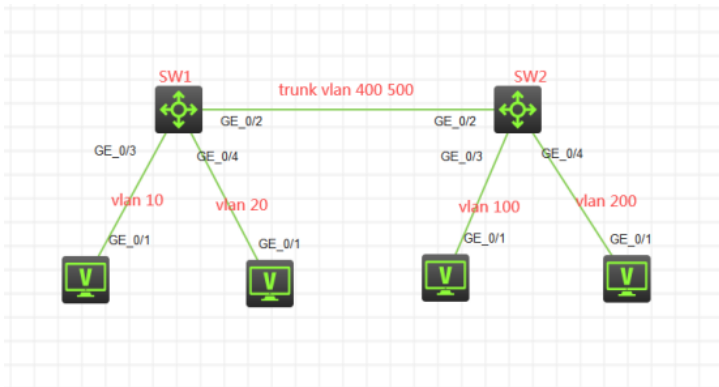


组网及说明



组网说明:

本案例采用H3C HCL模拟器的S5820交换机来模拟MPLS VPN OPTION-A 典型组网配置。为了实现业务的相互隔离，需要将不同的VLAN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。其中SW1属于AS100，SW2属于AS200，SW1与SW2的互联使用trunk，允许VLAN 400 VLAN 500通过，最终建立多VPN实例EBGP邻居关系，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	IP地址	子网掩码位数	所属VPN实例	备注
SW1	VLAN 400	10.0.0.1	30	vpn-rt	互联
	VLAN 500	10.0.0.1	30	vpn-nrt	互联
	VLAN 10	192.168.10.1	24	vpn-rt	
	VLAN 20	192.168.20.1	24	vpn-nrt	
	Loopback 0	1.1.1.1	32	vpn-rt	Router-id
SW2	VLAN 400	10.0.0.2	30	vpn-rt	互联
	VLAN 500	10.0.0.2	30	vpn-nrt	互联
	VLAN 100	172.16.10.1	24	vpn-rt	
	VLAN 200	172.16.20.1	24	vpn-nrt	
	Loopback 0	3.3.3.3	32		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]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 10
[SW1-vlan10]quit
[SW1]vlan 20
    
```

```
[SW1-vlan20]quit
[SW1]vlan 400
[SW1-vlan400]quit
[SW1]vlan 500
[SW1-vlan500]quit
[SW1]int vlan 10
[SW1-Vlan-interface10]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW1-Vlan-interface10]ip address 192.168.10.1 24
[SW1-Vlan-interface10]quit
[SW1]int vlan 20
[SW1-Vlan-interface20]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW1-Vlan-interface20]ip address 192.168.20.1 24
[SW1-Vlan-interface20]quit
[SW1]int vlan 400
[SW1-Vlan-interface400]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW1-Vlan-interface400]des
[SW1-Vlan-interface400]ip address 10.0.0.1 30
[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
[SW1-Vlan-interface500]ip address 10.0.0.1 30
[SW1-Vlan-interface500]quit
[SW1]int gi 1/0/3
[SW1-GigabitEthernet1/0/3]port link-mode bridge
[SW1-GigabitEthernet1/0/3]port link-type access
[SW1-GigabitEthernet1/0/3]port access vlan 10
[SW1-GigabitEthernet1/0/3]quit
[SW1]int gi 1/0/4
[SW1-GigabitEthernet1/0/4]port link-mode bridge
[SW1-GigabitEthernet1/0/4]port link-type access
[SW1-GigabitEthernet1/0/4]port access vlan 20
[SW1-GigabitEthernet1/0/4]quit
[SW1]int gi 1/0/2
[SW1-GigabitEthernet1/0/2]des
[SW1-GigabitEthernet1/0/2]port link-type trunk
[SW1-GigabitEthernet1/0/2]undo port trunk permit vlan 1
[SW1-GigabitEthernet1/0/2]port trunk permit vlan 400 500
[SW1-GigabitEthernet1/0/2]quit
[SW1]bgp 100
[SW1-bgp-default]router-id 1.1.1.1
[SW1-bgp-default]ip vpn-instance vpn-rt
[SW1-bgp-default-vpn-rt]peer 10.0.0.2 as-number 200
[SW1-bgp-default-vpn-rt]address-family ipv4 unicast
[SW1-bgp-default-ipv4-vpn-rt]peer 10.0.0.2 enable
[SW1-bgp-default-ipv4-vpn-rt]network 192.168.10.0 255.255.255.0
[SW1-bgp-default-ipv4-vpn-rt]quit
[SW1-bgp-default-vpn-rt]quit
[SW1-bgp-default]ip vpn-instance vpn-nrt
[SW1-bgp-default-vpn-nrt]peer 10.0.0.2 as-number 200
[SW1-bgp-default-vpn-nrt]address-family ipv4 unicast
[SW1-bgp-default-ipv4-vpn-nrt]peer 10.0.0.2 enable
[SW1-bgp-default-ipv4-vpn-nrt]network 192.168.20.0 255.255.255.0
[SW1-bgp-default-ipv4-vpn-nrt]quit
[SW1-bgp-default-vpn-nrt]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]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 100
[SW2-vlan100]quit
[SW2]vlan 200
[SW2-vlan200]quit
[SW2]vlan 400
[SW2-vlan400]quit
[SW2]vlan 500
[SW2-vlan500]quit
[SW2]int vlan 100
[SW2-Vlan-interface100]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW2-Vlan-interface100]ip address 172.16.10.1 24
[SW2-Vlan-interface100]quit
[SW2]int vlan 200
[SW2-Vlan-interface200]ip binding vpn-instance vpn-nrt
Some configurations on the interface are removed.
[SW2-Vlan-interface200]ip address 172.16.20.1 24
[SW2-Vlan-interface200]quit
[SW2]int vlan 400
[SW2-Vlan-interface400]ip binding vpn-instance vpn-rt
Some configurations on the interface are removed.
[SW2-Vlan-interface400]ip address 10.0.0.2 30
[SW2-Vlan-interface400]des
[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]ip address 10.0.0.2 30
[SW2-Vlan-interface500]des
[SW2-Vlan-interface500]quit
[SW2]int gi 1/0/3
[SW2-GigabitEthernet1/0/3]port link-mode bridge
[SW2-GigabitEthernet1/0/3]port link-type access
[SW2-GigabitEthernet1/0/3]port access vlan 100
[SW2-GigabitEthernet1/0/3]quit
[SW2]int gi 1/0/4
[SW2-GigabitEthernet1/0/4]port link-mode bridge
[SW2-GigabitEthernet1/0/4]port link-type access
[SW2-GigabitEthernet1/0/4]port access vlan 200
[SW2-GigabitEthernet1/0/4]quit
[SW2]int gi 1/0/2
[SW2-GigabitEthernet1/0/2]port link-mode bridge
[SW2-GigabitEthernet1/0/2]des
[SW2-GigabitEthernet1/0/2]port link-type trunk
[SW2-GigabitEthernet1/0/2]undo port trunk permit vlan 1
[SW2-GigabitEthernet1/0/2]port trunk permit vlan 400 500
[SW2-GigabitEthernet1/0/2]quit
[SW2]bgp 200
[SW2-bgp-default]router-id 3.3.3.3
[SW2-bgp-default]ip vpn-instance vpn-rt
[SW2-bgp-default-vpn-rt]peer 10.0.0.1 as-number 100
[SW2-bgp-default-vpn-rt]address-family ipv4 unicast
[SW2-bgp-default-ipv4-vpn-rt]peer 10.0.0.1 enable
```

```
[SW2-bgp-default-ipv4-vpn-rt]network 172.16.10.0 255.255.255.0
[SW2-bgp-default-ipv4-vpn-rt]quit
[SW2-bgp-default-vpn-rt]quit
[SW2-bgp-default]ip vpn-instance vpn-nrt
[SW2-bgp-default-vpn-nrt]peer 10.0.0.1 as-number 100
[SW2-bgp-default-vpn-nrt]address-family ipv4 unicast
[SW2-bgp-default-ipv4-vpn-nrt]peer 10.0.0.1 enable
[SW2-bgp-default-ipv4-vpn-nrt]network 172.16.20.0 255.255.255.0
[SW2-bgp-default-ipv4-vpn-nrt]quit
[SW2-bgp-default-vpn-nrt]quit
[SW2-bgp-default]quit
```

PC都填写IP地址:

配置PC_3

接口	状态	IPv4地址	IPv6地址
G0/0/1	UP	192.168.10.2/24	

刷新

接口管理
 禁用 启用

IPv4配置:
 DHCP
 静态

IPv4地址:
掩码地址:
IPv4网关:

启用

配置PC_4

接口	状态	IPv4地址	IPv6地址
G0/0/1	UP	192.168.20.2/24	

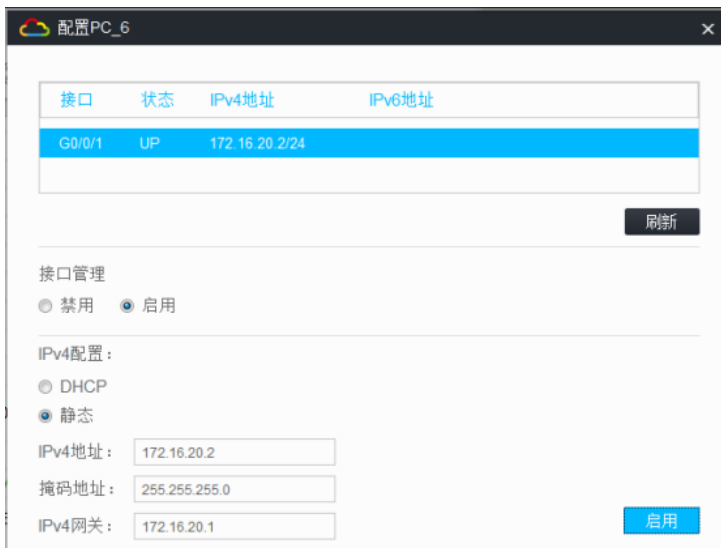
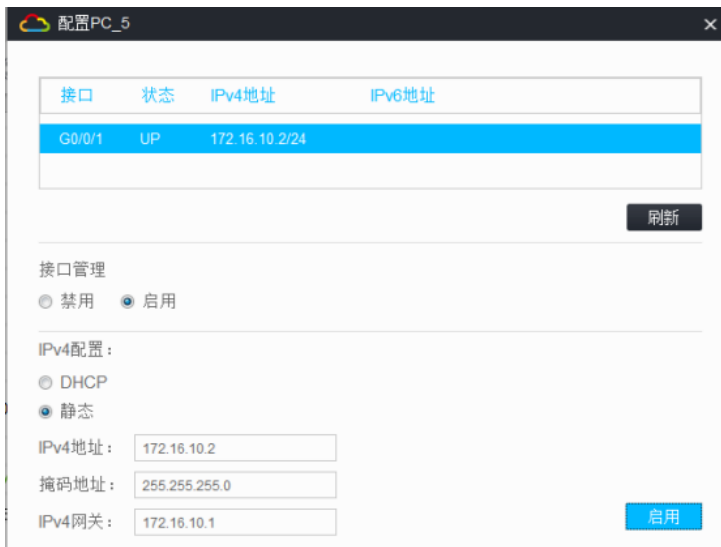
刷新

接口管理
 禁用 启用

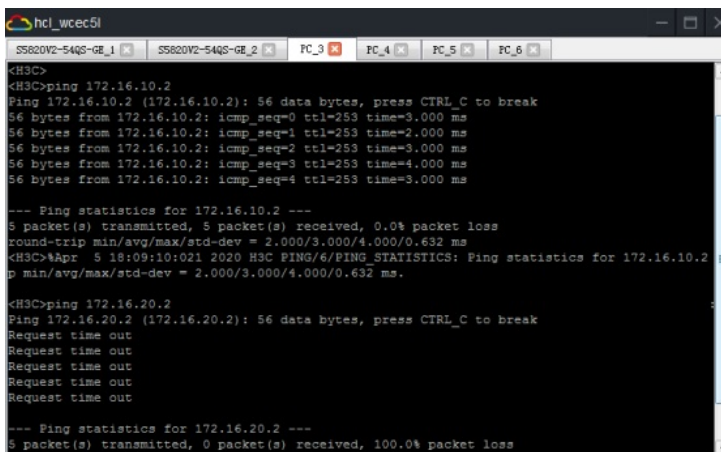
IPv4配置:
 DHCP
 静态

IPv4地址:
掩码地址:
IPv4网关:

启用



相同VPN实例的业务可以互通，不同VPN实例的业务不可以互通：



```

hcl_wce51
SS820V2-5405-GE_1 SS820V2-5405-GE_2 PC_3 PC_4 PC_5 PC_6
<H3C>ping 172.16.20.2
Ping 172.16.20.2 (172.16.20.2): 56 data bytes, press CTRL_C to break
56 bytes from 172.16.20.2: icmp_seq=0 ttl=255 time=0.000 ms
56 bytes from 172.16.20.2: icmp_seq=1 ttl=255 time=0.000 ms
56 bytes from 172.16.20.2: icmp_seq=2 ttl=255 time=0.000 ms
56 bytes from 172.16.20.2: icmp_seq=3 ttl=255 time=0.000 ms
56 bytes from 172.16.20.2: icmp_seq=4 ttl=255 time=0.000 ms
--- Ping statistics for 172.16.20.2 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 0.000/0.000/0.000/0.000 ms
<H3C>^Apr  5 18:09:54:1441 2020 H3C PING/6/PING_STATISTICS: Ping statistics for 172.16.20.2: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std-dev = 0.000/0.000/0.000/0.000 ms.

<H3C>ping 172.16.10.2
Ping 172.16.10.2 (172.16.10.2): 56 data bytes, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out
--- Ping statistics for 172.16.10.2 ---

```

```

hcl_wce51
SS820V2-5405-GE_1 SS820V2-5405-GE_2 PC_3 PC_4 PC_5 PC_6
<H3C>^Apr  5 18:09:04:934 2020 H3C SHELL/S/SHELL_LOGIN: Console logged in from con0.

<H3C>ping 192.168.10.2
Ping 192.168.10.2 (192.168.10.2): 56 data bytes, press CTRL_C to break
56 bytes from 192.168.10.2: icmp_seq=0 ttl=253 time=4.000 ms
56 bytes from 192.168.10.2: icmp_seq=1 ttl=253 time=3.000 ms
56 bytes from 192.168.10.2: icmp_seq=2 ttl=253 time=2.000 ms
56 bytes from 192.168.10.2: icmp_seq=3 ttl=253 time=1.000 ms
56 bytes from 192.168.10.2: icmp_seq=4 ttl=253 time=2.000 ms
--- Ping statistics for 192.168.10.2 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/2.400/4.000/1.020 ms
<H3C>^Apr  5 18:10:32:935 2020 H3C PING/6/PING_STATISTICS: Ping statistics for 192.168.10.2: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std-dev = 1.000/2.400/4.000/1.020 ms.

<H3C>ping 192.168.20.2
Ping 192.168.20.2 (192.168.20.2): 56 data bytes, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

```

```

hcl_wce51
SS820V2-5405-GE_1 SS820V2-5405-GE_2 PC_3 PC_4 PC_5 PC_6
<H3C>^Apr  5 18:14:14:157 2020 H3C SHELL/S/SHELL_LOGIN: Console logged in from con0.

<H3C>ping 192.168.20.2
Ping 192.168.20.2 (192.168.20.2): 56 data bytes, press CTRL_C to break
56 bytes from 192.168.20.2: icmp_seq=0 ttl=253 time=3.000 ms
56 bytes from 192.168.20.2: icmp_seq=1 ttl=253 time=2.000 ms
56 bytes from 192.168.20.2: icmp_seq=2 ttl=253 time=2.000 ms
56 bytes from 192.168.20.2: icmp_seq=3 ttl=253 time=2.000 ms
56 bytes from 192.168.20.2: icmp_seq=4 ttl=253 time=2.000 ms
--- Ping statistics for 192.168.20.2 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 2.000/2.200/3.000/0.400 ms
<H3C>^Apr  5 18:14:21:870 2020 H3C PING/6/PING_STATISTICS: Ping statistics for 192.168.20.2: 5 packet(s) transmitted, 5 packet(s) received, 0.0% packet loss, round-trip min/avg/max/std-dev = 2.000/2.200/3.000/0.400 ms.

<H3C>ping 192.168.10.2
Ping 192.168.10.2 (192.168.10.2): 56 data bytes, press CTRL_C to break
Request time out
Request time out
Request time out
Request time out
Request time out

```

查看SW1的BGP邻居信息:

```

<SW1>dis bgp peer ipv4 vpn-instance vpn-rt

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
10.0.0.2     200    22      21      0     1 00:17:06 Established
<SW1>dis bgp peer ipv4 vpn-instance vpn-rt

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
10.0.0.2     200    20      23      0     1 00:17:08 Established
<SW1>

```

查看SW2的BGP邻居信息:

```

<SW2>dis bgp peer ipv4 vpn-instance vpn-rt
BGP local router ID: 3.3.3.3
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
-----
10.0.0.1  100   22       22       0     1 00:16:01 Established
<SW2>dis bgp peer ipv4 vpn-instance vpn-rt
BGP local router ID: 3.3.3.3
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
-----
10.0.0.1  100   24       21       0     1 00:16:03 Established
<SW2>

```

查看SW1的VPN路由表:

```

<SW1>dis ip routing-table vpn-instance vpn-rt
Destinations : 17          Routes : 17

Destination/Mask  Proto  Pre Cost      NextHop          Interface
-----
0.0.0.0/32        Direct  0 0            127.0.0.1        InLoop0
10.0.0.0/30        Direct  0 0            10.0.0.1         Vlan400
10.0.0.0/32        Direct  0 0            10.0.0.1         Vlan400
10.0.0.1/32        Direct  0 0            127.0.0.1        InLoop0
10.0.0.3/32        Direct  0 0            10.0.0.1         Vlan400
127.0.0.0/8        Direct  0 0            127.0.0.1        InLoop0
127.0.0.0/32        Direct  0 0            127.0.0.1        InLoop0
127.0.0.1/32        Direct  0 0            127.0.0.1        InLoop0
127.255.255.255/32 Direct  0 0            127.0.0.1        InLoop0
172.16.10.0/24     BGP     255 0            10.0.0.2         Vlan400
192.168.10.0/24    Direct  0 0            192.168.10.1     Vlan10
192.168.10.0/32    Direct  0 0            192.168.10.1     Vlan10
192.168.10.1/32    Direct  0 0            127.0.0.1        InLoop0
192.168.10.255/32 Direct  0 0            192.168.10.1     Vlan10
224.0.0.0/4        Direct  0 0            0.0.0.0          NULL0
224.0.0.0/24       Direct  0 0            0.0.0.0          NULL0
255.255.255.255/32 Direct  0 0            127.0.0.1        InLoop0
<SW1>

```

```

<SW1>dis ip routing-table vpn-instance vpn-rt
Destinations : 17          Routes : 17

Destination/Mask  Proto  Pre Cost      NextHop          Interface
-----
0.0.0.0/32        Direct  0 0            127.0.0.1        InLoop0
10.0.0.0/30        Direct  0 0            10.0.0.1         Vlan500
10.0.0.0/32        Direct  0 0            10.0.0.1         Vlan500
10.0.0.1/32        Direct  0 0            127.0.0.1        InLoop0
10.0.0.3/32        Direct  0 0            10.0.0.1         Vlan500
127.0.0.0/8        Direct  0 0            127.0.0.1        InLoop0
127.0.0.0/32        Direct  0 0            127.0.0.1        InLoop0
127.0.0.1/32        Direct  0 0            127.0.0.1        InLoop0
127.255.255.255/32 Direct  0 0            127.0.0.1        InLoop0
172.16.20.0/24     BGP     255 0            10.0.0.2         Vlan500
192.168.20.0/24    Direct  0 0            192.168.20.1     Vlan20
192.168.20.0/32    Direct  0 0            192.168.20.1     Vlan20
192.168.20.1/32    Direct  0 0            127.0.0.1        InLoop0
192.168.20.255/32 Direct  0 0            192.168.20.1     Vlan20
224.0.0.0/4        Direct  0 0            0.0.0.0          NULL0
224.0.0.0/24       Direct  0 0            0.0.0.0          NULL0
255.255.255.255/32 Direct  0 0            127.0.0.1        InLoop0
<SW1>

```

查看SW2的VPN路由表:

```

<SW2>dis ip routing-table vpn-instance vpn-rt
Destinations : 17          Routes : 17

Destination/Mask  Proto  Pre Cost      NextHop          Interface
-----
0.0.0.0/32        Direct  0 0            127.0.0.1        InLoop0
10.0.0.0/30        Direct  0 0            10.0.0.2         Vlan400
10.0.0.0/32        Direct  0 0            10.0.0.2         Vlan400
10.0.0.2/32        Direct  0 0            127.0.0.1        InLoop0
10.0.0.3/32        Direct  0 0            10.0.0.2         Vlan400
127.0.0.0/8        Direct  0 0            127.0.0.1        InLoop0
127.0.0.0/32        Direct  0 0            127.0.0.1        InLoop0
127.0.0.1/32        Direct  0 0            127.0.0.1        InLoop0
127.255.255.255/32 Direct  0 0            127.0.0.1        InLoop0
172.16.10.0/24     Direct  0 0            172.16.10.1     Vlan100
172.16.10.0/32     Direct  0 0            172.16.10.1     Vlan100
172.16.10.1/32     Direct  0 0            127.0.0.1        InLoop0
172.16.10.255/32   Direct  0 0            172.16.10.1     Vlan100
192.168.10.0/24    BGP     255 0            10.0.0.1         Vlan400
224.0.0.0/4        Direct  0 0            0.0.0.0          NULL0
224.0.0.0/24       Direct  0 0            0.0.0.0          NULL0
255.255.255.255/32 Direct  0 0            127.0.0.1        InLoop0
<SW2>

```

```
<SW2>dis ip routing-table vpn-instance vpn-nrt
Destinations : 17          Routes : 17

Destination/Mask  Proto  Pre Cost      NextHop        Interface
0.0.0.0/32        Direct  0  0             127.0.0.1      InLoop0
10.0.0.0/30        Direct  0  0             10.0.0.2        Vlan500
10.0.0.0/32        Direct  0  0             10.0.0.2        Vlan500
10.0.0.2/32        Direct  0  0             127.0.0.1      InLoop0
10.0.0.3/32        Direct  0  0             10.0.0.2        Vlan500
127.0.0.0/8        Direct  0  0             127.0.0.1      InLoop0
127.0.0.0/32        Direct  0  0             127.0.0.1      InLoop0
127.0.0.1/32        Direct  0  0             127.0.0.1      InLoop0
127.255.255.255/32 Direct  0  0             127.0.0.1      InLoop0
172.16.20.0/24     Direct  0  0             172.16.20.1    Vlan200
172.16.20.0/32     Direct  0  0             172.16.20.1    Vlan200
172.16.20.1/32     Direct  0  0             127.0.0.1      InLoop0
172.16.20.255/32   Direct  0  0             172.16.20.1    Vlan200
192.168.20.0/24    BGP     255 0            10.0.0.1        Vlan500
224.0.0.0/4        Direct  0  0             0.0.0.0         NULL0
224.0.0.0/24       Direct  0  0             0.0.0.0         NULL0
255.255.255.255/32 Direct  0  0             127.0.0.1      InLoop0
<SW2>
```

至此，S5820 MPLS VPN OPTION-A典型组网配置案例已完成！

配置关键点