S9500交换机MPLS L3 VPN PE设备转发异常问题处理方法

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一、故障处理流程

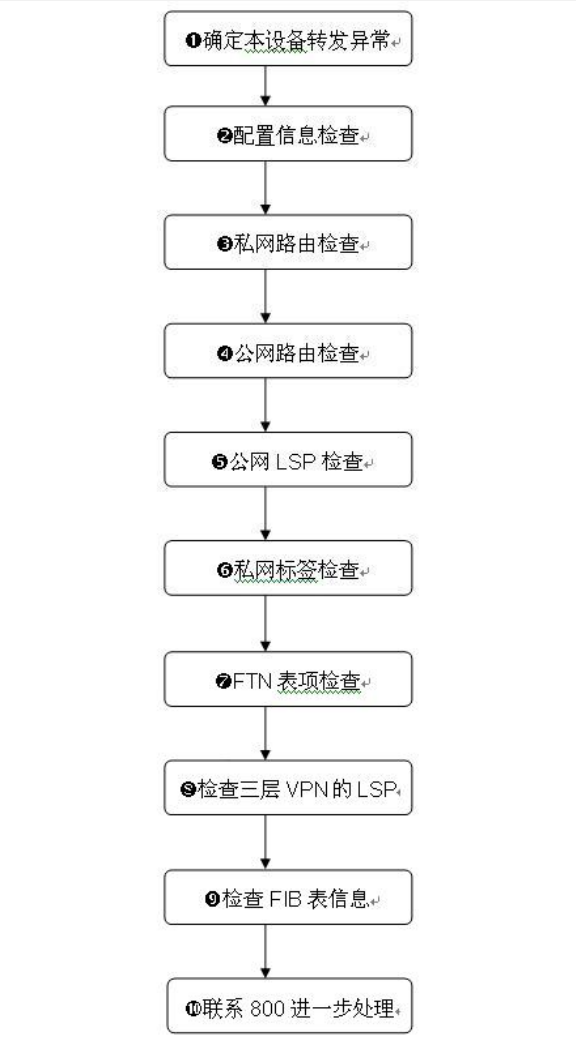

图1 PE设备转发异常故障处理流程

二、故障处理步骤

1）步骤1

通过display interface、抓包等手段确认报文已经进入本设备，且没有从本设备转发出去。如果确定报文在本交换机丢失，请转步骤2。

2）步骤2

检查预期的入端口和出端口配置情况，确认端口配置正确，STP状态正常。

使用display current-configuration configuration检查MPLS和VPN配置正确，接口VPN配置正确，BGP相关配置正确。

如果确认端口配置和状态正确，请转步骤3。

3）步骤3

确认报文进入的VPN，使用命令display ip routing-table vpn-instance查询私网路由是否正确。（主要关注私网路由下一跳是否正确）

[S9500]display ip routing-table vpn-instance vpna

vpna Route Information

Routing Table: vpna Route-Distinguisher: 100:1

Destination/Mask	Protocol	Pre	Cost	Nexthop	Interface
10.10.10.10/32	BGP	256	0	5.5.5.5	InLoopBack0
40.1.1.0/24	DIRECT	0	0	40.1.1.1	Vlan-interface30
40.1.1.1/32	DIRECT	0	0	127.0.0.1	InLoopBack0

VPN Routing Table: Route-Distinguisher: 400:1

9.9.9.9/32 BGP 256 0 2.2.2.2 InLoopBack0

4）步骤4

如果确定私网路由没有问题，通过私网的下一跳查询公网路由信息，确定下一跳是否能够ping通。如果路由无法查询或者无法ping通，请根据“路由故障处理”进行相关定位。

```
[S9500]display ip routing-table
 Routing Table: public net
Destination/Mask   Protocol Pre  Cost        Nexthop         Interface
1.1.1.1/32         DIRECT   0    0           127.0.0.1       InLoopBack0
2.2.2.2/32         OSPF     10   22          30.1.1.2        Vlan-interface20
3.3.3.3/32         OSPF     10   11          30.1.1.2        Vlan-interface20
5.5.5.5/32         OSPF     10   12          30.1.1.2        Vlan-interface20
19.1.1.0/24        OSPF     10   21          30.1.1.2        Vlan-interface20
20.1.1.0/24        OSPF     10   11          30.1.1.2        Vlan-interface20
30.1.1.0/24        DIRECT   0    0           30.1.1.1        Vlan-interface20
30.1.1.1/32        DIRECT   0    0           127.0.0.1       InLoopBack0
31.1.1.0/24        OSPF     10   22          30.1.1.2        Vlan-interface20
127.0.0.0/8        DIRECT   0    0           127.0.0.1       InLoopBack0
127.0.0.1/32       DIRECT   0    0           127.0.0.1       InLoopBack0
```

5）步骤5

通过命令display mpls lsp查询公网LSP建立情况，确认公网LSP正确建立，出接口是否正确。

```
[S9500]dis mpls lsp
-------------------------------------------------------------------------------
                LSP Information: Ldp Lsp
-------------------------------------------------------------------------------
NO    FEC               NEXTHOP         I/O-LABEL    OUT-INTERFACE
1     1.1.1.1/32        127.0.0.1       3/-----      -------
2     3.3.3.3/32        30.1.1.2        -----/3      Vlan20
3     5.5.5.5/32        30.1.1.2        -----/1025   Vlan20
4     2.2.2.2/32        30.1.1.2        -----/1026   Vlan20
TOTAL:  4 Record(s) Found.
```

6）步骤6

通过命令display bgp vpnv4 vpn-instance routing-table检查私网标签分配是否正确，主要关注到达目的地的标签是否正确分配

```
[S9500]dis bgp vpnv4 vpn-instance  vpna routing-table
Flags:   # - valid       ^ - active      I - internal
         D - damped      H - history     S - aggregate suppressed
In/out     As   t/mask     Next-hop   Med       Local-pref     label     path
-------------------------------------------------------------------------------
   Route Distinguisher:100:1 (VPN instance:vpna)
#^I 10.10.10.10/32     5.5.5.5         0          100            -/4096
#^  40.1.1.0/24        0.0.0.0         0                         4096/-
   Route Distinguisher:400:1
#^I 9.9.9.9/32         2.2.2.2         0          100            -/1024
  Routes total: 3
```

7）步骤7

通过命令display mpls ftn vpn-instance检查FTN表项是否正确，主要关注到目的地址的出接口信息和标签信息（需要进入隐含模式进行确认）

```
[S9500]_hidecmd
[S9500-hidecmd]display mpls ftn vpn-instance vpna
Destination/Mask    OutInterface                InnerLabel     Token
10.10.10.10/32      Vlan-interface20            4096           1
40.1.1.0/24         Vlan-interface30            [No Label]     -1
40.1.1.1/32         InLoopBack0                 [No Label]     -1
40.1.1.2/32         Vlan-interface30            [No Label]     -1
9.9.9.9/32          Vlan-interface20            1024           2
TOTAL: 5 Record(s) Found.
```

8）步骤8

使用命令display mpls l3vpn-lsp vpn-instance检查L3VPN的出、入标签和前面查询结果是否匹配

```
[S9500]dis mpls l3vpn-lsp vpn-instance vpna
-------------------------------------------------------------------------------
                LSP Information: L3vpn Ingress Lsp
```

```
--------------------------------------------------------------------------------
Vpn-instance Name: vpna     Route Distinguisher: 100:1
NO   FEC              NEXTHOP      OUTER-LABEL   OUT-INTERFACE
1    10.10.10.10/32    30.1.1.2       1025(vpn)   Vlan20
2    9.9.9.9/32        30.1.1.2       1026(vpn)   Vlan20
TOTAL:  2 Record(s) Found.
--------------------------------------------------------------------------------
                LSP Information: L3vpn Egress Lsp
--------------------------------------------------------------------------------
NO  VRFNAME         INNER-LABEL  NEXTHOP      OUT-INTERFACE
1    vpna             4096        0.0.0.0        InLoop0
TOTAL:  1 Record(s) Found.
--------------------------------------------------------------------------------
                LSP Information: L3vpn Transit Lsp
--------------------------------------------------------------------------------
TOTAL:  0 Record(s) Found.
```

9）步骤9

检查底层FIB表信息，确认FIB表信息和查询的路由信息是否一致

```
[S9500]_hidecmd
[S9500-hidecmd]_display drv fib
Destination/Mask   Nexthop         VRID Command   DevNum  Trunk Port MPLS ECM
P
9.9.9.9/32         30.1.1.2        1    ROUT      20      N     11    YES  SGL
5.5.5.5/32         30.1.1.2        0    ROUT      20      N     11    YES  SGL
19.1.1.0/24        30.1.1.2        0    ROUT      20      N     M     NO   SGL
2.2.2.2/32         30.1.1.2        0    ROUT      20      N     11    YES  SGL
31.1.1.0/24        30.1.1.2        0    ROUT      20      N     M     NO   SGL
40.1.1.2/32        40.1.1.2        1    ROUT      20      N     10    NO   SGL
40.1.1.1/32        127.0.0.1       1    TO CPU    0       N     0     NO   SGL
40.1.1.0/24        40.1.1.1        1    TO CPU    0       N     M     NO   SGL
10.10.10.10/32     30.1.1.2        1    ROUT      20      N     11    YES  SGL
3.3.3.3/32         30.1.1.2        0    ROUT      20      N     11    NO   SGL
20.1.1.0/24        30.1.1.2        0    ROUT      20      N     M     NO   SGL
30.1.1.2/32        30.1.1.2        0    ROUT      20      N     11    NO   SGL
30.1.1.1/32        127.0.0.1       0    TO CPU    0       N     0     NO   SGL
30.1.1.0/24        30.1.1.1        0    TO CPU    0       N     M     NO   SGL
1.1.1.1/32         127.0.0.1       0    TO CPU    0       N     0     NO   SGL
127.0.0.0/8        127.0.0.1       0    TO CPU    0       N     M     NO   SGL
```

10）步骤10

上述步骤无法定位问题，请联系800进一步处理。