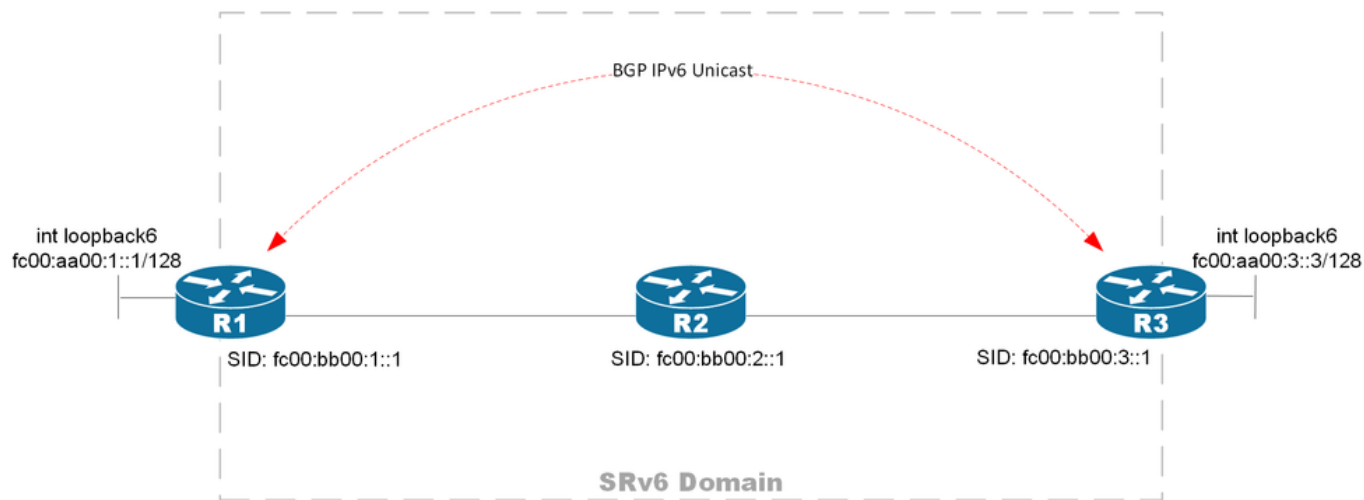


图1.通过SRv6的BGP ipv6单播的拓扑图

SRv6配置

本部分显示所有三台SRv6路由器的配置。路由器R2仅包括SRv6配置，因为它不参与BGP。

路由器 R1 配置

路由器R1是SRv6域的一部分，其定位符为fc00:bb00:1::/48。它还充当BGP IPv6单播路由器，生成本地前缀fc00:aa00:1::1/128。此外，它还通过SRv6基础设施与路由器R3建立BGP IPv6单播对等。以粗体突出显示的配置用作调试本文档中所述控制流的起点，并且是整个过程中使用的唯一触发器。

<#root>

```
interface Loopback0
  ipv4 address 10.0.0.1 255.255.255.255
  ipv6 address fc00:bb00:1::1/128
!
interface Loopback6
  ipv6 address fc00:aa00:1::1/128
!
interface TenGigE0/0/0/8
  ipv6 enable
!
router isis 1
  is-type level-1
  net 49.0000.0000.0001.00
  address-family ipv6 unicast
  metric-style wide
  segment-routing srv6
    locator MAIN
  !
!
!
interface TenGigE0/0/0/8
  point-to-point
  address-family ipv6 unicast
!
```

```

!
!
router bgp 1
  bgp router-id 10.0.0.1
  segment-routing srv6
    locator MAIN
  !
  address-family ipv6 unicast
    segment-routing srv6
      locator MAIN
      alloc mode per-vrf
    !
    network fc00:aa00:1::1/128
  !
  neighbor fc00:bb00:3::1
    remote-as 1
    update-source Loopback0
    address-family ipv6 unicast

```

encapsulation-type srv6

```

!
!
segment-routing
  srv6
    encapsulation
      source-address fc00:bb00:1::1
    !
    locators
      locator MAIN
        micro-segment behavior unode psp-usd
        prefix fc00:bb00:1::/48
    !

```

路由器 R2 配置

路由器R2是SRv6域的一部分，其定位符为fc00:bb00:2::/48。它不参与BGP并在此拓扑中充当P路由器。

```

interface Loopback0
  ipv4 address 10.0.0.2 255.255.255.255
  ipv6 address fc00:bb00:2::1/128
!
interface TenGigE0/0/0/0
  description T0 R1
  ipv6 enable
!
interface TenGigE0/0/0/1
  description T0 R2
  ipv6 enable
!
router isis 1
  is-type level-1
  net 49.0000.0000.0002.00
  address-family ipv6 unicast
    metric-style wide

```

```

segment-routing srv6
  locator MAIN
  !
!
!
interface TenGigE0/0/0/0
  point-to-point
  address-family ipv6 unicast
  !
!
interface TenGigE0/0/0/1
  point-to-point
  address-family ipv6 unicast
  !
!
!
segment-routing
srv6
  encapsulation
    source-address fc00:bb00:2::1
  !
  locators
    locator MAIN
    micro-segment behavior unode psp-usd
    prefix fc00:bb00:2::/48
  !

```

路由器 R3 配置

路由器R3是SRv6域的一部分，其定位符为fc00:bb00:3::/48。它与路由器R1具有BGP IPv6单播对等，并且两者都交换其Loopback 6接口的IPv6前缀。

```

interface Loopback0
  ipv4 address 10.0.0.3 255.255.255.255
  ipv6 address fc00:bb00:3::1/128
  !
interface Loopback6
  ipv6 address fc00:aa00:3::3/128
  !
interface TenGigE0/0/0/1
  description T0 R2
  ipv6 enable
  !
router isis 1
  is-type level-1
  net 49.0000.0000.0003.00
  address-family ipv6 unicast
  metric-style wide
  segment-routing srv6
    locator MAIN
  !
!
!
interface TenGigE0/0/0/1
  point-to-point
  address-family ipv6 unicast
  !

```

```

!
!
router bgp 1
  bgp router-id 10.0.0.3
  segment-routing srv6
    locator MAIN
  !
  address-family ipv6 unicast
    segment-routing srv6
      locator MAIN
      alloc mode per-vrf
    !
    network fc00:aa00:3::3/128
  !
  neighbor fc00:bb00:1::1
    remote-as 1
    update-source Loopback0
    address-family ipv6 unicast
      encapsulation-type srv6
    !
  !
segment-routing
  srv6
    encapsulation
      source-address fc00:bb00:3::1
    !
    locators
      locator MAIN
        micro-segment behavior unode psp-usd
        prefix fc00:bb00:3::/48
      !
    !
  !
!
!
!
!

```

SRv6 SID的信令流

在底层SRv6基础设施中，每台路由器在整个拓扑中都包含链路状态信息，每台路由器都通过链路状态ISIS协议通告其SRv6定位器。R1上的ISIS数据库显示参与SRv6域的所有路由器的定位器。

<#root>

RP/0/RSP0/CPU0:R1#

show isis database verbose R1 | include SRv6 Locator

SRv6 Locator: MT (IPv6 Unicast)

fc00:bb00:1::/48

D:0 Metric: 1 Algorithm: 0

RP/0/RSP0/CPU0:R1#

show isis database verbose R2 | include SRv6 Locator

SRv6 Locator: MT (IPv6 Unicast)

fc00:bb00:2::/48

```

D:0 Metric: 0 Algorithm: 0

RP/0/RSP0/CPU0:R1#
show isis database verbose R3 | include SRv6 Locator

  SRv6 Locator:    MT (IPv6 Unicast)
fc00:bb00:3::/48

D:0 Metric: 1 Algorithm: 0

```

此SRv6实施支持全局路由表(GRT)流量重叠。当R1和R3上都启用了全局BGP IPv6单播重叠服务时，每台路由器都会生成新的服务SID。此服务SID与默认VRF关联，并在此场景中使用Endpoint behavior uDT6。必须在BGP IPv6单播对等体之间交换此服务SID，才能在两个BGP对等体之间启用SRv6转发。下一部分将概述BGP信令流的步骤，从触发执行(启用encapsulation-type srv6)开始，直至在路由器R3上对SRv6转发进行编程。

1.启用SRv6封装前的状态

在BGP对等体的IPv6单播SAFI上启用SRv6封装之前，路由器R1必须具有具有已分配服务SID的BGP IPv6前缀。当R1上的IPv6单播全局SAFI下启用“segment-routing srv6”时，会出现这种情况。输出显示本地SID fc00:bb00:1:e002::分配给BGP ipv6单播下的所有前缀。

```

<#root>

RP/0/RSP0/CPU0:R1#
show bgp ipv6 unicast local-sids

BGP router identifier 10.0.0.1, local AS number 1
BGP generic scan interval 60 secs
Non-stop routing is enabled
BGP table state: Active
Table ID: 0xe0800000 RD version: 7
BGP table nexthop route policy:
BGP main routing table version 7
BGP NSR Initial initsync version 7 (Reached)
BGP NSR/ISSU Sync-Group versions 0/0
BGP scan interval 60 secs

Status codes: s suppressed, d damped, h history, * valid, > best
               i - internal, r RIB-failure, S stale, N Nexthop-discard
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network                Local Sid                        Alloc mode   Locator
*> fc00:aa00:1::1/128 fc00:bb00:1:e002:::                per-vrf      MAIN
*> ifc00:aa00:3::3/128 NO SRv6 Sid                        -            -

Processed 2 prefixes, 2 paths

```

此服务SID由R1上的sid_mgr进程本地编程，该进程将终端行为作为uDT6，该行为与默认vrf关联并由bgp拥有。这仅仅意味着，只要R1收到目的地址与服务SID fc00:bb00:1:e002::它是最后一个数据

段，R1必须解封报头并将解封的数据包提交到IPv6默认vrf表的FIB查找。这是根据列出所有SRv6终端行为的RFC8986进行的。注意以下输出，其中显示sid_mgr创建服务SID fc00:bb00:1:e002::并将此信息传递给RIB，最终传递给FIB。

<#root>

RP/0/RSP0/CPU0:R1#

show segment-routing srv6 sid all

*** Locator: 'MAIN' ***

SID	Behavior	Context	Owner	Sta
-----	-----	-----	-----	---
fc00:bb00:1::	uN (PSP/USD)	'default':1	sidmgr	InU
fc00:bb00:1:e001::	uA (PSP/USD)	[Te0/0/0/8, Link-Local]:0	isis-1	InU
fc00:bb00:1:e002::	uDT6	'default'	bgp-1	
InUse Y				

RP/0/RSP0/CPU0:R1#

show segment-routing srv6 sid fc00:bb00:1:e002:: internal

*** Locator: 'MAIN' ***

SID	Behavior	Context	Owner	Sta
-----	-----	-----	-----	---
fc00:bb00:1:e002::	uDT6	'default'	bgp-1	InUse Y
SID Function: 0xe002				
SID context: { table-id=0xe0800000 ('default':IPv6/Unicast) }				
App data: [00000000000000000000]				
Locator: 'MAIN'				
Allocation type: Dynamic				
Owner List:				
1) Name: bgp-1, Client-ID: 32, Proto-ID: 8, Node-ID: 0, Locator-ID: 5 ()				
RefCount: 1				
Flags: 0x0 ()				
Chkpt Obj ID: 0x2f60				
TI Object:				
Type: Entry				
Ptr: 0x140160285526000, Producer ID: 0				
Flags:				
Generic: 0x0 ()				
Specific: 0x0 ()				
Modified: Fri Jun 27 16:27:05 EST 2025 (2d01h ago)				
Created: Jun 27 16:17:40.796 (2d01h ago)				
Event history:				
SIDMGR-OPCODE-EVENT-CLASS				
Total entries : 4				
+-----+-----+-----+				
Event		Time Stamp		S, M
+-----+-----+-----+				
object create		Jun 27 16:17:40.864		1, 0
object delete		Jun 27 16:27:04.320		1, 1

```
| object modify | Jun 27 16:27:04.320 | 0, 1 |
| object refcount decrement | Jun 27 16:27:04.320 | 0, 1 |
+-----+-----+-----+
RP/0/RSP0/CPU0:R1#
```

show route ipv6 fc00:bb00:1:e002:: detail

Routing entry for

fc00:bb00:1:e002::/64

Known via

"local-srv6 bgp-1"

, distance 0, metric 0,

SRv6 Endpoint uDT6

, SRv6 Format f3216

Installed Jun 27 16:27:06.040 for 2d01h

Routing Descriptor Blocks

directly connected

Route metric is 0

Label: None

Tunnel ID: None

Binding Label: None

Extended communities count: 0

NHID: 0x0 (Ref: 0)

Route version is 0x15 (21)

No local label

IP Precedence: Not Set

QoS Group ID: Not Set

Flow-tag: Not Set

Fwd-class: Not Set

Route Priority: RIB_PRIORITY_LOCAL (3) SVD Type RIB_SVD_TYPE_LOCAL

Download Priority 0, Download Version 3140327

No advertising protos.

RP/0/RSP0/CPU0:R1#

show cef ipv6 fc00:bb00:1:e002::

fc00:bb00:1:e002::/64, version 3140327,

SRv6 Endpoint uDT6

, internal 0x1000001 0x0 (ptr 0x7bb98f54) [1], 0x400 (0x7ba7cfa0), 0x0 (0x7a90d290)

Updated Jun 27 16:27:06.043

Prefix Len 64, traffic index 0, precedence n/a, priority 0

gateway array (0x78e92608) reference count 3, flags 0x0, source rib (7), 0 backups

[4 type 3 flags 0x8401 (0x78f35598) ext 0x0 (0x0)]

LW-LDI[type=3, refc=1, ptr=0x7ba7cfa0, sh-ldi=0x78f35598]

gateway array update type-time 1 Jun 26 15:54:48.345

LDI Update time Jun 26 15:54:48.349

LW-LDI-TS Jun 27 16:17:42.533

Accounting: Disabled

via ::/128, 0 dependencies, weight 0, class 0 [flags 0x0]

path-idx 0 NHID 0x0 [0x781b61e8 0x0]

next hop ::/128

Load distribution: 0 (refcount 4)

Hash	OK	Interface	Address
0	Y	recursive	Lookup in table

由于R1未在其BGP ipv6单播对等体下启用SRv6封装，因此R1会在BGP更新中向R3通告这些前缀，而没有SRv6 TLV，即使R1已在本地分配本地SID。

<#root>

RP/0/RSP0/CPU0:R1#

show bgp ipv6 unicast

```

BGP router identifier 10.0.0.1, local AS number 1
BGP generic scan interval 60 secs
Non-stop routing is enabled
BGP table state: Active
Table ID: 0xe0800000 RD version: 7
BGP table nexthop route policy:
BGP main routing table version 7
BGP NSR Initial initsync version 7 (Reached)
BGP NSR/ISSU Sync-Group versions 0/0
BGP scan interval 60 secs

```

Status codes: s suppressed, d damped, h history, * valid, > best
i - internal, r RIB-failure, S stale, N Nexthop-discard
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> fc00:aa00:1::1/128 ::		0		32768	i
*> ifc00:aa00:3::3/128 fc00:bb00:3::1		0	100	0	i

Processed 2 prefixes, 2 paths

RP/0/RSP0/CPU0:R1#

show bgp ipv6 unicast advertised neighbor fc00:bb00:3::1

fc00:aa00:1::1/128 is advertised to fc00:bb00:3::1

Path info:

neighbor: Local neighbor router id: 10.0.0.1
valid local best

Received Path ID 0, Local Path ID 1, version 4

Attributes after inbound policy was applied:

next hop: ::
MET ORG AS
origin: IGP metric: 0
aspath:

Attributes after outbound policy was applied:

next hop: fc00:bb00:1::1
MET ORG AS
origin: IGP metric: 0
aspath:

路由器R3从没有SID的路由器R1接收更新。R3将从R1接收的前缀安装到其RIB和FIB表中，但不带SRv6报头。

<#root>

RP/0/RSP0/CPU0:R3#

show bgp ipv6 unicast received-sids

BGP router identifier 10.0.0.3, local AS number 1
BGP generic scan interval 60 secs
Non-stop routing is enabled
BGP table state: Active
Table ID: 0xe0800000 RD version: 44
BGP table nexthop route policy:
BGP main routing table version 44
BGP NSR Initial initsync version 6 (Reached)
BGP NSR/ISSU Sync-Group versions 0/0
BGP scan interval 60 secs

Status codes: s suppressed, d damped, h history, * valid, > best
 i - internal, r RIB-failure, S stale, N Nexthop-discard
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Received Sid
*>ifc00:aa00:1::1/128	fc00:bb00:1::1	NO SRv6 Sid
*> fc00:aa00:3::3/128	::	NO SRv6 Sid

Processed 2 prefixes, 2 paths

RP/0/RSP0/CPU0:R3#

show route ipv6 unicast fc00:aa00:1::1/128 detail

Routing entry for fc00:aa00:1::1/128
Known via "bgp 1", distance 200, metric 0, type internal
Installed Jun 8 17:34:24.126 for 00:12:38
Routing Descriptor Blocks
 fc00:bb00:1::1, from fc00:bb00:1::1
 Route metric is 0
 Label: None
 Tunnel ID: None
 Binding Label: None
 Extended communities count: 0
 NHID: 0x0 (Ref: 0)
 Path Grouping ID: 1
Route version is 0x1d (29)
No local label
IP Precedence: Not Set
QoS Group ID: Not Set
Flow-tag: Not Set
Fwd-class: Not Set
Route Priority: RIB_PRIORITY_RECURSIVE (12) SVD Type RIB_SVD_TYPE_LOCAL
Download Priority 4, Download Version 162
No advertising protos.

RP/0/RSP0/CPU0:R3#

```
show cef ipv6 fc00:aa00:1::1/128
```

```
fc00:aa00:1::1/128, version 162, internal 0x5000001 0x40 (ptr 0x7941f0f4) [1], 0x0 (0x0), 0x0 (0x0)
Updated Jun  8 17:34:24.128
Prefix Len 128, traffic index 0, precedence n/a, priority 4
gateway array (0x78eac518) reference count 1, flags 0x2010, source rib (7), 0 backups
    [1 type 3 flags 0x48441 (0x78f4f538) ext 0x0 (0x0)]
LW-LDI[type=0, refc=0, ptr=0x0, sh-ldi=0x0]
gateway array update type-time 1 Jun  8 17:34:24.129
LDI Update time Jun  8 17:34:24.129
```

```
Level 1 - Load distribution: 0
[0] via fc00:bb00:1::1/128, recursive
```

```
Accounting: Disabled
via fc00:bb00:1::1/128, 5 dependencies, recursive [flags 0x6000]
path-idx 0 NHID 0x0 [0x7941edb4 0x0]
next hop fc00:bb00:1::1/128 via fc00:bb00:1::/48
```

```
Load distribution: 0 (refcount 1)
```

Hash	OK	Interface	Address
0	Y	TenGigE0/0/0/1	remote

2.启用封装SRv6

启用SRv6封装会导致R1向其属性类型为40的对等设备发送BGP更新消息，该消息用于分段路由以通告具有特定分段路由标识符(SID)的BGP前缀。路由器R1向R3发送带有相关SID fc00:bb00:1:e002:: 的IPv6前缀fc00:bb00:3::1 (步骤1) 的UPDATE。收到更新后，路由器R3更新其BGP IPv6单播表 (步骤2)，然后更新其RIB和FIB表 (步骤3)。图2说明了BGP信令流以及相应的步骤。

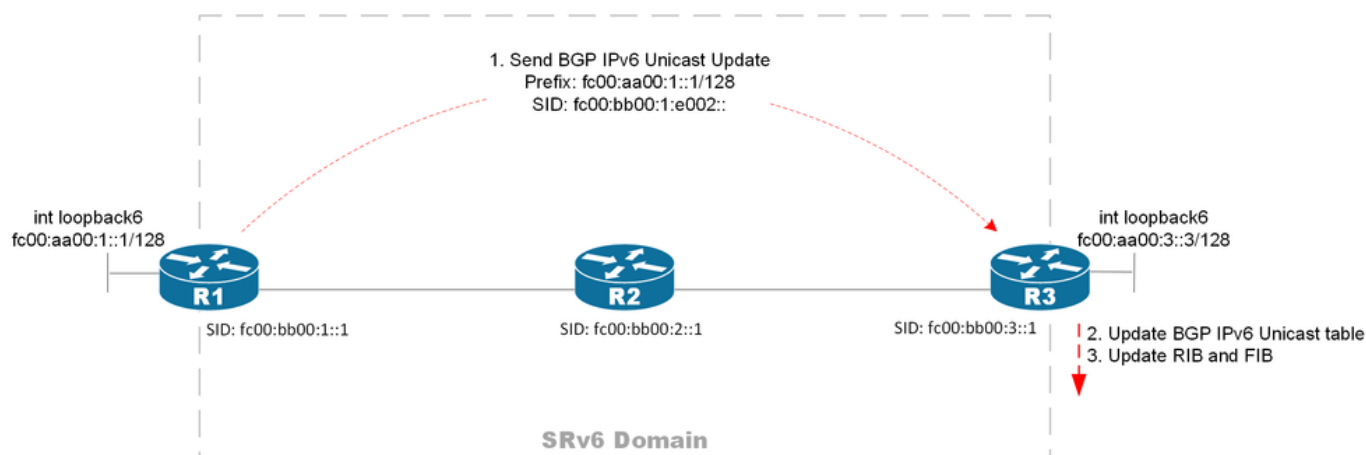


图2.启用封装srv6后的BGP信令流

在R3对等体上启用SRv6封装后，输出立即显示BGP调试日志，显示R1向R3发送BGP更新消息：

```
router bgp 1
neighbor fc00:bb00:3::1
```

```
address-family ipv6 unicast
encapsulation-type srv6
!
!
!
end
```

```
RP/0/RSP0/CPU0:R1(config)#commit
```

```
bgp[1100]: [default-upd] (ip6u): Added reference to table TBL:default (2/1) refcount 9
bgp[1100]: [default-upd] (ip6u): Created update group for table TBL:default (2/1), index 0.3 neighbor f
bgp[1100]: [default-upd] (ip6u): Removed neighbor fc00:bb00:3::1 from update group 0.2 for IPv6 Unicast
bgp[1100]: [default-upd] (ip6u): Removing neighbor fc00:bb00:3::1 from update filter-group 0.2 in IPv6
bgp[1100]: [default-upd]: Enqueue Wdw: Nbr:fc00:bb00:3::1(5) Wdw:0 Del:0 Pending:0 RefreshPending:0
bgp[1100]: [default-upd]: Deleting filter-group 0.2 in TBL:default (2/1) refcount 2
bgp[1100]: [default-upd] (ip6u): Deleted update group 0.2
bgp[1100]: [default-upd] (ip6u): Added reference to table TBL:default (2/1) refcount 10
bgp[1100]: [default-upd]: Compute RT set for vrf default neighbor fc00:bb00:3::1 from old filter-group
bgp[1100]: [default-upd]: Allocating filter-group 0.3 in TBL:default (2/1)
bgp[1100]: [default-upd] (ip6u): Added reference to table TBL:default (2/1) refcount 11
bgp[1100]: [default-upd] (ip6u): Adding vrf default neighbor fc00:bb00:3::1 to new filter-group 0.3 in
bgp[1100]: [default-upd] (ip6u): Added vrf default neighbor fc00:bb00:3::1 to update filter-group 0.3 in
bgp[1100]: [default-upd] (ip6u): Added neighbor fc00:bb00:3::1 to update sub-group 0.1 in IPv6 Unicast
bgp[1100]: [default-upd] (ip6u): Started updgrp timer for updgrp 0.3:: delay=0.010, delaytype=0
bgp[1100]: [default-upd] (ip6u): Removed reference to Table TBL:default (2/1) refcount 9
bgp[1100]: [default-upd] (ip6u): Starting updgen walk for updgrp 0.3:: targetver=27: tblver=27, labelv
bgp[1100]: [default-upd] (ip6u): Computing updates for update sub-group 0.1 (Regular)
bgp[1100]: [default-upd] (ip6u): bgp_srv6_execute_sid_alloc_mode_policy: Use default SRv6 alloc mode pe
bgp[1100]: [default-upd]: table-attr walk for table TBL:default (2/1), resume version 0, subgrp version
bgp[1100]: [default-upd] (ip6u): process UPDATE for: tbl=TBL:default (2/1), afi=5: ug=0.3, (Regular), p
bgp[1100]: [default-upd] (ip6u): Ran 'internal' policy '(null)', result 'TRUE', ptr 0x7f4584005f30, use
bgp[1100]: [default-upd] (ip6u):      : tbl=TBL:default (2/1), afi=5: ug=0.3, sg=0.1, ugfl=0x00104183: n
bgp[1100]: [default-upd] (ip6u):      <NH&LABEL-SEL>: tbl=TBL:default (2/1), afi=5: ug=0.3, sg=0.1, ugfl
bgp[1100]: [default-upd] (ip6u):      <nh&label-sel>:: labselectdo=1, labselectdone=0, updlab=1048577(0
bgp[1100]: [default-upd]: Comm-lib: Assigned ID (0x1d000008) for elem-type PREFIX_SID SRV6_L3SVC
bgp[1100]: [default-upd]: Comm-lib: Assigned ID (0x900000c) for elem-type Attribute
bgp[1100]: [default-upd] (ip6u): Permit UPDATE to filter-group 0.3 (Regular, pelem Regular) for fc00:aa
bgp[1100]: [default-upd] (ip6u): Sending UPDATE message(0x0x7f4589fd4ba4) to sub-group 0.1 (Regular, pe
bgp[1100]: [default-upd] (ip6u): origin i, path , metric 0, localpref 100, Prefix-SID attribute 0x05002
bgp[1100]: [default-upd] (ip6u): Created msg elem 0x0x7f4589e3afc8 (pointing to message 0x0x7f4589fd4ba
bgp[1100]: [default-upd] (ip6u): process UPDATE for: tbl=TBL:default (2/1), afi=5: ug=0.3, (Regular), p
bgp[1100]: [default-upd] (ip6u): No unreachable (not advertising to sender: fc00:bb00:3::1) sent to sub
bgp[1100]: [default-upd] (ip6u): Generated 1 updates for update sub-group 0.1 (average size = 126 bytes
bgp[1100]: [default-upd] (ip6u): Updates replicated to neighbor fc00:bb00:3::1
bgp[1100]: [default-iowt]: fc00:bb00:3::1 send UPDATE length (incl. header) 126
bgp[1100]: [default-iowt]: Send message dump for fc00:bb00:3::1:
bgp[1100]: [default-iowt]: ffff ffff ffff ffff ffff ffff ffff ffff
bgp[1100]: [default-iowt]: 007e 0200 0000 6790 0e00 2600 0201 10fc
bgp[1100]: [default-iowt]: 00bb 0000 0100 0000 0000 0000 0000 0100
bgp[1100]: [default-iowt]: 80fc 00aa 0000 0100 0000 0000 0000 0000
bgp[1100]: [default-iowt]: 0140 0101 0040 0200 8004 0400 0000 0040
bgp[1100]: [default-iowt]: 0504 0000 0064 c028 2505 0022 0001 001e
bgp[1100]: [default-iowt]: 00fc 00bb 0000 01e0 0200 0000 0000 0000
bgp[1100]: [default-iowt]: 0000 003e 0001 0006 2010 1000 0000
bgp[1100]: [default-iowt]: bgp_io_nbr_add_version: New ver: nbr=fc00:bb00:3::1, io_wr_txsn=58992, acksn
bgp[1100]: [default-iowt]: bgp_io_nbr_derive_acked_version: nbr=fc00:bb00:3::1, io_wr_txsn=58992, acksn
bgp[1100]: [default-iowt]: fc00:bb00:3::1 (afi:4) advancedpeer_acked_version to 10refresh peer acked ve
bgp[1100]: [default-iowt]: fc00:bb00:3::1 (afi:5) received ack for version 27
bgp[1100]: [default-iowt]: bgp_write_list_tonet: IO_SENDMSG: nbr=fc00:bb00:3::1, fd=530: total=1, send-
bgp[1100]: [default-iowt] (ip6u): Deleting msg elem 0x0x7f4589e3afc8 (message 0x0x7f4589fd4ba4), for fi
bgp[1100]: [default-iowt] (ip6u): Deleting message 0x0x7f4589fd4ba4, from subgroup 0.1
bgp[1100]: [default-iowt]: Keepalive timer started for fc00:bb00:3::1(loc 10): last 529293 this 529308
bgp[1100]: [default-iowt]: bgp write for afi 4 for neighbor fc00:bb00:3::1 (fd 530)
```

```
bgp[1100]: [default-iowt]: bgp write for afi 5 for neighbor fc00:bb00:3::1 (fd 530)
bgp[1100]: [default-iowt]: bgp_io_nbr_derive_acked_version: nbr=fc00:bb00:3::1, io_wr_txsn=58992, acksn=
bgp[1100]: [default-iowt]: fc00:bb00:3::1 (afi:4) advancedpeer_acked_version to 10refresh peer acked ve
bgp[1100]: [default-iowt]: fc00:bb00:3::1 (afi:5) advancedpeer_acked_version to 27refresh peer acked ve
bgp[1100]: [default-iowt]: bgp_io_write_nbr_ver_timer_process: nbr_ver_timer handler: Walk complete: nb
```

输出显示R1上的BGP跟踪条目：

```
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:7799: trying to find update group for nbr fc00:bb00:3::1
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:6752: created update group for table TBL:default (2/1)
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:2039: Filter-group op (Filter-group Rm Nbr) Tbl/Nbr(A
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:1501: Filter-group op (Delete) Tbl/Nbr(TBL:default (2/1)
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:6798: Delete update group for table TBL:default (2/1)
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:2181: Filter-group op (Filter-group Compute Nbr RT) T
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:1411: Filter-group op (Alloc) Tbl/Nbr(TBL:default (2/1)
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:2725: Filter-group op (Filter-group Add Nbr new) Tbl/N
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:2751: created filtergrp 3 for vrf default nbr fc00:bb00:3::1
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:4473: Created subgrp:1(0x840070a0) refr:0 for nbr fc00:bb00:3::1
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:6935: added vrf default nbr fc00:bb00:3::1 to update c
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:3088: TBL:default (2/1) free subgrp SG:2 subgrp:0x840070a0
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:1316: Update gen Start bit operation Filtergrp delete
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:11342: Updgen - TBL:default (2/1) UG: 0.3 SG: 0.1 msg
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:11344: Updgen - pfx: [tot] adv/wdn/sup/skp/be[2] 1/0/0/1
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:11351: Updgen - fpx: wdn/skp[0/0] ver: 0 -> 27 res ve
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:4009: Updgen - UG: 3 FG: 3 afi:5 msg: 1 ver -> 27
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t32561 [UPD]:4011: pfx: adv/wdn/sup/skp 1/0/0/1
default-bgp/spkr-tr2-common 0/RSP0/CPU0 t32558 [COMMON]:638: vrf default nbr fc00:bb00:3::1, set peer a
default-bgp/spkr-tr2-gen 0/RSP0/CPU0 t32501 [GEN]:617: vrf default nbr 2000:0:0:1::1, old state 1, new
```

解码的BGP UPDATE消息显示属性类型40和TLV类型5，其中包含服务SID fc00:bb00:1:e002::。

Attribute

```
ATTRIBUTE FLAG:      0xC0
ATTRIBUTE FLAG binary: 11000000
    Bit 0, the Optional bit, is 1 so this is an optional attribute
    Bit 1, the Transitive bit, is 1 so this is a transitive attribute
    Bit 2, the Partial bit, is not set
    Bit 3, the Extended Length Bit, is 0 so the length field is 1 byte
    The lower-order four bits of the Attribute Flag are unused and are set to 0000

ATTRIBUTE TYPE:      0x28      - 40
ATTRIBUTE LENGTH:    0x25      - 37 bytes
ATTRIBUTE CONTENT:    0x0500220001001E00FC00BB000001E00200000000000000000000003E00010006201010000000

    BGP Prefix-SID:
    Type:            5 (0x05) - SRv6 L3 Service
    Length:          34 - 0x0022
    Value:           0x0001001E00FC00BB000001E00200000000000000000000003E00010006201010000000
    Reserved:        0x00
    Sub Type:        1 (0x01)
    Sub Length:      30 (0x001E)
    SRv6 SID = FC00:BB00:0001:E002:0000:0000:0000:0000
    SID Flags:       0 (0x00)
    Endpoint Behavior: 62 (0x003E)
    Reserved2 :      0 (0x00)
    SRv6 SID Optional Type: 1 (0x01)
    SRv6 SID Optional Len: 6 (0x0006)
    SRv6 SID Optional Value: 35253360001024 (0x201010000000)
```

完整的解码BGP UPDATE消息如下：

Message #1 - 126 bytes

```
FF FF FF FF  FF FF FF FF  FF FF FF FF  FF FF FF FF
00 7E 02 00  00 00 67 90  0E 00 26 00  02 01 10 FC
00 BB 00 00  01 00 00 00  00 00 00 00  00 00 01 00
80 FC 00 AA  00 00 01 00  00 00 00 00  00 00 00 00
01 40 01 01  00 40 02 00  80 04 04 00  00 00 00 40
05 04 00 00  00 64 C0 28  25 05 00 22  00 01 00 1E
00 FC 00 BB  00 00 01 E0  02 00 00 00  00 00 00 00
00 00 00 3E  00 01 00 06  20 10 10 00  00 00
```

```
BGP Marker:      0xFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
BGP Length:      0x007E      - 126 bytes
BGP Type:        0x02      - UPDATE
```

```
UPDATE
UNFEASIBLE ROUTES LENGTH:    0x0000      - 0 bytes
TOTAL PATH ATTRIBUTES LENGTH: 0x0067      - 103 bytes
```

Attribute

```
ATTRIBUTE FLAG:      0x90
ATTRIBUTE FLAG binary: 10010000
    Bit 0, the Optional bit, is 1 so this is an optional attribute
    Bit 1, the Transitive bit, is 0 so this is a non-transitive attribute
    Bit 2, the Partial bit, is not set
    Bit 3, the Extended Length Bit, is 1 so the length field is 2 bytes
```


ATTRIBUTE TYPE: 0x04 - 4
ATTRIBUTE LENGTH: 0x04 - 4 bytes
ATTRIBUTE CONTENT: 0x00000000 - 0

Attribute

ATTRIBUTE FLAG: 0x40
ATTRIBUTE FLAG binary: 01000000
Bit 0, the Optional bit, is 0 so this is a well-known attribute
Bit 1, the Transitive bit, is 1 so this is a transitive attribute
Bit 2, the Partial bit, is not set
Bit 3, the Extended Length Bit, is 0 so the length field is 1 byte
The lower-order four bits of the Attribute Flag are unused and are set to 0000

ATTRIBUTE TYPE: 0x05 - 5
ATTRIBUTE LENGTH: 0x04 - 4 bytes
ATTRIBUTE CONTENT: 0x00000064 - 100

Attribute

ATTRIBUTE FLAG: 0xC0
ATTRIBUTE FLAG binary: 11000000
Bit 0, the Optional bit, is 1 so this is an optional attribute
Bit 1, the Transitive bit, is 1 so this is a transitive attribute
Bit 2, the Partial bit, is not set
Bit 3, the Extended Length Bit, is 0 so the length field is 1 byte
The lower-order four bits of the Attribute Flag are unused and are set to 0000

ATTRIBUTE TYPE: 0x28 - 40
ATTRIBUTE LENGTH: 0x25 - 37 bytes
ATTRIBUTE CONTENT: 0x0500220001001E00FC00BB000001E00200000000000000000003E00010006201010000000

BGP Prefix-SID:

Type: 5 (0x05) - SRv6 L3 Service
Length: 34 - 0x0022
Value: 0x0001001E00FC00BB000001E00200000000000000000003E00010006201010000000
Reserved: 0x00
Sub Type: 1 (0x01)
Sub Length: 30 (0x001E)
SRv6 SID = FC00:BB00:0001:E002:0000:0000:0000:0000
SID Flags: 0 (0x00)
Endpoint Behavior: 62 (0x003E)
Reserved2 : 0 (0x00)
SRv6 SID Optional Type: 1 (0x01)
SRv6 SID Optional Len: 6 (0x0006)
SRv6 SID Optional Value: 35253360001024 (0x201010000000)

NLRI

NLRI LENGTH: UPDATE Length - 23 - TOTAL PATH ATTRIBUTES LENGTH - UNFEASIBLE ROUTES LENGTH
NLRI LENGTH: 126 - 23 - 103 - 0
NLRI LENGTH: 0 bytes

3. R3接收BGP更新并将其安装到BGP IPv6单播表中

路由器R3收到来自R1的BGP更新，可以通过在R3上启用BGP调试来观察此情况。收到的BGP更新数据包必须与R1发送的数据包匹配，如debug输出所示。

```
bgp[1100]: [default-rtr]: UPDATE from fc00:bb00:1::1 contains nh fc00:bb00:1::1/128, gw_afi 5, flags 0x
bgp[1100]: [default-rtr]: NH-Validate-Create: addr=fc00:bb00:1::1/128, len=16, nlrifi=5, nbr=fc00:bb00:1::1/128
bgp[1100]: [default-rtr]: --bgp4_rcv_attributes--: END: nbr=fc00:bb00:1::1: msg=0x0x7fc420108bdc/126, l
bgp[1100]: [default-rtr]: Comm-lib: Assigned ID (0x1d0000ac) for elem-type PREFIX_SID SRV6_L3SVC
bgp[1100]: [default-rtr]: Comm-lib: Assigned ID (0x90000de) for elem-type Attribute
bgp[1100]: [default-rtr] (ip6u): Received UPDATE from fc00:bb00:1::1 with attributes:
bgp[1100]: [default-rtr] (ip6u): nexthop fc00:bb00:1::1/128, origin i, localpref 100, metric 0
bgp[1100]: [default-rtr] (ip6u): Received prefix fc00:aa00:1::1/128 (path ID: none) from fc00:bb00:1::1
bgp[1100]: [default-rtr] (ip6u): Handling OCRIB attrs while relacing path 0x7fc3e1be61d8. Old oc attr (
bgp[1100]: [default-rtr]: bgp_bmp_table_path_update_cb: Operation: 0x1, Inbound Post-Policy Route Mon i
bgp[1100]: [default-rtr] (ip6u): Done modify path (old tlv size=0 new tlv size=0) for net=fc00:aa00:1::1/128
bgp[1100]: [default-rtr]: bgp_set_path_metric:8712 afi 5 net fc00:aa00:1::1/128 path 0x7fc3e1be61d8 nh
bgp[1100]: [default-rtr] (ip6u): bestpath: (full bp 1) start for net=fc00:aa00:1::1/128, nver=2000371,
bgp[1100]: [default-rtr] (ip6u): bestpath: (full 1) calculated for net=fc00:aa00:1::1/128, nver=2000371
bgp[1100]: [default-rtr] (ip6u): bestpath: change for net=fc00:aa00:1::1/128, nver=2000371, nfl=0x00003
bgp[1100]: [default-rtr] (ip6u): bestpath: update flags for net=fc00:aa00:1::1/128, nver=2000371, nfl=0
bgp[1100]: [default-rtr] (ip6u): bestpath: modified path: net=fc00:aa00:1::1/128, nver=2000371, nfl=0x0
bgp[1100]: [default-rtr] (ip6u): bgp_srv6_get_alloc_mode_locator_from_policy: Use default SRV6 alloc mo
bgp[1100]: [default-rtr] (ip6u): bestpath: complete for net=fc00:aa00:1::1/128, nver=2000371, nfl=0x000
bgp[1100]: [default-rtr]: Received UPDATE from fc00:bb00:1::1 (length incl. header = 126)
bgp[1100]: [default-rtr]: Receive message dump for fc00:bb00:1::1:
bgp[1100]: [default-rtr]: ffff ffff ffff ffff ffff ffff ffff ffff
bgp[1100]: [default-rtr]: 007e 0200 0000 6790 0e00 2600 0201 10fc
bgp[1100]: [default-rtr]: 00bb 0000 0100 0000 0000 0000 0000 0100
bgp[1100]: [default-rtr]: 80fc 00aa 0000 0100 0000 0000 0000 0000
bgp[1100]: [default-rtr]: 0140 0101 0040 0200 8004 0400 0000 0040
bgp[1100]: [default-rtr]: 0504 0000 0064 c028 2505 0022 0001 001e
bgp[1100]: [default-rtr]: 00fc 00bb 0000 01e0 0200 0000 0000 0000
bgp[1100]: [default-rtr]: 0000 003e 0001 0006 2010 1000 0000
bgp[1100]: [default-rtr]: Enabling read from: fc00:bb00:1::1 readset: 1 msgcount: 0
bgp[1100]: [default-iowt]: bgp write for afi 4 for neighbor fc00:bb00:1::1 (fd 516)
bgp[1100]: [default-iowt]: bgp write for afi 5 for neighbor fc00:bb00:1::1 (fd 516)
bgp[1100]: [default-imp] (ip6u): START import walk from 2000371 to 2000372 skip_walk 1
bgp[1100]: [default-rib2] (ip6u): RIB thread triggered for versioned walk: current version 2000371, ack
bgp[1100]: [default-rib2] (ip6u): RNH rib opaque update for (IPv6 Unicast)
bgp[1100]: [default-rib2] (ip6u): RIB thread triggered for RNH walk for nh table(IPv6 Unicast): current
bgp[1100]: [default-lbl] (ip6u): Label update triggered: current version 2000371, target version 200037
bgp[1100]: [default-lbl]: Table: TBL:default (2/1) bgp_label_srv6_sid_config_release: label_sid_need_ev
bgp[1100]: [default-lbl]: uSID WLIB allocation is (LIB Default)
bgp[1100]: [default-lbl]: Table: TBL:default (2/1) bgp_label_thread_walk_type: rd:0x7fc3e1efbf30(ALLzer
bgp[1100]: [default-lbl] (ip6u): rd:0x7fc3e1efbf30 sid_walk:1 label_walk:0
bgp[1100]: [default-lbl]: uSID WLIB allocation is (LIB Default)
bgp[1100]: [default-upd] (vpn4u): Started updgrp timer for updgrp 0.1:: delay=0.010, delaytype=0
bgp[1100]: [default-lbl] (ip6u): SRV6 SID process for net: TBL:default (2/1)fc00:aa00:1::1/128(SID N) e
bgp[1100]: [default-lbl] (ip6u): SRV6 SID process for net: TBL:default (2/1)fc00:aa00:1::1/128 point 1
bgp[1100]: [default-lbl]: uSID WLIB allocation is (LIB Default)
bgp[1100]: [default-lbl] (ip6u): Label update run from 2000371 target label version 2000372, rib versio
bgp[1100]: [default-lbl] (ip6u): Wake up rib thread, label version 2000372, rib version 2000371, bgp ta
bgp[1100]: [default-rib2] (ip6u): RIB thread triggered for versioned walk: current version 2000371, ack
bgp[1100]: [default-rib2] (ip6u): RNH rib opaque update for (IPv6 Unicast)
bgp[1100]: [default-rib2] (ip6u): RIB thread triggered for RNH walk for nh table(IPv6 Unicast): current
bgp[1100]: [default-rib2] (ip6u): Rib Batch-buf Route ADD: table=TBL:default (2/1), tableid=0xe0800000,
bgp[1100]: [default-rib2] (ip6u): Revise route batch: installing fc00:aa00:1::1/128 with next hop fc00:
```

```

bgp[1100]: [default-rib2] (ip6u): [0]: Rib Batch-buf Path ADD: table=TBL:default (2/1), net=fc00:aa00:1
bgp[1100]: [default-rib2] (ip6u): Sending convergence info for IPv6 Unicast - not converged, version: 0
bgp[1100]: [default-upd] (ip6u): Started updgrp timer for updgrp 0.1:: delay=0.010, delaytype=0
bgp[1100]: [default-rib2] (ip6u): vrf default: RIB update run to 2000372: installed 0, modified 1, skip
bgp[1100]: [default-rib2] (ip6u): RIB thread finished versioned walk: table version 2000372, acked tabl
bgp[1100]: [default-upd] (vpn4u): Starting updgen walk for updgrp 0.1:: targetver=463: tblver=463, lab
bgp[1100]: [default-upd] (ip6u): Starting updgen walk for updgrp 0.1:: targetver=2000372: tblver=20003
bgp[1100]: [default-upd] (ip6u): Computing updates for update sub-group 0.1 (Regular)
bgp[1100]: [default-upd] (ip6u): bgp_srv6_execute_sid_alloc_mode_policy: Use default SRv6 alloc mode pe
bgp[1100]: [default-upd]: table-attr walk for table TBL:default (2/1), resume version 0, subgrp version
bgp[1100]: [default-upd] (ip6u): process UPDATE for: tbl=TBL:default (2/1), afi=5: ug=0.1, (Regular), p
bgp[1100]: [default-upd] (ip6u): No unreachable (not advertising to sender: fc00:bb00:1::1) sent to sub

```

路由器R3生成与来自R1的更新处理对应的BGP跟踪，最终导致R3更新其BGP IPv6单播表。此更新包含BGP属性类型40，涉及从R1安装收到的SID以及关联的BGP IPv6单播前缀。

```

RP/0/RSP0/CPU0:R3#show bgp trace
default-bgp/spkr-tr2-imp 0/RSP0/CPU0 t16100 [IMPORT]:6661: Skipping Import walk: import ver 2000371 ->
default-bgp/spkr-tr2-rib 0/RSP0/CPU0 t30391 [RIB]:17177: RIB walk for afi IPv6 Unicast: target version
default-bgp/spkr-tr2-label 0/RSP0/CPU0 t16061 [LABEL]:8505: label walk afi:IPv6 Unicast, lbl ver 200037
default-bgp/spkr-tr2-label 0/RSP0/CPU0 t16061 [LABEL]:8510: label walk afi:IPv6 Unicast, lbl ver 200037
default-bgp/spkr-tr2-rib 0/RSP0/CPU0 t30391 [RIB]:17177: RIB walk for afi IPv6 Unicast: target version
default-bgp/spkr-tr2-rib 0/RSP0/CPU0 t30391 [RIB]:14681: send converge to RIB, afi IPv6 Unicast, tablei
default-bgp/spkr-tr2-rib 0/RSP0/CPU0 t30391 [RIB]:15892: RIB(default:v6u): ver 2000371 -> 2000372 :pfx
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t16101 [UPD]:11342: Updgen - TBL:default (2/1) UG: 0.1 SG: 0.1 msg
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t16101 [UPD]:11344: Updgen - pfx: [tot] adv/wdn/sup/skp/be[1] 0/0
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t16101 [UPD]:11351: Updgen - fpx: wdn/skp[0/0] ver: 2000371 -> 200
default-bgp/spkr-tr2-common 0/RSP0/CPU0 t16101 [COMMON]:3628: vrf default nbr fc00:bb00:1::1, set peer
default-bgp/spkr-tr2-upd 0/RSP0/CPU0 t16101 [UPD]:11663: Updgen - Skip EoR for Tbl:(TBL:default (2/1))

```

<#root>

RP/0/RSP0/CPU0:R3#

show bgp ipv6 unicast received-sids

```

BGP router identifier 10.0.0.3, local AS number 1
BGP generic scan interval 60 secs
Non-stop routing is enabled
BGP table state: Active
Table ID: 0xe0800000 RD version: 46
BGP table nexthop route policy:
BGP main routing table version 46
BGP NSR Initial initsync version 6 (Reached)
BGP NSR/ISSU Sync-Group versions 0/0
BGP scan interval 60 secs

```

```

Status codes: s suppressed, d damped, h history, * valid, > best
              i - internal, r RIB-failure, S stale, N Nexthop-discard

```

Origin codes: i - IGP, e - EGP, ? - incomplete

```

Network          Next Hop          Received Sid
*>ifc00:aa00:1::1/128 fc00:bb00:1::1

```

fc00:bb00:1:e002::

```
*> fc00:aa00:3::3/128 ::
```

```
NO SRv6 Sid
```

```
Processed 2 prefixes, 2 paths
```

4. R3安装RIB和FIB

最终R3安装RIB和FIB以完成信令过程。然后R3充当SID列表fc00:bb00:1:e002::的SRv6头端。此入口R1充当SR策略中封装的SRv6头端，缩写为H.Encaps (RFC 8986，第5.1节)。此行为将数据包封装到IPv6报头中，强制实施数据段列表并在需要时添加SRH。在这种情况下，无需添加SRH，因为只有一个网段。数据包将发送目的地址fc00:bb00:1:e002::，这是R1上具有SRv6终端UDT6行为的服务SID。

```
<#root>
```

```
RP/0/RSP0/CPU0:R3#
```

```
show route ipv6 fc00:aa00:1::1/128 detail
```

```
Routing entry for fc00:aa00:1::1/128
  Known via "bgp 1", distance 200, metric 0, type internal
  Installed Jun  8 17:52:31.546 for 00:53:55
  Routing Descriptor Blocks
    fc00:bb00:1::1, from fc00:bb00:1::1
      Route metric is 0
      Label: None
      Tunnel ID: None
      Binding Label: None
      Extended communities count: 0
      NHID: 0x0 (Ref: 0)
      Path Grouping ID: 1
```

```
SRv6 Headend: H.Encaps.Red [f3216], SID-list {fc00:bb00:1:e002::}
```

```
Route version is 0x1f (31)
No local label
IP Precedence: Not Set
QoS Group ID: Not Set
Flow-tag: Not Set
Fwd-class: Not Set
Route Priority: RIB_PRIORITY_RECURSIVE (12) SVD Type RIB_SVD_TYPE_LOCAL
Download Priority 4, Download Version 166
No advertising protos.
```

```
RP/0/RSP0/CPU0:R3#
```

```
show cef ipv6 fc00:aa00:1::1/128
```

```
fc00:aa00:1::1/128, version 166,
```

```
SRv6 Headend
```

```
, internal 0x5000001 0x40 (ptr 0x7941f0f4) [1], 0x0 (0x0), 0x0 (0x7ad58368)
Updated Jun  8 17:52:31.551
Prefix Len 128, traffic index 0, precedence n/a, priority 4
gateway array (0x78eac428) reference count 1, flags 0x2010, source rib (7), 0 backups
```

```
[1 type 3 flags 0x48441 (0x78f4f4d8) ext 0x0 (0x0)]
LW-LDI[type=0, refc=0, ptr=0x0, sh-ldi=0x0]
gateway array update type-time 1 Jun  8 17:52:31.551
LDI Update time Jun  8 17:52:31.551

Level 1 - Load distribution: 0
[0] via fc00:bb00:1::/128, recursive

Accounting: Disabled
via fc00:bb00:1::/128, 5 dependencies, recursive [flags 0x6000]
path-idx 0 NHID 0x0 [0x7941edb4 0x0]
next hop fc00:bb00:1::/128 via fc00:bb00:1::/48
```

SRv6 H.Encaps.Red SID-list {fc00:bb00:1:e002::}

Load distribution: 0 (refcount 1)

Hash	OK	Interface	Address
0	Y	TenGigE0/0/0/1	remote

图4显示了路由器R3(fc00:aa00:3::3)ping R1(fc00:aa00:1::1)时的数据包格式。

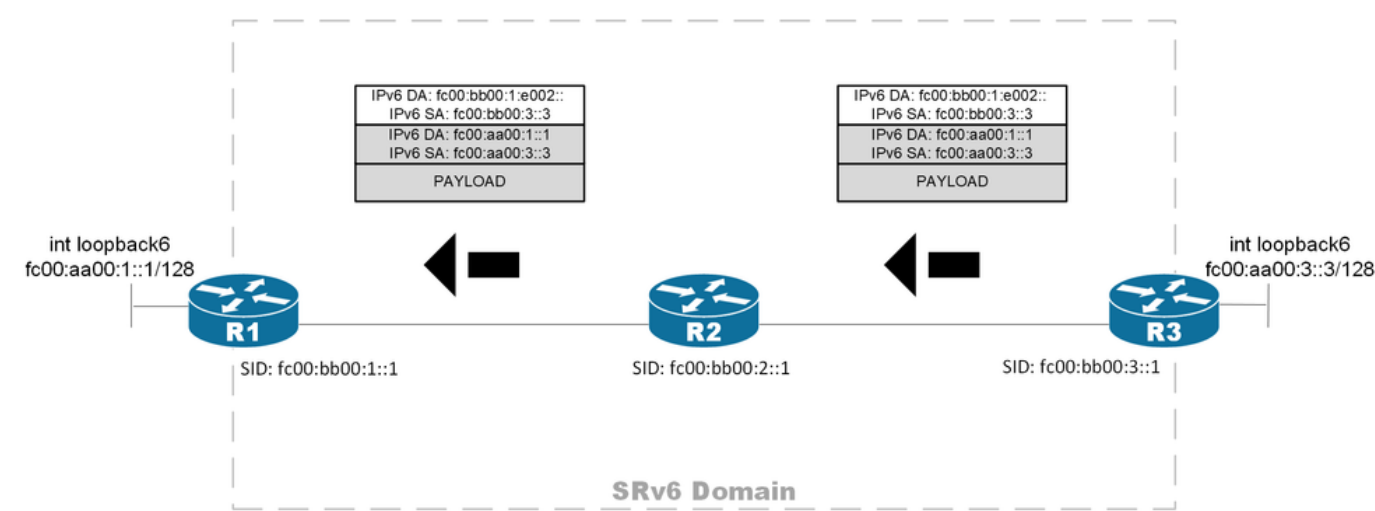


图4.沿SRv6上BGP IPv6单播路径的数据包处理

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