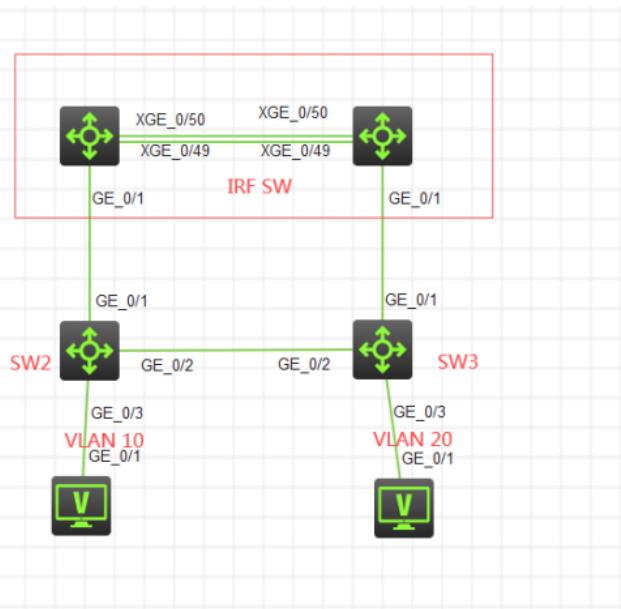


知 S5820 RSTP配置案例1 (IRF组网模式下的接入设备采用STP COST) 及切换演练

STP 韦家宁 2020-10-25 发表

组网及说明



本案例采用H3C HCL模拟器来模拟RSTP的部署，在网络拓扑图中已经明确标识了具体的设备和VLAN划分，其中SW部署IRF模式，SW2和SW3为接入交换机，为了实现链路冗余，将SW2和SW3连接起来，接着使用STP COST来指定端口的开销来实现链路的“主备”，在该网络拓扑中，SW2和SW3互联的端口都配置STP COST为100，这样不仅能避免物理环路，还能实现链路冗余。

配置步骤

1、部署SW的IRF：

1号设备IRF部署：

<H3C>sys

System View: return to User View with Ctrl+Z.

[H3C]irf member 1 renumber 1

Renumbering the member ID may result in configuration change or loss. Continue?[Y/N]:y

[H3C]int range ten 1/0/49 to ten 1/0/50

[H3C-if-range]shutdown

[H3C-if-range]quit

[H3C]irf-port 1/1

[H3C-irf-port1/1]port group interface Ten-GigabitEthernet 1/0/49

[H3C-irf-port1/1]port group interface Ten-GigabitEthernet 1/0/50

[H3C-irf-port1/1]quit

[H3C]int range ten 1/0/49 to ten 1/0/50

[H3C-if-range]undo shutdown

[H3C-if-range]quit

[H3C]irf-port-configuration active

[H3C]%Oct 24 10:07:34:375 2020 H3C STM/6/STM_LINK_UP: IRF port 1 came up.

[H3C]save

The current configuration will be written to the device. Are you sure? [Y/N]:y

Please input the file name(*.cfg)[flash:/startup.cfg]

(To leave the existing filename unchanged, press the enter key):

Validating file. Please wait...

Saved the current configuration to mainboard device successfully.

2号设备IRF部署：

[H3C]irf member 1 renumber 2

Renumbering the member ID may result in configuration change or loss. Continue?[Y/N]:y

[H3C]int range ten 1/0/49 to ten 1/0/50

```

[H3C-if-range]shutdown
[H3C-if-range]quit
[H3C]irf-port 1/2
[H3C-irf-port1/2]port group interface Ten-GigabitEthernet 1/0/49
[H3C-irf-port1/2]port group interface Ten-GigabitEthernet 1/0/50
[H3C-irf-port1/2]quit
[H3C]int range ten 1/0/49 to ten 1/0/50
[H3C-if-range]undo shutdown
[H3C-if-range]quit
[H3C]save
The current configuration will be written to the device. Are you sure? [Y/N]:y
Please input the file name(*.cfg)[flash:/startup.cfg]
(To leave the existing filename unchanged, press the enter key):
Validating file. Please wait...
Saved the current configuration to mainboard device successfully.
[H3C]irf-port-configuration active
[H3C]%Oct 24 10:10:59:609 2020 H3C STM/6/STM_LINK_UP: IRF port 2 came up.

```

```

[H3C]save
The current configuration will be written to the device. Are you sure? [Y/N]:y
Please input the file name(*.cfg)[flash:/startup.cfg]
(To leave the existing filename unchanged, press the enter key):
flash:/startup.cfg exists, overwrite? [Y/N]:y
Validating file. Please wait...
Saved the current configuration to mainboard device successfully.

```

重启部署了IRF的两台设备。

IRF部署已完成：

```

<H3C>dis irf
MemberID  Role    Priority  CPU-Mac      Description
 *+1      Master   1        8852-017f-0104  ---
  2       Standby  1        8852-0895-0204  ---
-----
* indicates the device is the master.
+ indicates the device through which the user logs in.

The bridge MAC of the IRF is: 8852-017f-0100
Auto upgrade          : yes
Mac persistent        : 6 min
Domain ID             : 0
<H3C>%Oct 24 10:13:06:226 2020 H3C SHELL/5/SHELL_LOGIN: Console logged in f

```

```

<H3C>dis irf
MemberID  Role    Priority  CPU-Mac      Description
 *1      Master   1        8852-017f-0104  ---
  +2     Standby  1        8852-0895-0204  ---
-----
* indicates the device is the master.
+ indicates the device through which the user logs in.

The bridge MAC of the IRF is: 8852-017f-0100
Auto upgrade          : yes
Mac persistent        : 6 min
Domain ID             : 0
<H3C>

```

1、配置SW的VLAN及RSTP

```

<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW
[SW]vlan 10
[SW-vlan10]quit
[SW]vlan 20
[SW-vlan20]quit
[SW]int range gi 1/0/1 gi 2/0/1
[SW-if-range]port link-type trunk
[SW-if-range]undo port trunk permit vlan 1
[SW-if-range]port trunk permit vlan 10 20
[SW-if-range]quit
[SW-if-range]quit

```

```
[SW]int vlan 10
[SW-Vlan-interface10]ip address 192.168.10.1 24
[SW-Vlan-interface10]quit
[SW]int vlan 20
[SW-Vlan-interface20]ip address 192.168.20.1 24
[SW-Vlan-interface20]quit
```

```
[SW]stp global enable
[SW]stp mode rstp
[SW]stp priority 0
```

SW2配置：

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW2
[SW2]vlan 10
[SW2-vlan10]quit
[SW2]vlan 20
[SW2-vlan20]quit
[SW2]int range gi 1/0/1 to gi 1/0/2
[SW2-if-range]port link-type trunk
[SW2-if-range]undo port trunk permit vlan 1
[SW2-if-range]port trunk permit vlan 10 20
[SW2-if-range]quit
[SW2]int gi 1/0/3
[SW2-GigabitEthernet1/0/3]port link-type access
[SW2-GigabitEthernet1/0/3]port access vlan 10
[SW2-GigabitEthernet1/0/3]stp edged-port
Edge port should only be connected to terminal. It will cause temporary loops if port
GigabitEthernet1/0/3 is connected to bridges. Please use it carefully.
[SW2-GigabitEthernet1/0/3]quit
```

```
[SW2]stp global enable
[SW2]stp mode rstp
[SW2]int gi 1/0/2
[SW2-GigabitEthernet1/0/2]stp cost 100
[SW2-GigabitEthernet1/0/2]quit
```

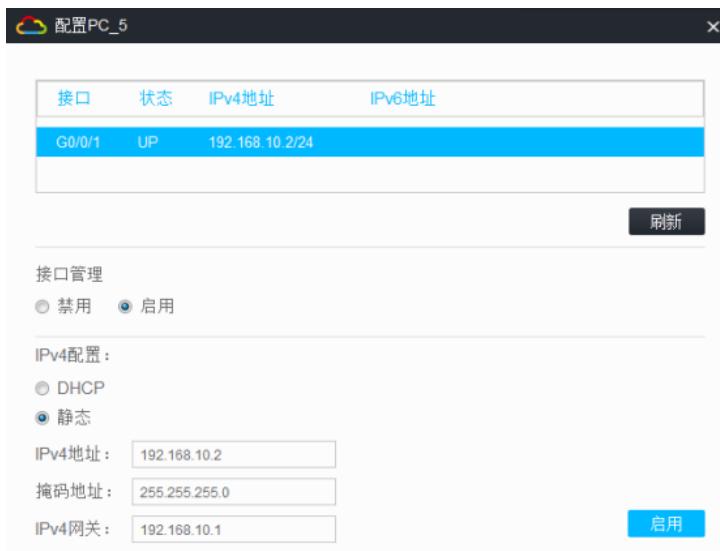
SW3配置：

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname SW3
[SW3]vlan 10
[SW3-vlan10]quit
[SW3]vlan 20
[SW3-vlan20]quit
[SW3]int range gi 1/0/1 to gi 1/0/2
[SW3-if-range]port link-type trunk
[SW3-if-range]undo port trunk permit vlan 1
[SW3-if-range]port trunk permit vlan 10 20
[SW3-if-range]quit
[SW3]int gi 1/0/3
[SW3-GigabitEthernet1/0/3]port link-type access
[SW3-GigabitEthernet1/0/3]port access vlan 20
[SW3-GigabitEthernet1/0/3]stp edged-port
Edge port should only be connected to terminal. It will cause temporary loops if port
GigabitEthernet1/0/3 is connected to bridges. Please use it carefully.
[SW3-GigabitEthernet1/0/3]quit
```

```
[SW3]stp global enable
[SW3]stp mode rstp
```

```
[SW3]int gi 1/0/2
[SW3-GigabitEthernet1/0/2]stp cost 100
[SW3-GigabitEthernet1/0/2]quit
```

填写PC的IP，并测试PING网关：



```
<H3C>ping 192.168.10.1
Ping 192.168.10.1 (192.168.10.1): 56 data bytes, press CTRL_C to break
56 bytes from 192.168.10.1: icmp_seq=0 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=1 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=2 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=3 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=4 ttl=255 time=1.000 ms
--- Ping statistics for 192.168.10.1 ---

```

配置关键点

切换演练开始：

在网络正常时的STP根桥和STP端口的状态如下：

SW:

```
[SW]dis stp root
MST ID  Root Bridge ID      ExtPathCost IntPathCost Root Port
0       0.8852-017f-0100     0             0
[SW]dis stp brief
MST ID  Port                  Role  STP State   Protection
0       GigabitEthernet1/0/1    DESI  FORWARDING NONE
0       GigabitEthernet2/0/1    DESI  FORWARDING NONE
[SW]
```

SW2:

```
[SW2]dis stp root
MST ID  Root Bridge ID      ExtPathCost IntPathCost Root Port
0       0.8852-017f-0100     20            0           GE1/0/1
[SW2]dis stp brief
MST ID  Port                  Role  STP State   Protection
0       GigabitEthernet1/0/1    ROOT FORWARDING NONE
0       GigabitEthernet1/0/2    DESI FORWARDING NONE
0       GigabitEthernet1/0/3    DESI FORWARDING NONE
[SW2]
```

SW3:

```
[SW3]dis stp root
MST ID  Root Bridge ID      ExtPathCost IntPathCost Root Port
0       0.8852-017f-0100     20            0           GE1/0/1
[SW3]dis stp brief
MST ID  Port                  Role  STP State   Protection
0       GigabitEthernet1/0/1    ROOT FORWARDING NONE
0       GigabitEthernet1/0/2    ALTE DISCARDING NONE
[SW3]
```

根据SW3反馈的STP端口状态，G1/0/1为根端口，G1/0/2被阻塞掉了。

在网络正常时，根桥稳定，各端口都在正常的状态内，仅SW3的G1/0/2端口被阻塞，因此没有成环。

切换演练：

断开SW的gi 1/0/1端口，并查看STP的状态和STP端口状态：

```
[SW]#sh sw
[SW-GigabitEthernet1/0/1]shu
[SW-GigabitEthernet1/0/1]shutdown
[SW-GigabitEthernet1/0/1]Oct 25 12:50:31:972 2020 SW IFNET/3/PHY_UPDOWN: Physical state o
n the interface GigabitEthernet1/0/1 changed to down.
%Oct 25 12:50:31:973 2020 SW IFNET/5/LINK_UPDOWN: Line protocol state on the interface Gig
abitEthernet1/0/1 changed to down.
%Oct 25 12:50:32:537 2020 SW STP/6/STP_NOTIFIED_TC: -Slot=2; Instance 0's port GigabitEthe
rnet2/0/1 was notified a topology change.
```

SW:

```
[SW-GigabitEthernet1/0/1]dis stp 10
[SW-GigabitEthernet1/0/1]dis stp root
MST ID Root Bridge ID ExtPathCost IntPathCost Root Port
0 0.8852-017f-0100 0 0
[SW-GigabitEthernet1/0/1]dis stp brief
MST ID Port Role STP State Protection
0 GigabitEthernet2/0/1 DESI FORWARDING NONE
[SW-GigabitEthernet1/0/1]
```

SW2:

```
<SW2>dis stp root
MST ID Root Bridge ID ExtPathCost IntPathCost Root Port
0 0.8852-017f-0100 120 0 GE1/0/2
<SW2>dis stp brief
MST ID Port Role STP State Protection
0 GigabitEthernet1/0/2 ROOT FORWARDING NONE
0 GigabitEthernet1/0/3 DESI FORWARDING NONE
<SW2>
```

根据SW2反馈的情况来看， GI 1/0/2已经切换为根端口

SW3:

```
<SW3>dis stp root
MST ID Root Bridge ID ExtPathCost IntPathCost Root Port
0 0.8852-017f-0100 20 0 GE1/0/1
<SW3>dis stp brief
MST ID Port Role STP State Protection
0 GigabitEthernet1/0/1 ROOT FORWARDING NONE
0 GigabitEthernet1/0/2 DESI FORWARDING NONE
<SW3>
```

SW3的根端口没有变动，因为SW3有直连链路到SW上。

PC PING 不丢包：

```
hcl_udf1
SS820V2-54QS-GE_1 SS820V2-54QS-GE_2 SS820V2-54QS-GE_3 SS820V2-54QS-GE_4 PC_5
56 bytes from 192.168.10.1: icmp_seq=98 ttl=255 time=3.000 ms
56 bytes from 192.168.10.1: icmp_seq=99 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=100 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=101 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=102 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=103 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=104 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=105 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=106 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=107 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=108 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=109 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=110 ttl=255 time=4.000 ms
56 bytes from 192.168.10.1: icmp_seq=111 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=112 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=113 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=114 ttl=255 time=2.000 ms
--- Ping statistics for 192.168.10.1 ---
115 packet(s) transmitted, 115 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/2.035/21.000/1.911 ms
<H3C>%Oct 25 15:16:17:692 2020 H3C PING/6/PING_STATISTICS: Ping statistics for 192.
1: 115 packet(s) transmitted, 115 packet(s) received, 0.0% packet loss, round-trip
/max/std-dev = 1.000/2.035/21.000/1.911 ms.
```

恢复SW的GI 1/0/1端口，并关闭GI 2/0/1端口：

```
[SW]int gi 2/0/1
[SW-GigabitEthernet2/0/1]shu
[SW-GigabitEthernet2/0/1]shutdown
[SW-GigabitEthernet2/0/1]Oct 25 13:10:30:309 2020 SW IFNET/3/PHY_UPDOWN: Physical state o
n the interface GigabitEthernet2/0/1 changed to down.
%Oct 25 13:10:30:309 2020 SW IFNET/5/LINK_UPDOWN: Line protocol state on the interface Gig
abitEthernet2/0/1 changed to down.
%Oct 25 13:10:30:312 2020 SW STP/6/STP_NOTIFIED_TC: Instance 0's port GigabitEthernet1/0/
was notified a topology change.
```

查看SW：

```
[SW-GigabitEthernet2/0/1]dis stp root
MST ID Root Bridge ID      ExtPathCost IntPathCost Root Port
0      0.8852-017f-0100    0          0
[SW-GigabitEthernet2/0/1]dis stp brief
MST ID Port                  Role STP State Protection
0      GigabitEthernet1/0/1   DESI FORWARDING NONE
[SW-GigabitEthernet2/0/1]
```

SW2:

```
<SW2>dis stp root
MST ID Root Bridge ID      ExtPathCost IntPathCost Root Port
0      0.8852-017f-0100    20         0          GE1/0/1
<SW2>dis stp brief
MST ID Port                  Role STP State Protection
0      GigabitEthernet1/0/1   ROOT FORWARDING NONE
0      GigabitEthernet1/0/2   DESI FORWARDING NONE
0      GigabitEthernet1/0/3   DESI FORWARDING NONE
<SW2>
```

根据SW2反馈的情况来看， GI 1/0/2端口已从阻塞状态切换到指定端口

SW3:

```
<SW2>dis stp root
MST ID Root Bridge ID      ExtPathCost IntPathCost Root Port
0      0.8852-017f-0100    20         0          GE1/0/1
<SW2>dis stp brief
MST ID Port                  Role STP State Protection
0      GigabitEthernet1/0/1   ROOT FORWARDING NONE
0      GigabitEthernet1/0/2   DESI FORWARDING NONE
0      GigabitEthernet1/0/3   DESI FORWARDING NONE
<SW2>
```

根据SW3反馈的情况来看， GI 1/0/2端口已切换到根端口。

恢复网络，重新开启SW的GI 2/0/1端口：

```
[SW-GigabitEthernet2/0/1]undo shutdown
[SW-GigabitEthernet2/0/1]*Oct 25 13:16:01.223 2020 SW IFNET/3/PHY_UPDOWN: Physical state on the interface GigabitEthernet2/0/1 changed to up.
*Oct 25 13:16:224 2020 SW IFNET/5/LINK_UPDOWN: Line protocol state on the interface GigabitEthernet2/0/1 changed to up.
*Oct 25 13:16:01.981 2020 SW STP/6/STP_DETECTED_TC: -Slot=2; Instance 0's port GigabitEthernet2/0/1 detected a topology change.
*Oct 25 13:16:02.019 2020 SW LLDP/6/LLDP_CREATE_NEIGHBOR: -Slot=2; Nearest bridge agent neighbor created on port GigabitEthernet2/0/1 (IfIndex 130), neighbor's chassis ID is 8852-1397-0400, port ID is GigabitEthernet1/0/1.
```

再次分别查看SW、SW2、SW3的状态，已正常切换回来：

```
[SW-GigabitEthernet2/0/1]dis stp root
MST ID Root Bridge ID      ExtPathCost IntPathCost Root Port
0      0.8852-017f-0100    0          0
[SW-GigabitEthernet2/0/1]dis stp brief
MST ID Port                  Role STP State Protection
0      GigabitEthernet1/0/1   DESI FORWARDING NONE
0      GigabitEthernet2/0/1   DESI FORWARDING NONE
[SW-GigabitEthernet2/0/1]
```

```
<SW2>dis stp root
MST ID Root Bridge ID      ExtPathCost IntPathCost Root Port
0      0.8852-017f-0100    20         0          GE1/0/1
<SW2>dis stp brief
MST ID Port                  Role STP State Protection
0      GigabitEthernet1/0/1   ROOT FORWARDING NONE
0      GigabitEthernet1/0/2   DESI FORWARDING NONE
0      GigabitEthernet1/0/3   DESI FORWARDING NONE
<SW2>
```

```
<SW3>dis stp root
MST ID Root Bridge ID      ExtPathCost IntPathCost Root Port
0      0.8852-017f-0100    20         0          GE1/0/1
<SW3>dis stp brief
MST ID Port                  Role STP State Protection
0      GigabitEthernet1/0/1   ROOT FORWARDING NONE
0      GigabitEthernet1/0/2   ALTE DISCARDING NONE
<SW3>
```

至此， S5820 RSTP典型组网配置案例1及切换演练已完成！