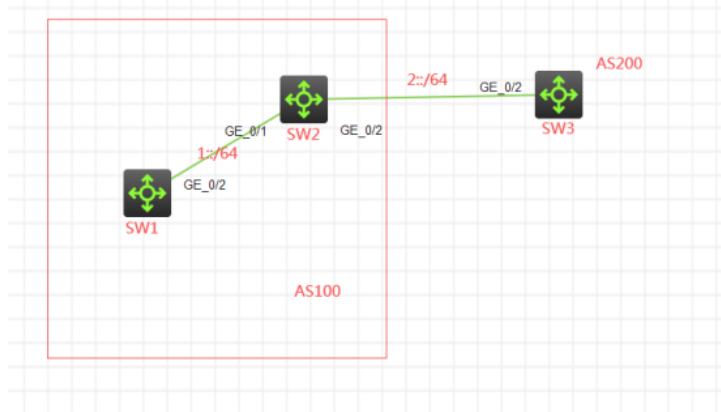


# 知 S5820 IPV6 BGP一级RR路由反射器典型组网配置案例

BGP H3C模拟器 韦家宁 2020-04-07 发表

## 组网及说明



### 组网说明:

本案例使用H3C HCL模拟器的S5820交换机来模拟IPv6 BGP一级RR路由反射器的典型组网配置。SW 1、SW2属于AS100，SW3属于AS200。由于SW1与SW3没有互联，又想实现业务地址的互通，因此需要采用RR路由反射器技术，SW2为SW1的RR路由反射器，SW1为SW2的RR路由反射器的客户端。为了使得SW1与SW2之间能够建立IBGP邻居关系及达到路由反射的效果，因此SW1与SW2之间同时运行OSPFV3路由协议，为IBGP邻居的建立及路由反射提供承载。最后SW2与SW3之间建立EBGP邻居关系。

IP地址规划如下:

设备名称	接口/VLAN	IP地址	子网掩码/地址前缀	备注
SW1	Gi 1/0/2	1::1	64	
	Loopback 10	3::1	64	模拟业务
	Loopback 20	4::1	64	模拟业务
	Loopback 0	1.1.1.1	32	Ipv4 Router-id
	Loopback 1	7::1	64	Ipv6 Router-id
SW2	Gi 1/0/1	1::2	64	
	Gi 1/0/2	2::1	64	
	Loopback 0	3.3.3.3	32	Ipv4 Router-id
	Loopback 1	8::1	64	Ipv6 Router-id
SW3	Gi 1/0/2	2::2	64	
	Loopback 10	5::1	64	模拟业务
	Loopback 20	6::1	64	模拟业务
	Loopback 0	2.2.2.2	32	Ipv4 Router-id
	Loopback 1	9::1	64	Ipv6 Router-id

## 配置步骤

SW1:

```
sys
```

```
System View: return to User View with Ctrl+Z.
```

```
[H3C]sysname SW1
```

```
[SW1]int loopback 0
```

```
[SW1-LoopBack0]ip address 1.1.1.1 32
```

```
[SW1-LoopBack0]quit
```

```
[SW1]int loopback 1
```

```
[SW1-LoopBack1]ipv6 address 7::1 64
```

```
[SW1-LoopBack1]quit
```

```
[SW1]int loopback 10
```

```
[SW1-LoopBack10]ipv6 address 3::1 64
```

```
[SW1-LoopBack10]quit
```

```
[SW1]int loopback 20
```

```
[SW1-LoopBack20]ipv6 address 4::1 64
```

```
[SW1-LoopBack20]quit
```

```
[SW1]int gi 1/0/2
```

```
[SW1-GigabitEthernet1/0/2]port link-mode route
[SW1-GigabitEthernet1/0/2]description
[SW1-GigabitEthernet1/0/2]ipv6 address 1::1 64
[SW1-GigabitEthernet1/0/2]quit
[SW1]ospfv3 1
[SW1-ospfv3-1]router-id 1.1.1.1
[SW1-ospfv3-1]quit
[SW1]int gi 1/0/2
[SW1-GigabitEthernet1/0/2]ospfv3 1 area 0
[SW1-GigabitEthernet1/0/2]quit
[SW1]int loopback 1
[SW1-LoopBack1]ospfv3 1 area 0
[SW1-LoopBack1]quit
[SW1]bgp 100
[SW1-bgp-default]router-id 1.1.1.1
[SW1-bgp-default]peer 8::1 as-number 100
[SW1-bgp-default]peer 8::1 connect-interface LoopBack 1
[SW1-bgp-default]address-family ipv6 unicast
[SW1-bgp-default-ipv6]peer 8::1 enable
[SW1-bgp-default-ipv6]network 3:: 64
[SW1-bgp-default-ipv6]network 4:: 64
[SW1-bgp-default-ipv6]quit
[SW1-bgp-default]quit
```

SW2:

sys

System View: return to User View with Ctrl+Z.

```
[H3C]sysname SW2
[SW2]int loopback 0
[SW2-LoopBack0]ip address 3.3.3.3 32
[SW2-LoopBack0]quit
[SW2]int loopback 1
[SW2-LoopBack1]ipv6 address 8::1 64
[SW2-LoopBack1]quit
[SW2]int gi 1/0/1
[SW2-GigabitEthernet1/0/1]port link-mode route
[SW2-GigabitEthernet1/0/1]des
[SW2-GigabitEthernet1/0/1]ipv6 address 1::2 64
[SW2-GigabitEthernet1/0/1]quit
[SW2]int gi 1/0/2
[SW2-GigabitEthernet1/0/2]port link-mode route
[SW2-GigabitEthernet1/0/2]des
[SW2-GigabitEthernet1/0/2]ipv6 address 2::1 64
[SW2-GigabitEthernet1/0/2]quit
[SW2]ospfv3 1
[SW2-ospfv3-1]router-id 3.3.3.3
[SW2-ospfv3-1]import-route direct
[SW2-ospfv3-1]quit
[SW2]int gi 1/0/1
[SW2-GigabitEthernet1/0/1]ospfv3 1 area 0
[SW2-GigabitEthernet1/0/1]quit
[SW2]int gi 1/0/2
[SW2-GigabitEthernet1/0/2]ospfv3 1 area 0
[SW2-GigabitEthernet1/0/2]quit
[SW2]int loopback 1
[SW2-LoopBack1]ospfv3 1 area 0
[SW2-LoopBack1]quit
[SW2]bgp 100
[SW2-bgp-default]router-id 3.3.3.3
[SW2-bgp-default]peer 7::1 as-number 100
[SW2-bgp-default]peer 7::1 connect-interface LoopBack 1
[SW2-bgp-default]peer 2::2 as-number 200
[SW2-bgp-default]address-family ipv6 unicast
```

```
[SW2-bgp-default-ipv6]import-route direct
[SW2-bgp-default-ipv6]peer 7::1 enable
[SW2-bgp-default-ipv6]peer 7::1 reflect-client
[SW2-bgp-default-ipv6]peer 2::2 enable
[SW2-bgp-default-ipv6]quit
[SW2-bgp-default]quit
```

SW3:

sys

System View: return to User View with Ctrl+Z.

[H3C]sysname SW3

sys

System View: return to User View with Ctrl+Z.

[H3C]sysname SW3

[SW3]int loopback 0

[SW3-LoopBack0]ip address 2.2.2.2 32

[SW3-LoopBack0]quit

[SW3]int loopback 1

[SW3-LoopBack1]ipv6 address 9::1 64

[SW3-LoopBack1]quit

[SW3]int loopback 10

[SW3-LoopBack10]ipv6 address 5::1 64

[SW3-LoopBack10]quit

[SW3]int loopback 20

[SW3-LoopBack20]ipv6 address 6::1 64

[SW3-LoopBack20]quit

[SW3]int gi 1/0/2

[SW3-GigabitEthernet1/0/2]port link-mode route

[SW3-GigabitEthernet1/0/2]description

[SW3-GigabitEthernet1/0/2]ipv6 address 2::2 64

[SW3-GigabitEthernet1/0/2]quit

[SW3]bgp 200

[SW3-bgp-default]router-id 2.2.2.2

[SW3-bgp-default]peer 2::1 as-number 100

[SW3-bgp-default]address-family ipv6 unicast

[SW3-bgp-default-ipv6]peer 2::1 enable

[SW3-bgp-default-ipv6]network 5:: 64

[SW3-bgp-default-ipv6]network 6:: 64

[SW3-bgp-default-ipv6]quit

[SW3-bgp-default]quit

测试:

SW1的loopback 10\20能与SW3的loopback 10\20互通:

```
<SW1>ping ipv6 -a 3::1 5::1
Ping6(56 data bytes) 3::1 --> 5::1, press CTRL_C to break
56 bytes from 5::1, icmp_seq=0 hlim=63 time=3.000 ms
56 bytes from 5::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 5::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 5::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 5::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 5::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.400/3.000/0.800 ms
<SW1>Apr  6 18:13:09:549 2020 SW1 PING/6/PING_STATISTICS: Ping6 statistics for 5::1: 5 pa
cket(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std-de
v = 1.000/1.400/3.000/0.800 ms.

<SW1>ping ipv6 -a 3::1 6::1
Ping6(56 data bytes) 3::1 --> 6::1, press CTRL_C to break
56 bytes from 6::1, icmp_seq=0 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 6::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.000/1.000/0.000 ms
<SW1>Apr  6 18:13:14:249 2020 SW1 PING/6/PING_STATISTICS: Ping6 statistics for 6::1: 5 pa
cket(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std-de
v = 1.000/1.000/1.000/0.000 ms.
```

```

<SW1>ping ipv6 -a 4::1 5::1
Ping6(56 data bytes) 4::1 --> 5::1, press CTRL_C to break
56 bytes from 5::1, icmp_seq=0 hlim=63 time=2.000 ms
56 bytes from 5::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 5::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 5::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 5::1, icmp_seq=4 hlim=63 time=2.000 ms

--- Ping6 statistics for 5::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.400/2.000/0.490 ms
<SW1>%Apr 6 18:13:33:267 2020 SW1 PING/6/PING_STATISTICS: Ping6 statistics for 5::1
avg/max/std-dev = 1.000/1.400/2.000/0.490 ms.

<SW1>ping ipv6 -a 4::1 6::1
Ping6(56 data bytes) 4::1 --> 6::1, press CTRL_C to break
56 bytes from 6::1, icmp_seq=0 hlim=63 time=3.000 ms
56 bytes from 6::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 6::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 6::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.400/3.000/0.800 ms
<SW1>%Apr 6 18:13:36:973 2020 SW1 PING/6/PING_STATISTICS: Ping6 statistics for 6::1
avg/max/std-dev = 1.000/1.400/3.000/0.800 ms.

<SW1>

```

```

[SW3]ping ipv6 -a 5::1 3::1
Ping6(56 data bytes) 5::1 --> 3::1, press CTRL_C to break
56 bytes from 3::1, icmp_seq=0 hlim=63 time=2.000 ms
56 bytes from 3::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 3::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 3::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 3::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 3::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.200/2.000/0.400 ms
[SW3]Apr 6 18:11:09:032 2020 SW3 PING/6/PING_STATISTICS: Ping6 statistics for 3::1
avg/max/std-dev = 1.000/1.200/2.000/0.400 ms.

[SW3]ping ipv6 -a 5::1 4::1
Ping6(56 data bytes) 5::1 --> 4::1, press CTRL_C to break
56 bytes from 4::1, icmp_seq=0 hlim=63 time=2.000 ms
56 bytes from 4::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 4::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.200/2.000/0.400 ms
[SW3]Apr 6 18:11:12:227 2020 SW3 PING/6/PING_STATISTICS: Ping6 statistics for 4::1
avg/max/std-dev = 1.000/1.200/2.000/0.400 ms.

[SW3]

```

```

[SW3]ping ipv6 -a 6::1 3::1
Ping6(56 data bytes) 6::1 --> 3::1, press CTRL_C to break
56 bytes from 3::1, icmp_seq=0 hlim=63 time=2.000 ms
56 bytes from 3::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 3::1, icmp_seq=2 hlim=63 time=2.000 ms
56 bytes from 3::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 3::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 3::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.400/2.000/0.490 ms
[SW3]Apr 6 18:11:30:146 2020 SW3 PING/6/PING_STATISTICS: Ping6 statistics for 3::1
avg/max/std-dev = 1.000/1.400/2.000/0.490 ms.

[SW3]ping ipv6 -a 6::1 4::1
Ping6(56 data bytes) 6::1 --> 4::1, press CTRL_C to break
56 bytes from 4::1, icmp_seq=0 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 4::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 4::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.000/1.000/0.000 ms
[SW3]Apr 6 18:11:33:165 2020 SW3 PING/6/PING_STATISTICS: Ping6 statistics for 4::1
avg/max/std-dev = 1.000/1.000/1.000/0.000 ms.

[SW3]

```

查看SW1的BGP邻居信息:

```

<SW1>dis bgp peer ipv6

BGP local router ID: 1.1.1.1
Local AS number: 100
Total number of peers: 1                Peers in established state: 1

* - Dynamically created peer
Peer          AS  MsgRcvd  MsgSent  OutQ  PrefRcv  Up/Down  State
-----
8::1         100    320      285     0     5 04:32:43  Established
<SW1>

```

查看SW2的BGP邻居信息:

```
<SW2>dis bgp peer ipv6
BGP local router ID: 3.3.3.3
Local AS number: 100
Total number of peers: 2          Peers in established state: 2
* - Dynamically created peer
Peer      AS  MsgRcvd  MsgSent  OutQ  PrefRcv  Up/Down  State
2::2     200    9        11      0     2 00:05:23 Established
7::1     100   285      320     0     2 04:32:54 Established
<SW2>
```

查看SW3的BGP邻居信息:

```
[SW3]dis bgp peer ipv6
BGP local router ID: 2.2.2.2
Local AS number: 200
Total number of peers: 1          Peers in established state: 1
* - Dynamically created peer
Peer      AS  MsgRcvd  MsgSent  OutQ  PrefRcv  Up/Down  State
2::1     100    11       9       0     5 00:05:32 Established
[SW3]
```

查看SW1的路由表:

dis ipv6 routing-table

Destinations : 16 Routes : 16

Destination: ::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 1::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : GE1/0/2	Cost : 0
Destination: 1::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 2::/64	Protocol : O_INTRA
NextHop : FE80::2225:7FF:FEBC:706	Preference: 10
Interface : GE1/0/2	Cost : 2
Destination: 3::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : Loop10	Cost : 0
Destination: 3::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 4::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : Loop20	Cost : 0
Destination: 4::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 5::/64	Protocol : BGP4+
NextHop : 2::2	Preference: 255
Interface : GE1/0/2	Cost : 0
Destination: 6::/64	Protocol : BGP4+
NextHop : 2::2	Preference: 255
Interface : GE1/0/2	Cost : 0

Destination: 7::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : Loop1	Cost : 0
Destination: 7::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 8::/64	Protocol : O_ASE2
NextHop : FE80::2225:7FF:FEBC:706	Preference: 150
Interface : GE1/0/2	Cost : 1
Destination: 8::1/128	Protocol : O_INTRA
NextHop : FE80::2225:7FF:FEBC:706	Preference: 10
Interface : GE1/0/2	Cost : 1
Destination: FE80::/10	Protocol : Direct
NextHop : ::	Preference: 0
Interface : InLoop0	Cost : 0
Destination: FF00::/8	Protocol : Direct
NextHop : ::	Preference: 0
Interface : NULL0	Cost : 0

查看SW2的路由表:  
dis ipv6 routing-table

Destinations : 14    Routes : 14

Destination: ::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 1::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : GE1/0/1	Cost : 0
Destination: 1::2/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 2::/64	Protocol : Direct
NextHop : ::	Preference: 0
Interface : GE1/0/2	Cost : 0
Destination: 2::1/128	Protocol : Direct
NextHop : ::1	Preference: 0
Interface : InLoop0	Cost : 0
Destination: 3::/64	Protocol : BGP4+
NextHop : 7::1	Preference: 255
Interface : GE1/0/1	Cost : 0
Destination: 4::/64	Protocol : BGP4+
NextHop : 7::1	Preference: 255
Interface : GE1/0/1	Cost : 0
Destination: 5::/64	Protocol : BGP4+
NextHop : 2::2	Preference: 255
Interface : GE1/0/2	Cost : 0
Destination: 6::/64	Protocol : BGP4+
NextHop : 2::2	Preference: 255
Interface : GE1/0/2	Cost : 0

Destination: 7::1/128 Protocol : O\_INTRA  
NextHop : FE80::22E3:CAFF:FE63:107 Preference: 10  
Interface : GE1/0/1 Cost : 1

Destination: 8::/64 Protocol : Direct  
NextHop : :: Preference: 0  
Interface : Loop1 Cost : 0

Destination: 8::1/128 Protocol : Direct  
NextHop : ::1 Preference: 0  
Interface : InLoop0 Cost : 0

Destination: FE80::/10 Protocol : Direct  
NextHop : :: Preference: 0  
Interface : InLoop0 Cost : 0

Destination: FF00::/8 Protocol : Direct  
NextHop : :: Preference: 0  
Interface : NULL0 Cost : 0

查看SW3的路由表:

[SW3]dis ipv6 routing-table

Destinations : 15 Routes : 15

Destination: ::1/128 Protocol : Direct  
NextHop : ::1 Preference: 0  
Interface : InLoop0 Cost : 0

Destination: 1::/64 Protocol : BGP4+  
NextHop : 2::1 Preference: 255  
Interface : GE1/0/2 Cost : 0

Destination: 2::/64 Protocol : Direct  
NextHop : :: Preference: 0  
Interface : GE1/0/2 Cost : 0

Destination: 2::2/128 Protocol : Direct  
NextHop : ::1 Preference: 0  
Interface : InLoop0 Cost : 0

Destination: 3::/64 Protocol : BGP4+  
NextHop : 2::1 Preference: 255  
Interface : GE1/0/2 Cost : 0

Destination: 4::/64 Protocol : BGP4+  
NextHop : 2::1 Preference: 255  
Interface : GE1/0/2 Cost : 0

Destination: 5::/64 Protocol : Direct  
NextHop : :: Preference: 0  
Interface : Loop10 Cost : 0

Destination: 5::1/128 Protocol : Direct  
NextHop : ::1 Preference: 0  
Interface : InLoop0 Cost : 0

Destination: 6::/64 Protocol : Direct  
NextHop : :: Preference: 0  
Interface : Loop20 Cost : 0

Destination: 6::1/128 Protocol : Direct  
NextHop : ::1 Preference: 0

```
Interface : InLoop0          Cost   : 0

Destination: 8::/64         Protocol : BGP4+
NextHop    : 2::1          Preference: 255
Interface  : GE1/0/2       Cost     : 0

Destination: 9::/64         Protocol : Direct
NextHop    : ::           Preference: 0
Interface  : Loop1        Cost     : 0

Destination: 9::1/128       Protocol : Direct
NextHop    : ::1         Preference: 0
Interface  : InLoop0      Cost     : 0

Destination: FE80::/10      Protocol : Direct
NextHop    : ::         Preference: 0
Interface  : InLoop0      Cost     : 0

Destination: FF00::/8       Protocol : Direct
NextHop    : ::         Preference: 0
Interface  : NULL0        Cost     : 0
[SW3]
```

至此，S5820 IPV6 BGP一级RR路由反射器典型组网配置案例已完成！

配置关键点