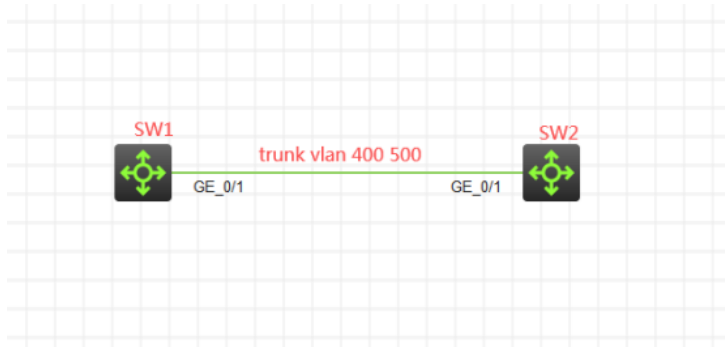


组网及说明



组网说明:

本案例采用H3C HCL模拟器的S5820交换机来模拟IPv6多VPN实例RIPng典型组网配置。为了实现业务的相互隔离，需要将不同的业务绑定到不同的VPN实例中进行业务的互通，因此在本案例引入多实例VPN，将相关的业务进行捆绑。SW1与SW2的互联使用trunk，允许VLAN 400 VLAN 500通过，宣告业务网段，使得相同VPN实例的业务能互通，不同VPN实例的业务不能互通。

VPN实例规划如下:

VPN实例名称	RD值	RT值	业务类型	备注
vpn-rt	100:1	100:1	实时业务	
vpn-nrt	200:1	200:1	非实时业务	

IP地址规划如下:

设备名称	接口/VLAN	IPV4/IPV6地址	IPV4/IPV6地址位数	所属VPN实例	备注
SW1	VLAN 400	1::1	64	vpn-rt	互联
	VLAN 500	1::1	64	vpn-nrt	互联
	Loopback 10	2::1	64	vpn-rt	模拟业务
	Loopback 20	3::1	64	vpn-nrt	模拟业务
	Loopback 0	1.1.1.1	32	vpn-rt	作为vpn-rt router-id
	Loopback 1	2.2.2.2	32	vpn-nrt	作为vpn-nrt router-id
SW2	VLAN 400	1::2	64	vpn-rt	互联
	VLAN 500	1::2	64	vpn-nrt	互联
	Loopback 10	4::1	64	vpn-rt	模拟业务
	Loopback 20	5::1	64	vpn-nrt	模拟业务
	Loopback 0	3.3.3.3	32	vpn-rt	作为vpn-rt router-id
	Loopback 1	4.4.4.4	32	vpn-nrt	作为vpn-nrt router-id

配置步骤

SW1:

```

<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW1
#创建VPN实例，指定RD值、RT值
[SW1]ip vpn-instance vpn-rt
[SW1-vpn-instance-vpn-rt]route-distinguisher 100:1
[SW1-vpn-instance-vpn-rt]vpn-target 100:1
[SW1-vpn-instance-vpn-rt]quit
[SW1]ip vpn-instance vpn-nrt
[SW1-vpn-instance-vpn-nrt]route-distinguisher 200:1
[SW1-vpn-instance-vpn-nrt]vpn-target 200:1
[SW1-vpn-instance-vpn-nrt]quit
[SW1]vlan 400
[SW1-vlan400]quit
[SW1]vlan 500
    
```

```
[SW1-vlan500]quit
[SW1]int vlan 400
[SW1-Vlan-interface400]ip binding vpn-instance vpn-rt //将VLAN绑定到VPN实例
Some configurations on the interface are removed.
[SW1-Vlan-interface400]des <connect to SW2_vpn-rt>
[SW1-Vlan-interface400]ipv6 address 1::1 64
[SW1-Vlan-interface400]quit
[SW1]int vlan 500
[SW1-Vlan-interface500]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW1-Vlan-interface500]des <connect to SW2_vpn-nrt>
[SW1-Vlan-interface500]ipv6 address 1::1 64
[SW1-Vlan-interface500]quit
[SW1]int gi 1/0/1
[SW1-GigabitEthernet1/0/1]des <connect to SW2>
[SW1-GigabitEthernet1/0/1]port link-type trunk
[SW1-GigabitEthernet1/0/1]undo port trunk permit vlan 1
[SW1-GigabitEthernet1/0/1]port trunk permit vlan 400 500
[SW1-GigabitEthernet1/0/1]quit
[SW1]int loopback 10
[SW1-LoopBack10]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW1-LoopBack10]ipv6 address 2::1 64
[SW1-LoopBack10]quit
[SW1]int loopback 20
[SW1-LoopBack20]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW1-LoopBack20]ipv6 address 3::1 64
[SW1-LoopBack20]quit
[SW1]int loopback 0
[SW1-LoopBack0]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW1-LoopBack0]ip address 1.1.1.1 32
[SW1-LoopBack0]quit
[SW1]int loopback 1
[SW1-LoopBack1]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW1-LoopBack1]ip address 2.2.2.2 32
[SW1-LoopBack1]quit
[SW1]ripng 10 vpn-instance vpn-rt //将RIPng绑定到VPN实例
[SW1-ripng-10]import-route direct
[SW1-ripng-10]quit
[SW1]ripng 20 vpn-instance vpn-nrt
[SW1-ripng-20]import-route direct
[SW1-ripng-20]quit
[SW1]int LoopBack 10
[SW1-LoopBack10]ripng 10 enable
[SW1-LoopBack10]quit
[SW1]int vlan 400
[SW1-Vlan-interface400]ripng 10 enable
[SW1-Vlan-interface400]quit
[SW1]int loopback 20
[SW1-LoopBack20]ripng 20 enable
[SW1-LoopBack20]quit
[SW1]int vlan 500
[SW1-Vlan-interface500]ripng 20 enable
[SW1-Vlan-interface500]quit
```

SW2:

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW2
[SW2]ip vpn-instance vpn-rt
[SW2-vpn-instance-vpn-rt]route-distinguisher 100:1
```

```
[SW2-vpn-instance-vpn-rt]vpn-target 100:1
[SW2-vpn-instance-vpn-rt]quit
[SW2]ip vpn-instance vpn-nrt
[SW2-vpn-instance-vpn-nrt]route-distinguisher 200:1
[SW2-vpn-instance-vpn-nrt]vpn-target 200:1
[SW2-vpn-instance-vpn-nrt]quit
[SW2]vlan 400
[SW2-vlan400]quit
[SW2]vlan 500
[SW2-vlan500]quit
[SW2]int vlan 400
[SW2-Vlan-interface400]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW2-Vlan-interface400]des <connect to SW1_vpn-rt>
[SW2-Vlan-interface400]ipv6 address 1::2 64
[SW2-Vlan-interface400]quit
[SW2]int vlan 500
[SW2-Vlan-interface500]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW2-Vlan-interface500]des <connect to SW1_vpn-nrt>
[SW2-Vlan-interface500]ipv6 address 1::2 64
[SW2-Vlan-interface500]quit
[SW2]int LoopBack 10
[SW2-LoopBack10]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW2-LoopBack10]ipv6 address 4::1 64
[SW2-LoopBack10]quit
[SW2]int loopback 20
[SW2-LoopBack20]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW2-LoopBack20]ipv6 address 5::1 64
[SW2-LoopBack20]quit
[SW2]int loopback 0
[SW2-LoopBack0]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW2-LoopBack0]ip address 3.3.3.3 32
[SW2-LoopBack0]quit
[SW2]int loopback 1
[SW2-LoopBack1]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW2-LoopBack1]ip address 4.4.4.4 32
[SW2-LoopBack1]quit
[SW2]int gi 1/0/1
[SW2-GigabitEthernet1/0/1]port link-mode bridge
[SW2-GigabitEthernet1/0/1]des <connect to SW1>
[SW2-GigabitEthernet1/0/1]port link-type trunk
[SW2-GigabitEthernet1/0/1]undo port trunk permit vlan 1
[SW2-GigabitEthernet1/0/1]port trunk permit vlan 400 500
[SW2-GigabitEthernet1/0/1]quit
[SW2]ripng 10 vpn-instance vpn-rt
[SW2-ripng-10]import-route direct
[SW2-ripng-10]quit
[SW2]ripng 20 vpn-instance vpn-nrt
[SW2-ripng-20]import-route direct
[SW2-ripng-20]quit
[SW2]int LoopBack 10
[SW2-LoopBack10]ripng 10 enable
[SW2-LoopBack10]quit
[SW2]int vlan 400
[SW2-Vlan-interface400]ripng 10 enable
[SW2-Vlan-interface400]quit
[SW2]int loopback 20
[SW2-LoopBack20]ripng 20 enable
[SW2-LoopBack20]quit
```

```
[SW2]int vlan 500
```

```
[SW2-Vlan-interface500]ripng 20 enable
```

```
[SW2-Vlan-interface500]quit
```

测试:

在SW1使用loopback 10作为源,带VPN能PING通FW2的loopback 10, PING不通FW2的loopback 20

:

```
[SW1]ping ipv6 -vpn-instance vpn-rt -a 2::1 4::1
Ping6(56 data bytes) 2::1 --> 4::1, press CTRL_C to break
56 bytes from 4::1, icmp_seq=0 hlim=64 time=3.000 ms
56 bytes from 4::1, icmp_seq=1 hlim=64 time=1.000 ms
56 bytes from 4::1, icmp_seq=2 hlim=64 time=1.000 ms
56 bytes from 4::1, icmp_seq=3 hlim=64 time=1.000 ms
56 bytes from 4::1, icmp_seq=4 hlim=64 time=0.000 ms

--- Ping6 statistics for 4::1 in VPN instance vpn-rt ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/1.200/3.000/0.980 ms
[SW1]Apr  5 13:54:58:111 2020 SW1 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 4::1 i
n VPN instance vpn-rt: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, ro
und-trip min/avg/max/std-dev = 0.000/1.200/3.000/0.980 ms.
[SW1]
```

```
[SW1]ping ipv6 -vpn-instance vpn-rt -a 2::1 5::1
Ping6(56 data bytes) 2::1 --> 5::1, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping6 statistics for 5::1 in VPN instance vpn-rt ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss
[SW1]Apr  5 13:55:34:178 2020 SW1 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 5::1 i
n VPN instance vpn-rt: 5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss.
[SW1]
```

在SW1使用loopback 20作为源,带VPN能PING通FW2的loopback20, PING不通FW2的loopback 10

:

```
[SW1]ping ipv6 -vpn-instance vpn-rt -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=64 time=2.000 ms
56 bytes from 5::1, icmp_seq=1 hlim=64 time=1.000 ms
56 bytes from 5::1, icmp_seq=2 hlim=64 time=1.000 ms
56 bytes from 5::1, icmp_seq=3 hlim=64 time=1.000 ms
56 bytes from 5::1, icmp_seq=4 hlim=64 time=1.000 ms

--- Ping6 statistics for 5::1 in VPN instance vpn-rt ---
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
[SW1]Apr  5 13:56:38:143 2020 SW1 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 5::1 i
n VPN instance vpn-rt: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, r
ound-trip min/avg/max/std-dev = 1.000/1.200/2.000/0.400 ms.
[SW1]
```

```
[SW1]ping ipv6 -vpn-instance vpn-rt -a 3::1 4::1
Ping6(56 data bytes) 3::1 --> 4::1, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping6 statistics for 4::1 in VPN instance vpn-rt ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss
[SW1]Apr  5 13:57:03:552 2020 SW1 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 4::1 i
n VPN instance vpn-rt: 5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss.
[SW1]
```

在SW2使用loopback 10作为源,带VPN能PING通FW1的loopback 10, PING不通FW1的loopback 20

:

```
[SW2]ping ipv6 -vpn-instance vpn-rt -a 4::1 2::1
Ping6(56 data bytes) 4::1 --> 2::1, press CTRL_C to break
56 bytes from 2::1, icmp_seq=0 hlim=64 time=2.000 ms
56 bytes from 2::1, icmp_seq=1 hlim=64 time=1.000 ms
56 bytes from 2::1, icmp_seq=2 hlim=64 time=0.000 ms
56 bytes from 2::1, icmp_seq=3 hlim=64 time=1.000 ms
56 bytes from 2::1, icmp_seq=4 hlim=64 time=1.000 ms

--- Ping6 statistics for 2::1 in VPN instance vpn-rt ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/1.000/2.000/0.632 ms
[SW2]Apr  5 13:57:45:483 2020 SW2 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 2::1 i
n VPN instance vpn-rt: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, ro
und-trip min/avg/max/std-dev = 0.000/1.000/2.000/0.632 ms.
[SW2]
```

```
[SW2]ping ipv6 -vpn-instance vpn-rt -a 4::1 3::1
Ping6(56 data bytes) 4::1 --> 3::1, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping6 statistics for 3::1 in VPN instance vpn-rt ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss
[SW2]Apr  5 14:00:30:783 2020 SW2 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 3::1 i
n VPN instance vpn-rt: 5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss.
```

在SW2使用loopback 20作为源，带VPN能PING通FW1的loopback20，PING不通FW1的loopback 10

```
[SW2]ping ipv6 -vpn-instance vpn-nrt -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=64 time=2.000 ms
56 bytes from 3::1, icmp_seq=1 hlim=64 time=1.000 ms
56 bytes from 3::1, icmp_seq=2 hlim=64 time=0.000 ms
56 bytes from 3::1, icmp_seq=3 hlim=64 time=0.000 ms
56 bytes from 3::1, icmp_seq=4 hlim=64 time=0.000 ms

--- Ping6 statistics for 3::1 in VPN instance vpn-nrt ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/0.600/2.000/0.800 ms
[SW2]Apr  5 14:01:11:636 2020 SW2 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 3::1 i
n VPN instance vpn-nrt: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, r
ound-trip min/avg/max/std-dev = 0.000/0.600/2.000/0.800 ms.
```

```
[SW2]ping ipv6 -vpn-instance vpn-nrt -a 5::1 2::1
Ping6(56 data bytes) 5::1 --> 2::1, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

--- Ping6 statistics for 2::1 in VPN instance vpn-nrt ---
5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss
[SW2]Apr  5 14:01:35:351 2020 SW2 PING/6/PING_VPN_STATISTICS: Ping6 statistics for 2::1 i
n VPN instance vpn-nrt: 5 packet(s) transmitted, 0 packet(s) received, 100.0% packet loss.
```

根据测试结果得知，相同VPN实例内的业务可以互通，不同VPN实例内的业务不能互通，达到了隔离的效果。

查看SW1的IPV6 VPN实例路由表：

```
[SW1]dis ipv6 routing-table vpn-instance vpn-rt

Destinations : 8          Routes : 8

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

Destination: 1::/64       Protocol : Direct
NextHop      : ::         Preference: 0
Interface   : Vlan400     Cost      : 0

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

Destination: 2::/64       Protocol : Direct
NextHop      : ::         Preference: 0
Interface   : Loop10      Cost      : 0

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

Destination: 4::/64       Protocol : RIPng
NextHop      : FE80::1C4D:49FF:FE7C:202 Preference: 100
Interface   : Vlan400     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

[SW1]
```

```

interface : Null0
[SW1]dis ipv6 routing-table vpn-instance vpn-nrt
Destinations : 8      Routes : 8
Destination: ::1/128      Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 1::/64      Protocol : Direct
NextHop : ::              Preference: 0
Interface : Vlan500       Cost : 0
Destination: 1::1/128    Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 3::/64      Protocol : Direct
NextHop : ::              Preference: 0
Interface : Loop20        Cost : 0
Destination: 3::1/128    Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 5::/64      Protocol : RIPng
NextHop : FE80::1C4D:49FF:FE7C:202 Preference: 100
Interface : Vlan500       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
[SW1]

```

查看SW2的IPV6 VPN实例路由表:

```

[SW2]dis ipv6 routing-table vpn-instance vpn-rt
Destinations : 8      Routes : 8
Destination: ::1/128      Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 1::/64      Protocol : Direct
NextHop : ::              Preference: 0
Interface : Vlan400       Cost : 0
Destination: 1::2/128    Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 2::/64      Protocol : RIPng
NextHop : FE80::1C4D:44FF:FEF5:102 Preference: 100
Interface : Vlan400       Cost : 1
Destination: 4::/64      Protocol : Direct
NextHop : ::              Preference: 0
Interface : Loop10        Cost : 0
Destination: 4::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
[SW2]

```

```

[SW2]dis ipv6 routing-table vpn-instance vpn-nrt
Destinations : 8      Routes : 8
Destination: ::1/128      Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 1::/64      Protocol : Direct
NextHop : ::              Preference: 0
Interface : Vlan500       Cost : 0
Destination: 1::2/128    Protocol : Direct
NextHop : ::1             Preference: 0
Interface : InLoop0       Cost : 0
Destination: 3::/64      Protocol : RIPng
NextHop : FE80::1C4D:44FF:FEF5:102 Preference: 100
Interface : Vlan500       Cost : 1
Destination: 5::/64      Protocol : Direct
NextHop : ::              Preference: 0
Interface : Loop20        Cost : 0
Destination: 5::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
[SW2]

```

至此，S5820 IPV6多VPN实例RIPng典型组网配置案例已完成！

配置关键点