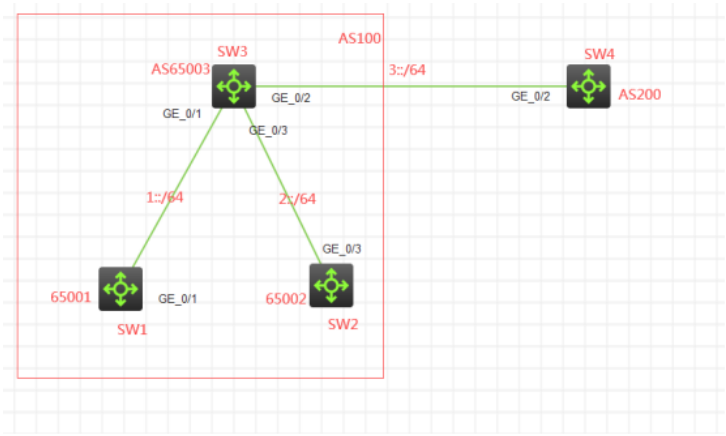
S5820 IPV6 BGP4+ 联盟典型组网配置案例

IPv6 BGP H3C模拟器 韦家宁 2020-04-07 发表

组网及说明



组网说明：

本案例采用H3C HCL模拟器的S5820来模拟BGP联盟的典型组网配置。在网络拓扑图中SW1、SW2没有直连到SW4，同时又属于不同的AS，为了实现SW1、SW2能与SW4互通，因此使用BGP联盟来达到互通的效果。

BGP联盟规划：

设备名称	AS号	联盟ID	备注
SW1	65001	100	
SW2	65002	100	
SW3	65003	100	
SW4	200		非联盟设备

IP地址规划：

设备名称	VLAN\接口	IP地址	子网掩码/地址前缀	备注
SW1	Loopback 0	1.1.1.1	32	Router-id
	Loopback 1	4::1	64	IPV6 Router-id
	Loopback 10	8::1	64	模拟业务
	GI 1/0/1	1::1	64	
SW2	Loopback 0	2.2.2.2	32	Router-id
	Loopback 1	5::1	64	IPV6 Router-id
	Loopback 10	9::1	64	模拟业务
	GI 1/0/3	2::1	64	
SW3	Loopback 0	3.3.3.3	32	Router-id
	Loopback 1	6::1	64	IPV6 Router-id
	GI 1/0/1	1::2	64	
	GI 1/0/3	2::2	64	
	GI 1/0/2	3::1	64	
SW4	Loopback 0	4.4.4.4	32	Router-id
	Loopback 1	7::1	64	IPV6 Router-id
	Loopback 100	10::1	64	模拟业务
	GI 1/0/2	3::2	64	

配置步骤

SW1：

```
<H3C>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 4::1 64
[SW1-LoopBack1]quit
[SW1]int loopback 10
[SW1-LoopBack10]ipv6 address 8::1 64
[SW1-LoopBack10]quit
[SW1]int gi 1/0/1
```

```
[SW1-GigabitEthernet1/0/1]port link-mode route
[SW1-GigabitEthernet1/0/1]des <connect to SW3>
[SW1-GigabitEthernet1/0/1]ipv6 address 1::1 64
[SW1-GigabitEthernet1/0/1]quit
[SW1]bgp 65001
[SW1-bgp-default]router-id 1.1.1.1
[SW1-bgp-default]confederation id 100  //指定联盟ID
[SW1-bgp-default]confederation peer-as 65002 65003  //指定联盟邻居的AS号
[SW1-bgp-default]peer 1::2 as-number 65003
[SW1-bgp-default]address-family ipv6 unicast
[SW1-bgp-default-ipv6]peer 1::2 enable
[SW1-bgp-default-ipv6]network 8:: 64
[SW1-bgp-default-ipv6]network 4:: 64
[SW1-bgp-default-ipv6]quit
[SW1-bgp-default]quit
```

SW2：

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW2
[SW2]int loopback 0
[SW2-LoopBack0]ip address 2.2.2.2 32
[SW2-LoopBack0]quit
[SW2]int loopback 1
[SW2-LoopBack1]ipv6 address 5::1 64
[SW2-LoopBack1]quit
[SW2]int loopback 10
[SW2-LoopBack10]ipv6 address 9::1 64
[SW2-LoopBack10]quit
[SW2]int gi 1/0/3
[SW2-GigabitEthernet1/0/3]port link-mode route
[SW2-GigabitEthernet1/0/3]des <connect to SW3>
[SW2-GigabitEthernet1/0/3]ipv6 address 2::1 64
[SW2-GigabitEthernet1/0/3]quit
[SW2]bgp 65002
[SW2-bgp-default]router-id 2.2.2.2
[SW2-bgp-default]confederation id 100
[SW2-bgp-default]confederation peer-as 65001 65003
[SW2-bgp-default]peer 2::2 as-number 65003
[SW2-bgp-default]address-family ipv6 unicast
[SW2-bgp-default-ipv6]peer 2::2 enable
[SW2-bgp-default-ipv6]network 5:: 64
[SW2-bgp-default-ipv6]network 9:: 64
[SW2-bgp-default-ipv6]quit
[SW2-bgp-default]quit
```

SW3：

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW3
[SW3]int loopback 0
[SW3-LoopBack0]ip address 3.3.3.3 32
[SW3-LoopBack0]quit
[SW3]int loopback 1
[SW3-LoopBack1]ipv6 address 6::1 64
[SW3-LoopBack1]quit
[SW3]int gi 1/0/1
[SW3-GigabitEthernet1/0/1]port link-mode route
[SW3-GigabitEthernet1/0/1]des <connect to SW1>
[SW3-GigabitEthernet1/0/1]ipv6 address 1::2 64
[SW3-GigabitEthernet1/0/1]quit
[SW3]int gi 1/0/3
```

[SW3-GigabitEthernet1/0/3]port link-mode route
[SW3-GigabitEthernet1/0/3]des <connect to SW2>
[SW3-GigabitEthernet1/0/3]ipv6 address 2::2 64
[SW3-GigabitEthernet1/0/3]quit
[SW3]int gi 1/0/2
[SW3-GigabitEthernet1/0/2]port link-mode route
[SW3-GigabitEthernet1/0/2]ipv6 address 3::1 64
[SW3-GigabitEthernet1/0/2]des <connect to SW4>
[SW3-GigabitEthernet1/0/2]quit
[SW3]bgp 65003
[SW3-bgp-default]router-id 3.3.3.3
[SW3-bgp-default]confederation id 100
[SW3-bgp-default]confederation peer-as 65001 65002
[SW3-bgp-default]peer 1::1 as-number 65001
[SW3-bgp-default]peer 2::1 as-number 65002
[SW3-bgp-default]peer 3::2 as-number 200
[SW3-bgp-default]address-family ipv6 unicast
[SW3-bgp-default-ipv6]peer 1::1 enable
[SW3-bgp-default-ipv6]peer 2::1 enable
[SW3-bgp-default-ipv6]peer 3::2 enable
[SW3-bgp-default-ipv6]network 6:: 64
[SW3-bgp-default-ipv6]import-route direct
[SW3-bgp-default-ipv6]quit
[SW3-bgp-default]quit

SW4：
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW4
[SW4]int loopback 0
[SW4-LoopBack0]ip address 4.4.4.4 32
[SW4-LoopBack0]quit
[SW4]int loopback 1
[SW4-LoopBack1]ipv6 address 7::1 64
[SW4-LoopBack1]quit
[SW4]int loopback 100
[SW4-LoopBack100]ipv6 address 10::1 64
[SW4-LoopBack100]quit
[SW4]int gi 1/0/2
[SW4-GigabitEthernet1/0/2]port link-mode route
[SW4-GigabitEthernet1/0/2]des <connect to SW3>
[SW4-GigabitEthernet1/0/2]ipv6 address 3::2 64
[SW4-GigabitEthernet1/0/2]quit
[SW4]bgp 200
[SW4-bgp-default]router-id 4.4.4.4
[SW4-bgp-default]peer 3::1 as-number 100
[SW4-bgp-default]address-family ipv6 unicast
[SW4-bgp-default-ipv6]peer 3::1 enable
[SW4-bgp-default-ipv6]network 7:: 64
[SW4-bgp-default-ipv6]network 10:: 64
[SW4-bgp-default-ipv6]quit
[SW4-bgp-default]quit

测试：
SW1、SW2的loopback 10能PING通SW4的loopback 100:

```
<SW1>ping ipv6 -a 8::1 10::1
Ping6(56 data bytes) 8::1 --> 10::1, press CTRL_C to break
56 bytes from 10::1, icmp_seq=0 hlim=63 time=3.000 ms
56 bytes from 10::1, icmp_seq=1 hlim=63 time=2.000 ms
56 bytes from 10::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 10::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 10::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 10::1 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/1.600/3.000/0.800 ms
<SW1>%Apr  7 16:53:13:086 2020 SW1 PING/6/PING_STATISTICS: Ping6 stat
acket(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-t
ev = 1.000/1.600/3.000/0.800 ms.

<SW1>
```

```
<SW2>%Apr  7 16:58:07:484 2020 SW2 SHELL/5/SHELL_LOGIN: Console logged in from con0.

<SW2>ping ipv6 -a 9::1 10::1
Ping6(56 data bytes) 9::1 --> 10::1, press CTRL_C to break
56 bytes from 10::1, icmp_seq=0 hlim=63 time=2.000 ms
56 bytes from 10::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 10::1, icmp_seq=2 hlim=63 time=2.000 ms
56 bytes from 10::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 10::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 10::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
<SW2>%Apr  7 16:58:14:611 2020 SW2 PING/6/PING_STATISTICS: Ping6 statistics for 10::1: 5
acket(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std
ev = 1.000/1.400/2.000/0.490 ms.
```

SW4的loopback 100能PING通SW1、SW2的loopback 10:

```
[SW4]ping ipv6 -a 10::1 8::1
Ping6(56 data bytes) 10::1 --> 8::1, press CTRL_C to break
56 bytes from 8::1, icmp_seq=0 hlim=63 time=2.000 ms
56 bytes from 8::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 8::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 8::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 8::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 8::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
[SW4]%Apr  7 16:59:52:694 2020 SW4 PING/6/PING_STATISTICS: Ping6 statistics for 8::1: 5 pa
cket(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std-de
v = 1.000/1.200/2.000/0.400 ms.

[SW4]ping ipv6 -a 10::1 9::1
Ping6(56 data bytes) 10::1 --> 9::1, press CTRL_C to break
56 bytes from 9::1, icmp_seq=0 hlim=63 time=3.000 ms
56 bytes from 9::1, icmp_seq=1 hlim=63 time=1.000 ms
56 bytes from 9::1, icmp_seq=2 hlim=63 time=1.000 ms
56 bytes from 9::1, icmp_seq=3 hlim=63 time=1.000 ms
56 bytes from 9::1, icmp_seq=4 hlim=63 time=1.000 ms

--- Ping6 statistics for 9::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
[SW4]%Apr  7 16:59:56:028 2020 SW4 PING/6/PING_STATISTICS: Ping6 statistics for 9::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.
```

分别查看SW1、SW2、SW3、SW4的BGP4+邻居信息：

```
<SW1>dis bgp peer ipv6

 BGP local router ID: 1.1.1.1
 Local AS number: 65001
 Total number of peers: 1                 Peers in established state: 1

  * - Dynamically created peer
  Peer                    AS  MsgRcvd  MsgSent OutQ PrefRcv Up/Down  State

  1::2                 65003       15       12    0       8 00:07:29 Established
<SW1>
```

```
<SW2>dis bgp peer ipv6

 BGP local router ID: 2.2.2.2
 Local AS number: 65002
 Total number of peers: 1                 Peers in established state: 1

  * - Dynamically created peer
  Peer                    AS  MsgRcvd  MsgSent OutQ PrefRcv Up/Down  State

  2::2                 65003       16       12    0       8 00:07:32 Established
<SW2>
```

```
[SW3]dis bgp peer ipv6

 BGP local router ID: 3.3.3.3
 Local AS number: 65003
 Total number of peers: 3                 Peers in established state: 3

  * - Dynamically created peer
  Peer                    AS  MsgRcvd  MsgSent OutQ PrefRcv Up/Down  State

  1::1                 65001       12       15    0       2 00:07:50 Established
  2::1                 65002       12       15    0       2 00:07:47 Established
  3::2                   200        8       12    0       2 00:04:01 Established
[SW3]
```

分别查看SW1、SW2、SW3、SW4的IPV6路由表：

<SW1>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 : GE1/0/1 Cost : 0

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

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

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

Destination: 4::/64 Protocol : Direct
NextHop : :: Preference: 0
Interface : Loop1 Cost : 0

Destination: 4::1/128 Protocol : Direct
NextHop : ::1 Preference: 0
Interface : InLoop0 Cost : 0

Destination: 5::/64 Protocol : BGP4+
NextHop : 2::1 Preference: 255
Interface : GE1/0/1 Cost : 0

Destination: 6::/64 Protocol : BGP4+
NextHop : 1::2 Preference: 255
Interface : GE1/0/1 Cost : 0

Destination: 7::/64 Protocol : BGP4+
NextHop : 3::2 Preference: 255
Interface : GE1/0/1 Cost : 0

Destination: 8::/64 Protocol : Direct
NextHop : :: Preference: 0
Interface : Loop10 Cost : 0

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

Destination: 9::/64 Protocol : BGP4+
NextHop : 2::1 Preference: 255

```
Interface  : GE1/0/1                        Cost      : 0

Destination: 10::/64                        Protocol  : BGP4+
NextHop    : 3::2                           Preference: 255
Interface  : GE1/0/1                        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
<SW1>

<SW2>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  : BGP4+
NextHop    : 2::2                           Preference: 255
Interface  : GE1/0/3                        Cost      : 0

Destination: 2::/64                         Protocol  : Direct
NextHop    : ::                             Preference: 0
Interface  : GE1/0/3                        Cost      : 0

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

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

Destination: 4::/64                         Protocol  : BGP4+
NextHop    : 1::1                           Preference: 255
Interface  : GE1/0/3                        Cost      : 0

Destination: 5::/64                         Protocol  : Direct
NextHop    : ::                             Preference: 0
Interface  : Loop1                          Cost      : 0

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

Destination: 6::/64                         Protocol  : BGP4+
NextHop    : 2::2                           Preference: 255
Interface  : GE1/0/3                        Cost      : 0

Destination: 7::/64                         Protocol  : BGP4+
NextHop    : 3::2                           Preference: 255
Interface  : GE1/0/3                        Cost      : 0

Destination: 8::/64                         Protocol  : BGP4+
NextHop    : 1::1                           Preference: 255
Interface  : GE1/0/3                        Cost      : 0

Destination: 9::/64                         Protocol  : Direct
```

```
NextHop    : ::                          Preference: 0
Interface  : Loop10                      Cost      : 0

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

Destination: 10::/64                     Protocol  : BGP4+
NextHop    : 3::2                        Preference: 255
Interface  : GE1/0/3                     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
<SW2>

[SW3]dis ipv6 routing-table

Destinations : 17       Routes : 17

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  : GE1/0/3                     Cost      : 0

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

Destination: 3::/64                      Protocol  : Direct
NextHop    : ::                          Preference: 0
Interface  : GE1/0/2                     Cost      : 0

Destination: 3::1/128                    Protocol  : Direct
NextHop    : ::1                         Preference: 0
Interface  : InLoop0                     Cost      : 0

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

Destination: 5::/64                      Protocol  : BGP4+
NextHop    : 2::1                        Preference: 255
Interface  : GE1/0/3                     Cost      : 0

Destination: 6::/64                      Protocol  : Direct
NextHop    : ::                          Preference: 0
Interface  : Loop1                       Cost      : 0
```

```
Destination: 6::1/128                   Protocol  : Direct
NextHop    : ::1                        Preference: 0
Interface  : InLoop0                    Cost      : 0

Destination: 7::/64                     Protocol  : BGP4+
NextHop    : 3::2                       Preference: 255
Interface  : GE1/0/2                    Cost      : 0

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

Destination: 9::/64                     Protocol  : BGP4+
NextHop    : 2::1                       Preference: 255
Interface  : GE1/0/3                    Cost      : 0

Destination: 10::/64                    Protocol  : BGP4+
NextHop    : 3::2                       Preference: 255
Interface  : GE1/0/2                    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]

[SW4]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  : BGP4+
NextHop    : 3::1                       Preference: 255
Interface  : GE1/0/2                    Cost      : 0

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

Destination: 3::/64                     Protocol  : Direct
NextHop    : ::                         Preference: 0
Interface  : GE1/0/2                    Cost      : 0

Destination: 3::2/128                   Protocol  : Direct
NextHop    : ::1                        Preference: 0
Interface  : InLoop0                    Cost      : 0

Destination: 4::/64                     Protocol  : BGP4+
NextHop    : 3::1                       Preference: 255
Interface  : GE1/0/2                    Cost      : 0

Destination: 5::/64                     Protocol  : BGP4+
NextHop    : 3::1                       Preference: 255
Interface  : GE1/0/2                    Cost      : 0

Destination: 6::/64                     Protocol  : BGP4+
NextHop    : 3::1                       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  : BGP4+
NextHop    : 3::1                       Preference: 255
Interface  : GE1/0/2                    Cost      : 0

Destination: 9::/64                     Protocol  : BGP4+
NextHop    : 3::1                       Preference: 255
Interface  : GE1/0/2                    Cost      : 0

Destination: 10::/64                    Protocol  : Direct
NextHop    : ::                         Preference: 0
Interface  : Loop100                    Cost      : 0

Destination: 10::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
[SW4]
```

至此，S5820 IPV6 BGP4+ 联盟典型组网配置案例已完成!

配置关键点

1、非联盟设备指向联盟边界设备建立EBGP邻居关系时，指向联盟ID即可，不用指向联盟边界设备的BGP进程号。

2、联盟内部的邻居建立均是EBGP邻居关系。