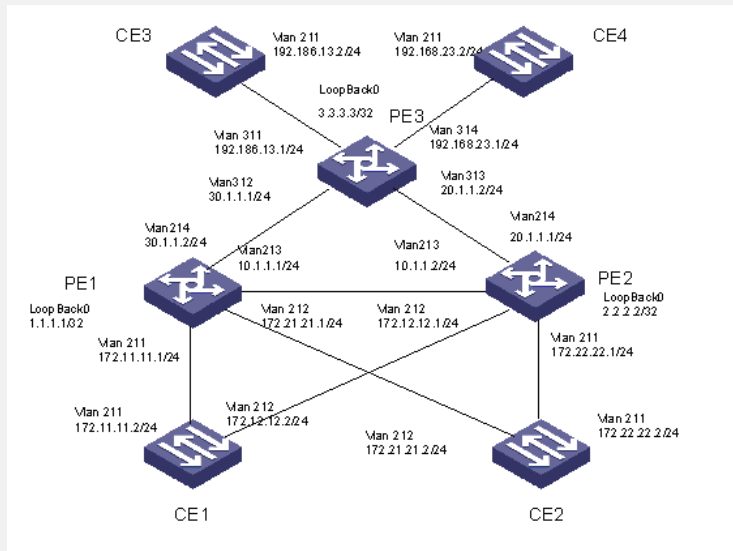


S9500交换机MPLS BGP VPN之CE双归属功能的配置

一、组网需求:

如下组网中，CE1和CE2分别与PE1和PE2设备相连，实现双归属；三个PE设备也两两相连，组成备份链路。CE3和CE4不使用双归属，只与一个PE设备相连。CE1与CE3属于同一个VPN；CE2与CE4属于同一个VPN。不同的VPN之间不能互通。

二、组网图



三、配置步骤:

软件版本：S9500交换机全系列软件版本

硬件版本：S9500交换机支持MPLS VPN业务板（CA/CB类业务板）

配置PE1设备

1) 在PE1上为CE1和CE2分别创建VPN-instance1.1和VPN-instance1.2，并配置不同的VPN-target属性

```
[PE1] ip vpn-instance vpn-instance1.1
[PE1-vpn-vpn-instance1.1] route-distinguisher 1.1.1.1:1
[PE1-vpn-vpn-instance1.1] vpn-target 1.1.1.1:1
[PE1] ip vpn-instance vpn-instance1.2
[PE1-vpn-vpn-instance1.2] route-distinguisher 2.2.2.2:2
[PE1-vpn-vpn-instance1.2] vpn-target 2.2.2.2:2
```

2) PE1在实例VPN-instance1.1下与CE1建立EBGP邻居，将CE1内部VPN路由引入VPN-instance1.1

```
[PE1] bgp 100
[PE1-bgp] ipv4-family vpn-instance vpn-instance1.1
[PE1-bgp-af-vpn-instance] import-route direct
[PE1-bgp-af-vpn-instance] import-route static
[PE1-bgp-af-vpn-instance] group 17211 external
[PE1-bgp-af-vpn-instance] peer 172.11.11.2 group 17211 as-number 65001
```

3) PE1在实例VPN-instance1.2下与CE2建立EBGP邻居，将CE2内部VPN路由引入VPN-instance1.2

```
[PE1] bgp 100
[PE1-bgp] ipv4-family vpn-instance vpn-instance1.2
[PE1-bgp-af-vpn-instance] import-route direct
[PE1-bgp-af-vpn-instance] import-route static
[PE1-bgp-af-vpn-instance] group 17221 external
[PE1-bgp-af-vpn-instance] peer 172.21.21.2 group 17221 as-number 65002
```

4) 将PE1与CE1相连的VLAN接口绑定到VPN-instance1.1；将PE1与CE2相连的VLAN接口绑定到VPN-instance1.2

```
[PE1] vlan 211
[PE1-vlan211] port gigabitethernet 2/1/1
[PE1] interface vlan-interface 211
[PE1-vlan-interface211] ip binding vpn-instance vpn-instance1.1
```

```

[PE1-vlan-interface211] ip address 172.11.11.1 255.255.255.0
[PE1] vlan 212
[PE1-vlan212] port gigabitethernet 2/1/2
[PE1] interface vlan-interface 212
[PE1-vlan-interface212] ip binding vpn-instance vpn-instance1.2
[PE1-vlan-interface212] ip address 172.21.21.1 255.255.255.0
5) 配置LoopBack接口
[PE1] interface loopback 0
[PE1-LoopBack0] ip address 1.1.1.1 255.255.255.255
6) 配置MPLS基本能力, 并在PE1与PE2、PE3相连的VLAN接口上使能LDP
[PE1] mpls lsr-id 1.1.1.1
[PE1] mpls
[PE1] mpls ldp
[PE1] vlan 213
[PE1-vlan213] port gigabitethernet 2/1/3
[PE1] interface vlan-interface 213
[PE1-vlan-interface213] mpls
[PE1-vlan-interface213] mpls ldp enable
[PE1-vlan-interface213] mpls ldp transport-ip interface
[PE1-vlan-interface213] ip address 10.1.1.1 255.255.255.0
[PE1] vlan 214
[PE1-vlan214] port gigabitethernet 2/1/4
[PE1] interface vlan-interface 214
[PE1-vlan-interface214] mpls
[PE1-vlan-interface214] mpls ldp enable
[PE1-vlan-interface214] mpls ldp transport-ip interface
[PE1-vlan-interface214] ip address 30.1.1.2 255.255.255.0
7) 在PE1与PE2、PE3相连的接口及环回接口上启用OSPF, 实现PE内部的互通
[PE1] router id 1.1.1.1
[PE1] ospf
[PE1-ospf-1] area 0
[PE1-ospf-1-area-0.0.0.0] network 1.1.1.1 0.0.0.0
[PE1-ospf-1-area-0.0.0.0] network 30.1.1.2 0.0.0.255
[PE1-ospf-1-area-0.0.0.0] network 10.1.1.1 0.0.0.255
8) 在PE与PE之间建立MP-IBGP邻居, 进行PE内部的VPN路由信息交换。并在VPNv4子地址族视图下激活MP-IBGP对等体
[PE1] bgp 100
[PE1-bgp] group 2
[PE1-bgp] peer 2.2.2.2 group 2
[PE1-bgp] peer 2.2.2.2 connect-interface loopback 0
[PE1-bgp] group 3
[PE1-bgp] peer 3.3.3.3 group 3
[PE1-bgp] peer 3.3.3.3 connect-interface loopback 0
[PE1-bgp] ipv4-family vpnv4
[PE1-bgp-af-vpn] peer 2 enable
[PE1-bgp-af-vpn] peer 2.2.2.2 group 2
[PE1-bgp-af-vpn] peer 3 enable
[PE1-bgp-af-vpn] peer 3.3.3.3 group 3
配置PE2设备
1) 在PE2上为CE1和CE2分别创建VPN-instance2.1和VPN-instance2.2, 并配置不同的VPN-target属性
[PE2] ip vpn-instance vpn-instance2.1
[PE2-vpn-vpn-instance2.1] route-distinguisher 1.1.1.1:1
[PE2-vpn-vpn-instance2.1] vpn-target 1.1.1.1:1
[PE2] ip vpn-instance vpn-instance2.2
[PE2-vpn-vpn-instance2.2] route-distinguisher 2.2.2.2:2
[PE2-vpn-vpn-instance2.2] vpn-target 2.2.2.2:2
2) PE2在实例VPN-instance2.1下与CE1建立EBGP邻居, 将CE1内部VPN路由引入VPN-instance2.1
[PE2] bgp 100
[PE2-bgp] ipv4-family vpn-instance vpn-instance2.1
[PE2-bgp-af-vpn-instance] import-route direct
[PE2-bgp-af-vpn-instance] import-route static
[PE2-bgp-af-vpn-instance] group 17212 external

```

```

[PE2-bgp-af-vpn-instance] peer 172.12.12.2 group 17212 as-number 65001
3) PE2在实例VPN-instance2.2下与CE2建立EBGP邻居, 将CE2内部VPN路由引入V
PN-instance2.2
[PE2-bgp] ipv4-family vpn-instance vpn-instance2.2
[PE2-bgp-af-vpn-instance] import-route direct
[PE2-bgp-af-vpn-instance] import-route static
[PE2-bgp-af-vpn-instance] group 17222 external
[PE2-bgp-af-vpn-instance] peer 172.22.22.2 group 17222 as-number 65002
4) 将PE2与CE1相连的VLAN接口绑定到VPN-instance2.1; 将PE2与CE2相连的VLA
N接口绑定到VPN-instance2.2
[PE2] vlan 212
[PE2-vlan212] port gigabitethernet 2/1/2
[PE2] interface vlan-interface 212
[PE2-vlan-interface212] ip binding vpn-instance vpn-instance2.1
[PE2-vlan-interface212] ip address 172.12.12.1 255.255.255.0
[PE2] vlan 211
[PE2-vlan211] port gigabitethernet 2/1/1
[PE2] interface vlan-interface 211
[PE2-vlan-interface211] ip binding vpn-instance vpn-instance2.2
[PE2-vlan-interface211] ip address 172.22.22.1 255.255.255.0
5) 配置LoopBack接口
[PE2] interface loopback 0
[PE2-LoopBack0] ip address 2.2.2.2 255.255.255.255
6) 配置MPLS基本能力, 并在PE2与PE1、PE3相连的VLAN接口上使能LDP
[PE2] mpls lsr-id 2.2.2.2
[PE2] mpls
[PE2] mpls ldp
[PE2] vlan 213
[PE2-vlan213] port gigabitethernet 2/1/3
[PE2] interface vlan-interface213
[PE2-vlan-interface213] mpls
[PE2-vlan-interface213] mpls ldp enable
[PE2-vlan-interface213] mpls ldp transport-ip interface
[PE2-vlan-interface213] ip address 10.1.1.2 255.255.255.0
[PE2] vlan 214
[PE2-vlan214] port gigabitethernet 2/1/4
[PE2] interface vlan-interface 214
[PE2-vlan-interface214] mpls
[PE2-vlan-interface214] mpls ldp enable
[PE2-vlan-interface214] mpls ldp transport-ip interface
[PE2-vlan-interface214] ip address 20.1.1.1 255.255.255.0
7) 在PE2与PE1、PE3相连的接口及环回接口上启用OSPF, 实现PE内部互通
[PE2] router id 2.2.2.2
[PE2] ospf
[PE2-ospf-1] area 0
[PE2-ospf-1-area-0.0.0.0] network 2.2.2.2 0.0.0.0
[PE2-ospf-1-area-0.0.0.0] network 20.1.1.1 0.0.0.255
[PE2-ospf-1-area-0.0.0.0] network 10.1.1.1 0.0.0.255
8) 在PE与PE之间建立MP-IBGP邻居, 进行PE内部的VPN路由信息交换。并在VPNv
4子地址族视图下激活MP-IBGP对等体
[PE2] bgp 100
[PE2-bgp] group 1
[PE2-bgp] peer 1.1.1.1 group 1
[PE2-bgp] peer 1.1.1.1 connect-interface loopback 0
[PE2-bgp] group 3
[PE2-bgp] peer 3.3.3.3 group 3
[PE2-bgp] peer 3.3.3.3 connect-interface loopback 0
[PE2-bgp] ipv4-family vpnv4
[PE2-bgp-af-vpn] peer 1 enable
[PE2-bgp-af-vpn] peer 1.1.1.1 group 1
[PE2-bgp-af-vpn] peer 3 enable
[PE2-bgp-af-vpn] peer 3.3.3.3 group 3
配置PE3设备
1) 在PE3上为CE3和CE4分别创建VPN-instance3.1和3.2, 并配置不同的VPN-target

```

属性

```
[PE3] ip vpn-instance vpn-instance3.1
[PE3-vpn-vpn-instance3.1] route-distinguisher 1.1.1.1:1
[PE3-vpn-vpn-instance3.1] vpn-target 1.1.1.1:1
[PE3] ip vpn-instance vpn-instance3.2
[PE3-vpn-vpn-instance3.2] route-distinguisher 2.2.2.2:2
[PE3-vpn-vpn-instance3.2] vpn-target 2.2.2.2:2
2) PE3在实例VPN-instance3.1下与CE2建立EBGP邻居2, 将CE3内部VPN路由引入
VPN-instance3.1
[PE3] bgp 100
[PE3-bgp] ipv4-family vpn-instance vpn-instance3.1
[PE3-bgp-af-vpn-instance] import-route direct
[PE3-bgp-af-vpn-instance] import-route static
[PE3-bgp-af-vpn-instance] group 192 external
[PE3-bgp-af-vpn-instance] peer 192.168.13.2 group 192 as-number 65003
3) PE3在实例VPN-instance3.2下与CE4建立EBGP邻居, 将CE4内部VPN路由引入V
PN-instance3.2
[PE3-bgp] ipv4-family vpn-instance vpn-instance3.2
[PE3-bgp-af-vpn-instance] import-route direct
[PE3-bgp-af-vpn-instance] import-route static
[PE3-bgp-af-vpn-instance] group 232 external
[PE3-bgp-af-vpn-instance] peer 192.168.23.2 group 232 as-number 65004
4) 将PE3与CE3相连的VLAN接口绑定到VPN-instance3.1; 将PE3与CE4相连的VLA
N接口绑定到VPN-instance3.2
[PE3] vlan 311
[PE3-vlan311] port gigabitethernet 2/1/1
[PE3] interface vlan-interface 311
[PE3-vlan-interface311] ip binding vpn-instance vpn-instance3.1
[PE3-vlan-interface311] ip address 192.168.13.1 255.255.255.0
[PE3] vlan 314
[PE3-vlan314] port gigabitethernet 2/1/4
[PE3] interface vlan-interface 314
[PE3-vlan-interface314] ip binding vpn-instance vpn-instance3.2
[PE3-vlan-interface314] ip address 192.168.23.1 255.255.255.0
5) 配置LoopBack接口
[PE3] interface loopback 0
[PE3-LoopBack0] ip address 3.3.3.3 255.255.255.255
6) 配置MPLS基本能力, 并在PE3与PE1、PE2相连的VLAN接口上使能LDP
[PE3] mpls lsr-id 3.3.3.3
[PE3] mpls
[PE3] mpls ldp
[PE3] vlan 312
[PE3-vlan312] port gigabitethernet 2/1/2
[PE3] interface vlan-interface312
[PE3-vlan-interface312] mpls
[PE3-vlan-interface312] mpls ldp enable
[PE3-vlan-interface312] mpls ldp transport-ip interface
[PE3-vlan-interface312] ip address 30.1.1.1 255.255.255.0
[PE3] vlan 313
[PE3-vlan313] port gigabitethernet 2/1/3
[PE3] interface vlan-interface 313
[PE3-vlan-interface313] mpls
[PE3-vlan-interface313] mpls ldp enable
[PE3-vlan-interface313] mpls ldp transport-ip interface
[PE3-vlan-interface313] ip address 20.1.1.2 255.255.255.0
7) 在PE3与PE1、PE2相连的接口及环回接口上启用OSPF, 实现PE内部互通
[PE3] router id 3.3.3.3
[PE3] ospf
[PE3-ospf-1] area 0
[PE3-ospf-1-area-0.0.0.0] network 3.3.3.3 0.0.0.0
[PE3-ospf-1-area-0.0.0.0] network 20.1.1.2 0.0.0.255
[PE3-ospf-1-area-0.0.0.0] network 30.1.1.1 0.0.0.255
8) 在PE与PE之间建立MP-IBGP邻居, 进行PE内部的VPN路由信息交换。并在VPNv
4子地址族视图下激活MP-IBGP对等体
```

```
[PE3] bgp 100
[PE3-bgp] group 1
[PE3-bgp] peer 1.1.1.1 group 1
[PE3-bgp] peer 1.1.1.1 connect-interface loopback 0
[PE3-bgp] group 2
[PE3-bgp] peer 2.2.2.2 group 2
[PE3-bgp] peer 2.2.2.2 connect-interface loopback 0
[PE3-bgp] ipv4-family vpnv4
[PE3-bgp-af-vpn] peer 1 enable
[PE3-bgp-af-vpn] peer 1.1.1.1 group 1
[PE3-bgp-af-vpn] peer 2 enable
[PE3-bgp-af-vpn] peer 2.2.2.2 group 2
```