# V7交换机静态路由、Track与NQA联动配置

目录

# 1 配置需求或说明

## 1.1适用产品系列

本案例适用于如S7000E、S7500E等的V7交换机，V5、V7交换机具体分类及型号可以参考“1.1 Comware V5、V7平台交换机分类说明”。

## 1.2配置需求及实现的效果

SW1、SW2、SW3和SW4连接了2.2.2.0/24和3.3.3.0/24两个网段，在交换机上配置静态路由以实现两个网段的互通，并配置路由备份以提高网络的可靠性。

SW2上配置环回口L0模拟2.2.2.0/24网段内的主机，在SW2上存在两条到达3.3.3.0/24网段的静态路由，下一跳分别为SW1和SW4，这两条静态路由形成备份，其中：

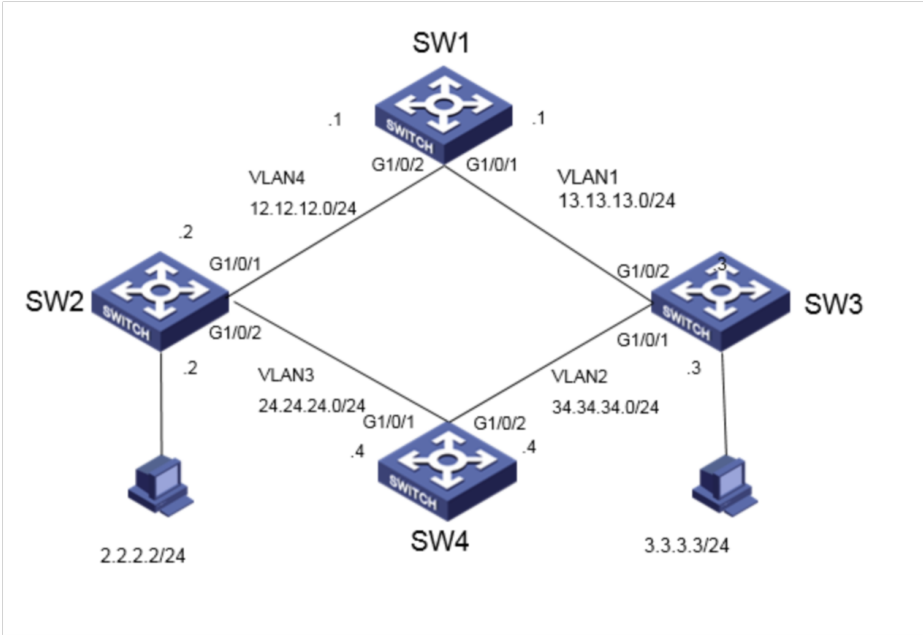
- 下一跳为SW1的静态路由优先级高，作为主路由。该路由可达时，SW2通过SW1将报文转发到3.3.3.0/24网段。
- 下一跳为SW4的静态路作为备份路由。
- 在SW2上通过静态路由、Track与NQA联动，实时判断主路由是否可达。当主路由不可达时，备份路由生效，SW2通过SW4将报

文转发到3.3.3.0/24网段。

同样地，SW3上配置环回接口L0模拟3.3.3.0/24网段内的主机，在SW3D上存在两条到达2.2.2.0/24网段的静态路由，下一跳分别为SW1和SW4。这两条静态路由形成备份，其中：

- 下一跳为SW1的静态路由优先级高，作为主路由。该路由可达时，SW3通过SW1将报文转发到2.2.2.0/24网段。
- 下一跳为SW4的静态路作为备份路由。
- 在SW3上通过静态路由、Track与NQA联动，实时判断主路由是否可达。当主路由不可达时，备份路由生效，SW3通过SW4将报文转发到2.2.2.0/24网段。

# 2 组网图




# 3 配置步骤

一．交换机vlan和ip地址基本配置

#在SW1上关闭生成树

```
<H3C>system-view
System View: return to User View with Ctrl+Z.
[H3C]undo stp global enable
```

#创建vlan 4

```
[H3C]vlan 4
[H3C-vlan4]quit
```

#配置vlan 1和vlan 4虚接口IP地址

```
[H3C]interface Vlan-interface 1
[H3C-Vlan-interface1] ip address 13.13.13.1
255.255.255.0
[H3C-Vlan-interface1]quit
```

```
[H3C]interface Vlan-interface 4
[H3C-Vlan-interface4]   ip   address   12.12.12.1
255.255.255.0
[H3C-Vlan-interface4]quit
```

#将端口2换分到vlan 4，端口1默认属于vlan 1

```
[H3C]interface GigabitEthernet 1/0/2
[H3C-GigabitEthernet1/0/2] port access vlan 4
[H3C-GigabitEthernet1/0/2]quit
```

#在SW2上关闭生成树

```
<H3C>system-view
System View: return to User View with Ctrl+Z.
[H3C]undo stp global enable
```

#创建环回接口LoopBack 0用来模拟主机，地址是2.2.2.2/24

```
[H3C]interface LoopBack 0
[H3C-LoopBack0]ip address 2.2.2.2 255.255.255.0
[H3C-LoopBack0]quit
```

#创建vlan 3、4，并分别配置IP地址。

```
[H3C]vlan 3
[H3C-vlan3]quit
[H3C]interface Vlan-interface 3
[H3C-Vlan-interface3]   ip   address   24.24.24.2
255.255.255.0
[H3C-Vlan-interface3]quit
[H3C]vlan 4
[H3C-vlan4]quit
[H3C]interface Vlan-interface 4
[H3C-Vlan-interface4]   ip   address   12.12.12.2
255.255.255.0
[H3C-Vlan-interface4]quit
```

#将端口1换分到vlan 4，端口2划分到vlan 3

```
[H3C]interface GigabitEthernet 1/0/1
[H3C-GigabitEthernet1/0/1] port access vlan 4
[H3C-GigabitEthernet1/0/1]quit
[H3C]interface GigabitEthernet 1/0/2
[H3C-GigabitEthernet1/0/2] port access vlan 3
[H3C-GigabitEthernet1/0/2]quit
```

#在SW3上关闭生成树

```
<H3C>system-view
System View: return to User View with Ctrl+Z.
[H3C]undo stp global enable
```

#创建环回接口LoopBack 0用来模拟主机，地址是3.3.3.3/24

```
[H3C]interface LoopBack 0
[H3C-LoopBack0]ip address 3.3.3.3 255.255.255.0
[H3C-LoopBack0]quit
```

#创建vlan 2，并分别配置vlan 1和vlan 2的IP地址

```
[H3C]vlan 2
[H3C-vlan2]quit
[H3C]interface Vlan-interface 1
[H3C-Vlan-interface1]   ip   address   13.13.13.3
255.255.255.0
[H3C-Vlan-interface1]quit
[H3C]interface Vlan-interface 2
[H3C-Vlan-interface2]   ip   address   34.34.34.3
255.255.255.0
[H3C-Vlan-interface2]quit
```

#将端口1换分到vlan 2，端口2默认属于vlan 1

```
[H3C]interface GigabitEthernet 1/0/1
[H3C-GigabitEthernet1/0/1] port access vlan 2
```

```
[H3C-GigabitEthernet1/0/1]quit
```

#在SW4上关闭生成树

```
<H3C>system-view
System View: return to User View with Ctrl+Z.
[H3C]undo stp global enable
```

#创建vlan 2、3，并分别配置IP地址

```
[H3C]vlan 2
[H3C-vlan2]quit
[H3C]interface Vlan-interface 2
[H3C-Vlan-interface2]   ip   address   34.34.34.4
255.255.255.0
[H3C-Vlan-interface2]quit
[H3C]vlan 3
[H3C-vlan3]quit
[H3C]interface Vlan-interface 3
[H3C-Vlan-interface3]   ip   address   24.24.24.4
255.255.255.0
[H3C-Vlan-interface3]quit
```

#将端口1换分到vlan 3，端口2划分到vlan 2

```
[H3C]interface GigabitEthernet 1/0/1
[H3C-GigabitEthernet1/0/1] port access vlan 3
[H3C-GigabitEthernet1/0/1]quit
[H3C]interface GigabitEthernet 1/0/2
[H3C-GigabitEthernet1/0/2] port access vlan 2
[H3C-GigabitEthernet1/0/2]quit
```

二．链路检测配置

【SW1】

#SW1配置到2.2.2.0和3.3.3.0网段的静态路由

```
[H3C]ip route-static 2.2.2.0 24 12.12.12.2
[H3C]ip route-static 3.3.3.0 24 13.13.13.3
```

【SW2】

# 配置到达3.3.3.0/24网段的静态路由：下一跳地址为12.12.12.1，优先级为缺省值60，该路由与Track项1关联。

```
<H3C> system-view
[H3C] ip route-static 3.3.3.0 24 12.12.12.1 track 1
```

# 配置到达3.3.3.0/24网段的静态路由：下一跳地址为24.24.24.4，优先级为80。

```
[H3C] ip route-static 3.3.3.0 24 24.24.24.4
preference 80
```

# 配置到达13.13.13.0的静态路由：下一跳地址为12.12.12.1。

```
[H3C]ip route-static 13.13.13.0 24 12.12.12.1
```

# 配置到达34.34.34.0的静态路由：下一跳地址为24.24.24.4。

```
[H3C]ip route-static 34.34.34.0 24 24.24.24.4
```

# 创建管理员名为admin、操作标签为test的NQA测试组。

```
[H3C] nqa entry admin test
```

# 配置测试类型为ICMP-echo。

```
[H3C-nqa-admin-test] type icmp-echo
```

# 配置测试的目的地址为13.13.13.3，下一跳地址为12.12.12.1，以便通过NQA检测Switch 2－Switch 2－Switch 3这条路径的连通性。

```
[H3C-nqa-admin-test-icmp-echo] destination ip
13.13.13.3
[H3C-nqa-admin-test-icmp-echo] next-hop ip
12.12.12.1
```

# 配置测试频率为100ms。

```
[H3C-nqa-admin-test-icmp-echo] frequency 100
```

# 配置联动项1（连续失败5次触发联动）。

```
[H3C-nqa-admin-test-icmp-echo] reaction 1
checked-element probe-fail threshold-type
consecutive 5 action-type trigger-only
[H3C-nqa-admin-test-icmp-echo] quit
```

# 启动探测。

```
[H3C] nqa schedule admin test start-time now
lifetime forever
```

# 配置Track项1，关联NQA测试组（管理员为admin，操作标签为test）的联动项1。

```
[H3C] track 1 nqa entry admin test reaction 1
```

【SW3】

# 配置到达2.2.2.0/24网段的静态路由：下一跳地址为13.13.13.1，优先级为缺省值60，该路由与Track项1关联。

```
<H3C> system-view
[H3C] ip route-static 2.2.2.0 24 13.13.13.1 track
1
```

# 配置到达2.2.2.0/24网段的静态路由：下一跳地址为34.34.34.4，优先级为80。

```
[H3C] ip route-static 2.2.2.0 24 34.34.34.4
preference 80
```

# 配置到达12.12.12.0的静态路由：下一跳地址为13.13.13.1。

```
[H3C] ip route-static 12.12.12.0 24 13.13.13.1
```

# 配置到达24.24.24.0的静态路由：下一跳地址为34.34.34.4。

```
[H3C] ip route-static 24.24.24.0 24 34.34.34.4
```

# 创建管理员名为admin、操作标签为test的NQA测试组。

```
[H3C] nqa entry admin test
```

# 配置测试类型为ICMP-echo。

```
[H3C-nqa-admin-test] type icmp-echo
```

# 配置测试的目的地址为12.12.12.2，下一跳地址为13.13.13.1，以便通过NQA检测Switch 2－Switch 2－Switch 3这条路径的连通性。

```
[H3C-nqa-admin-test-icmp-echo] destination ip
12.12.12.2
[H3C-nqa-admin-test-icmp-echo] next-hop ip
13.13.13.1
```

# 配置测试频率为100ms。

```
[H3C-nqa-admin-test-icmp-echo] frequency 100
```

# 配置联动项1（连续失败5次触发联动）。

```
[H3C-nqa-admin-test-icmp-echo] reaction 1
checked-element probe-fail threshold-type
```

```
consecutive 5 action-type trigger-only
[H3C-nqa-admin-test-icmp-echo] quit
```

# 启动探测。

```
[H3C] nqa schedule admin test start-time now
lifetime forever
```

# 配置Track项1，关联NQA测试组（管理员为admin，操作标签为test）的联动项1。

```
[H3C] track 1 nqa entry admin test reaction 1
```

【SW4】

#SW1配置到2.2.2.0和3.3.3.0网段的静态路由

```
[H3C]ip route-static 2.2.2.0 24 24.24.24.2
[H3C]ip route-static 3.3.3.0 24 34.34.34.3
```

# 4 验证配置

# 显示SW2上Track项的信息：

```
[H3C]display track all
Track ID: 1
  State: Positive
  Duration: 0 days 0 hours 1 minutes 18 seconds
  Tracked object type: NQA
  Notification delay: Positive 0, Negative 0 (in
seconds)
  Tracked object:
    NQA entry: admin test
```

```
    Reaction: 1
    Remote IP/URL: 13.13.13.3
    Local IP: --
    Interface: --
```

#查看SW2上的路由表：

```
[H3C]display ip routing-table

Destinations : 23       Routes : 23

Destination/Mask      Proto      Pre       Cost
NextHop         Interface
0.0.0.0/32              Direct      0       0
127.0.0.1       InLoop0
2.2.2.0/24                Direct        0         0
      2.2.2.2         Loop0
2.2.2.0/32              Direct      0       0
2.2.2.2         Loop0
2.2.2.2/32              Direct      0       0
127.0.0.1       InLoop0
2.2.2.255/32            Direct      0       0
2.2.2.2         Loop0
3.3.3.0/24              Static      60      0
12.12.12.1      Vlan4
12.12.12.0/24           Direct      0       0
12.12.12.2      Vlan4
12.12.12.0/32           Direct      0       0
12.12.12.2      Vlan4
12.12.12.2/32           Direct      0       0
127.0.0.1       InLoop0
12.12.12.255/32         Direct      0       0
12.12.12.2      Vlan4
13.13.13.0/24           Static      60      0
```

```
12.12.12.1      Vlan4
24.24.24.0/24          Direct      0       0
24.24.24.2      Vlan3
24.24.24.0/32          Direct      0       0
24.24.24.2      Vlan3
24.24.24.2/32          Direct      0       0
127.0.0.1       InLoop0
24.24.24.255/32        Direct      0       0
24.24.24.2      Vlan3
34.34.34.0/24          Static      60      0
24.24.24.4      Vlan3
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
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
```

#以上NQA测试的结果为主路由可达（Track项状态为Positive），访问3.3.3.0/24网段路径是SW2-SW1-SW3。

#将SW1的2号端口shutdown

```
[H3C]int GigabitEthernet 1/0/2
[H3C-GigabitEthernet1/0/2]shutdown
```

# 显示SW2上Track项的信息：

```
[H3C]display track all
Track ID: 1
  State: Negative
  Duration: 0 days 0 hours 0 minutes 10 seconds
  Tracked object type: NQA
  Notification delay: Positive 0, Negative 0 (in
seconds)
  Tracked object:
    NQA entry: admin test
    Reaction: 1
    Remote IP/URL: 13.13.13.3
    Local IP: --
  Interface: --
```

#查看SW2上的路由表

```
[H3C]display ip routing-table

Destinations : 18       Routes : 18

Destination/Mask      Proto      Pre       Cost
NextHop          Interface
0.0.0.0/32            Direct      0       0
127.0.0.1        InLoop0
2.2.2.0/24            Direct      0       0
2.2.2.2          Loop0
2.2.2.0/32            Direct      0       0
2.2.2.2          Loop0
2.2.2.2/32            Direct      0       0
127.0.0.1        InLoop0
2.2.2.255/32          Direct      0       0
2.2.2.2          Loop0
3.3.3.0/24            Static      80      0
```

```
24.24.24.4      Vlan3
24.24.24.0/24          Direct      0       0
24.24.24.2      Vlan3
24.24.24.0/32          Direct      0       0
24.24.24.2      Vlan3
24.24.24.2/32          Direct      0       0
127.0.0.1       InLoop0
24.24.24.255/32        Direct      0       0
24.24.24.2      Vlan3
34.34.34.0/24          Static      60      0
24.24.24.4      Vlan3
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
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
```

#NQA测试的结果为主路由不可达（Track项状态为Negative），则备份路由生效，访问3.3.3.0/24网段路径是SW2-SW4-SW3。出现故障后，2.2.2.2到3.3.3.3之间仍然可以通信：

```
[H3C]ping -a 2.2.2.2 3.3.3.3
Ping 3.3.3.3 (3.3.3.3) from 2.2.2.2: 56 data bytes,
press CTRL_C to break
56 bytes from 3.3.3.3: icmp_seq=0 ttl=254 time=4.000
ms
```

```
56 bytes from 3.3.3.3: icmp_seq=1 ttl=254 time=3.000
ms
56 bytes from 3.3.3.3: icmp_seq=2 ttl=254 time=1.000
ms
56 bytes from 3.3.3.3: icmp_seq=3 ttl=254 time=1.000
ms
56 bytes from 3.3.3.3: icmp_seq=4 ttl=254 time=1.000
ms

--- Ping statistics for 3.3.3.3 ---
5 packet(s) transmitted, 5 packet(s) received, 0.0%
packet loss
round-trip           min/avg/max/std-dev           =
1.000/2.000/4.000/1.265 ms
[H3C] % May 29 10:21:41:325 2019 H3C
PING/6/PING_STATISTICS: Ping statistics for 3.3.3.3:
5 packet(s) transmitted, 5 packet(s) received, 0.0%
packet loss, round-trip min/avg/max/std-dev =
1.000/2.000/4.000/1.265 ms.
```