HCIP-Datacom 分解实验 - IPv6 路由
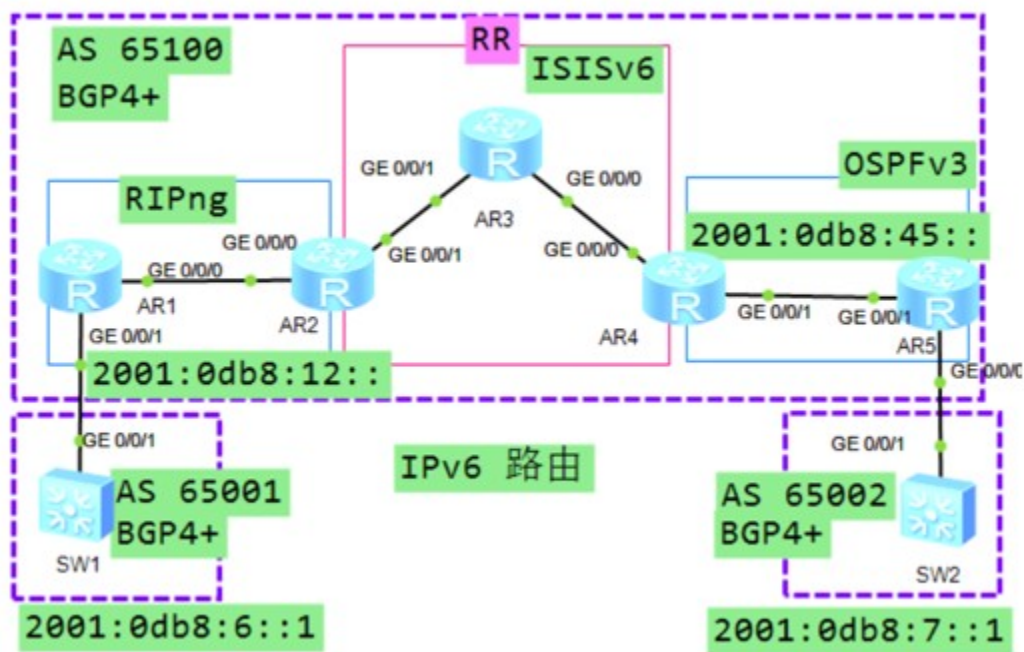
臧家林制作

IPv6 路由

某企业网络需要部署 IPv6 业务，使得分支 1 与分支 2 之间的 IPv6 网段能够互通。该企业网络规模较大，有自身的骨干网，其中骨干网接入层使用 RIPng 和 OSPFv3 建立网络，骨干网核心层使用 IS-IS（IPv6）建立网络。

R1：
undo ter mo
sys
sysname R1
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 1::1/128
int g0/0/0
ipv6 enable
ipv6 add 2001:db8:12::1/64
int g0/0/1
ipv6 enable
ipv6 add 2001:db8:16::1/64
q

R2：
undo ter mo
sys
sysname R2
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 2::2/128
int g0/0/0
ipv6 enable
ipv6 add 2001:db8:12::2/64
int g0/0/1
ipv6 enable

```
ipv6 add 2001:db8:23::2/64
q

R3 :
undo ter mo
sys
sysname R3
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 3::3/128
int g0/0/0
ipv6 enable
ipv6 add 2001:db8:34::3/64
int g0/0/1
ipv6 enable
ipv6 add 2001:db8:23::3/64
q

R4 :
undo ter mo
sys
sysname R4
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 4::4/128
int g0/0/0
ipv6 enable
ipv6 add 2001:db8:34::4/64
```

```
int g0/0/1
ipv6 enable
ipv6 add 2001:db8:45::4/64
q

R5 :
undo ter mo
sys
sysname R5
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 5::5/128
int g0/0/0
ipv6 enable
ipv6 add 2001:db8:57::5/64
int g0/0/1
ipv6 enable
ipv6 add 2001:db8:45::5/64
q

SW1 :
undo ter mo
sys
sysname SW1
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 2001:db8:6::1/128
int g0/0/1
```

```
port link acc
port de vlan 1
int vlan 1
ipv6 enable
ipv6 add 2001:db8:16::6/64
q

SW2：
undo ter mo
sys
sysname SW2
ipv6
user-interface console 0
idle-timeout 0 0
int loo0
ipv6 enable
ipv6 add 2001:db8:7::1/128
int g0/0/1
port link acc
port de vlan 1
int vlan 1
ipv6 enable
ipv6 add 2001:db8:57::7/64
q
```

接入层配置 RIPng，OSPFv3 和 ISISv6 ，搭建底层网络

部署 OSPF 进程，进程号使用 1，区域号为 0，Router ID 使用路由器的环回口地址，宣告 OSPF 接口时，使用精确宣告的方式。

部署 IS-IS 进程，进程号使用 1，所有 IS-IS 路由器都是 L2 路由器，cost 类型是 wide，NET 地址的区域号是 49.0001，System ID 根据环回口设置，IS-IS 主机名与设备名保持一致。

R1:
ripng
q
int loo0
ripng 1 enable
int g0/0/0
ripng 1 enable
q

R2:
ripng
q
int g0/0/0
ripng 1 enable
q
isis
network-entity 49.0001.0000.0000.0002.00
is-name R2
is-level level-2
cost-style wide
ipv6 enable topology ipv6
int loo0
isis ipv6 enable
int g0/0/1
isis ipv6 enable
q

R3 :
isis
network-entity 49.0001.0000.0000.0003.00
is-name R3
is-level level-2
cost-style wide

ipv6 enable topology ipv6
int loo0
isis ipv6 enable
int g0/0/0
isis ipv6 enable
int g0/0/1
isis ipv6 enable
q

R4 :
isis
network-entity 49.0001.0000.0000.0004.00
is-name R4
is-level level-2
cost-style wide
ipv6 enable topology ipv6
int loo0
isis ipv6 enable
int g0/0/0
isis ipv6 enable
q
ospfv3
router-id 4.4.4.4
int g0/0/1
ospfv3 1 area 0
q

R5:
ospfv3
router-id 5.5.5.5
int loo0
ospfv3 1 area 0
int g0/0/1
ospfv3 1 area 0

q

ISISv6 邻居已经建立好
[R3]dis isis peer
  System Id   Interface   Circuit Id
State HoldTime Type   PRI

R4*   GE0/0/0   R3.01
Up   22s   L2   64
R2*   GE0/0/1   R3.02
Up   29s   L2   64

Total Peer(s): 2

OSPFv3 邻居已经建立好
[R4]dis ospfv3 peer

OSPFv3 Process (1)
OSPFv3 Area (0.0.0.0)
Neighbor ID   Pri   State
Dead Time Interface Instance ID
5.5.5.5   1
Full/Backup   00:00:39   GE0/0/1
0

配置路由双向引入
R2：
ripng
import-route isis
isis
ipv6 import-route ripng

q

R4:
isis
ipv6 import-route ospfv3 1
ospfv3 1
import-route isis 1
q

检查双向引入配置结果 R5 上有 R1 R2 R3 R4 的环回接口地址
ping R1 的环回接口，是可以通的

[R5]ping ipv6 1::1
    PING 1::1 : 56   data bytes, press
CTRL_C to break
        Reply from 1::1
        bytes=56 Sequence=1 hop limit=61
time = 110 ms
        Reply from 1::1

骨干网部署 IBGP 对等体
AS 65100 内部署 IBGP 对等体关系，其中 R3 作为 IPv6 的
RR，R1、R2、R4、R5 是 R3 的反射器客户端。
R3 作为 RR，配置量较大，可以使用 peer-group 配置。

R1：
bgp 65100
router-id 1.1.1.1
peer 3::3 as-n 65100
peer 3::3 connect-interface loo0
ipv6-family unicast

peer 3::3 enable
peer 3::3 next-hop-local
q

R2 :
bgp 65100
router-id 2.2.2.2
peer 3::3 as-n 65100
peer 3::3 con loo0
ipv6-family unicast
peer 3::3 enable
q

R3 :
bgp 65100
router-id 3.3.3.3
group 1
peer 1::1 group 1
peer 2::2 group 1
peer 4::4 group 1
peer 5::5 group 1
peer 1 conn loo0
ipv6-family unicast
peer 1 enable
peer 1 reflect-client
peer 1::1 enable
peer 1::1 group 1
peer 2::2 enable
peer 2::2 group 1
peer 4::4 enable

peer 4::4 group 1

peer 5::5 enable

peer 5::5 group 1

q

R4：

bgp 65100

router-id 4.4.4.4

peer 3::3 as-n 65100

peer 3::3 con loo0

ipv6-family unicast

peer 3::3 enable

q

R5：

bgp 65100

router-id 5.5.5.5

peer 3::3 as-n 65100

peer 3::3 connect-interface loo0

ipv6-family unicast

peer 3::3 enable

peer 3::3 next-hop-local

q

检查 IBGP 配置结果　　在 R3 上查看 BGP IPv6 邻居

[R3]dis bgp ipv6 peer

```
   Peer            V          AS  MsgRcvd  MsgSent  Ou
tQ  Up/Down       State Pre    fRcv
    1::1           4       65100        5        5      0 00:
03:01 Established       0
```

2::2	4	65100	5	5	0 00:
03:05 Established		0			
4::4	4	65100	2	2	0 00:
00:48 Established		0			
5::5	4	65100	2	2	0 00:
00:01 Established		0			

配置 EBGP 对等体并发布路由

R1:

bgp 65100

peer 2001:db8:16::6 as-n 65001

ipv6-family unicast

peer 2001:db8:16::6 enable

q

SW1:

bgp 65001

router-id 6.6.6.6

peer 2001:db8:16::1 as-n 65100

ipv6-family unicast

peer 2001:db8:16::1 enable

network 2001:db8:6::1 128

q

R5:

bgp 65100

peer 2001:db8:57::7 as-n 65002

ipv6-family unicast

peer 2001:db8:57::7 enable

q

SW2:

bgp 65002

router-id 7.7.7.7

peer 2001:db8:57::5 as-n 65100

ipv6-family unicast

peer 2001:db8:57::5 enable

network 2001:db8:7::1 128

q

检查配置结果

SW1 SW2 通过 BGP 都能学习到环回接口的地址，也可以相互 ping 通

```
[SW1]dis bgp ipv6 rou

 Total Number of Routes: 2
 *>     Network    : 2001:DB8:6::1
PrefixLen : 128
         NextHop    : ::
LocPrf        :
         MED             : 0
PrefVal       : 0
         Label         :
         Path/Ogn : i
 *>     Network    : 2001:DB8:7::1
PrefixLen : 128
         NextHop    : 2001:DB8:16::1
LocPrf        :
         MED             :
```

```
   PrefVal      : 0
           Label        :
           Path/Ogn  :  65100 65002    i
```

要用环回口去 ping
```
[SW1]ping ipv6 -a 2001:db8:6::1
2001:db8:7::1
    PING 2001:db8:7::1 : 56    data bytes,
press CTRL_C to break
        Reply from 2001:DB8:7::1
        bytes=56 Sequence=1 hop limit=59
time = 80 ms
        Reply from 2001:DB8:7::1
        bytes=56 Sequence=2 hop limit=59
time = 90 ms
        Reply from 2001:DB8:7::1
```