S5000PV3/S5130/S5150系列交换机静态路由、Track与NQA联动配置

静态路由 NQA Track 闫宁 2019-09-16 发表

组网及说明

V7交换机静态路由、Track与NQA联动配置

1 配置需求或说明

1.1.1 1.1适用产品系列

本案例适用于如S5024PV3-EI-HPWR、S5048PV3-EI、S5120V2-52P-LI、S5120V2-28P-SI、S5130-52S-EI、S5130S-28S-EI、S5150X-16ST-EI等S5000PV3、S5120V2、S5130、S5150系列的交换机。

1.1.2 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。

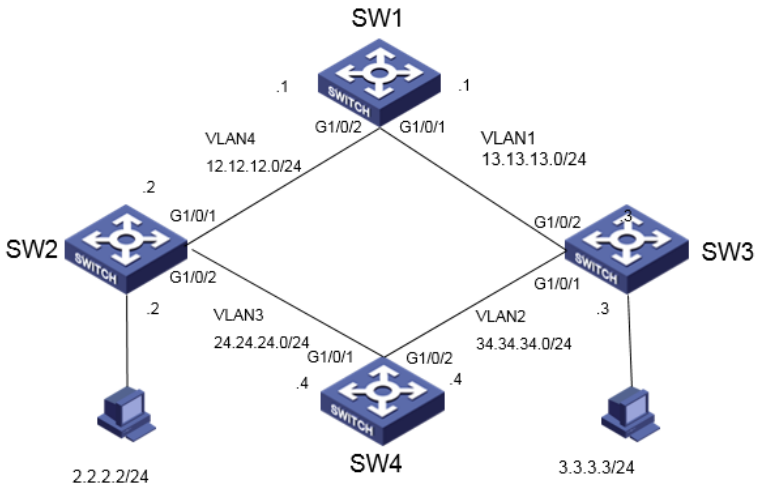
同样地，SW3上配置环回接口L0模拟3.3.3.0/24网段内的主机，在SW3D上存在两条到达2.2.2.0/24网段的静态路由，下一跳分别为SW1和SW4。这两条静态路由形成备份，其中：

· 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



配置步骤

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

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

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[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
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
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
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。
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。
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.

配置关键点