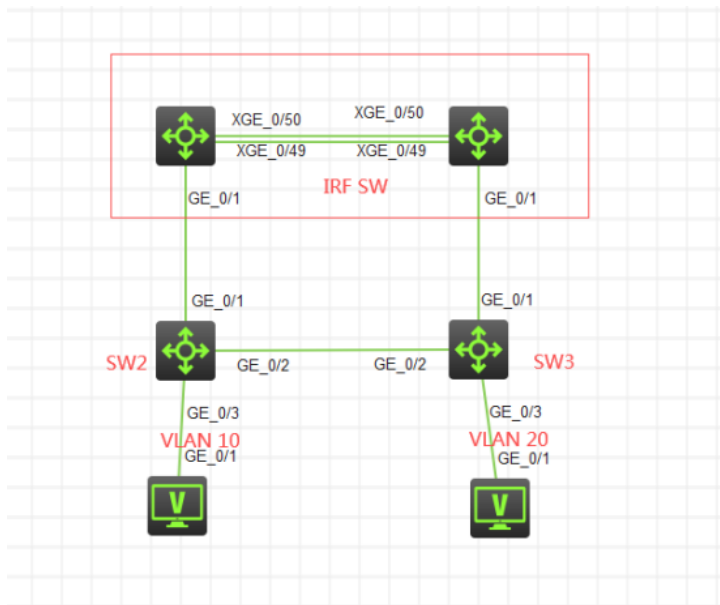


# 知 S5820 PVST配置案例1 (IRF组网模式下的接入设备采用STP COST) 及切换演练

PVST 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PVST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]jrf-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]jrf-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PVST

```

<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 pvst
[SW]stp vlan 10 20 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 pvst
[SW2]int gi 1/0/2
[SW2-GigabitEthernet1/0/2]stp vlan 10 20 cost 100
[SW2-GigabitEthernet1/0/2]quit
```

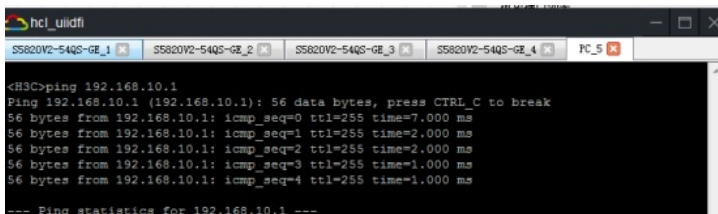
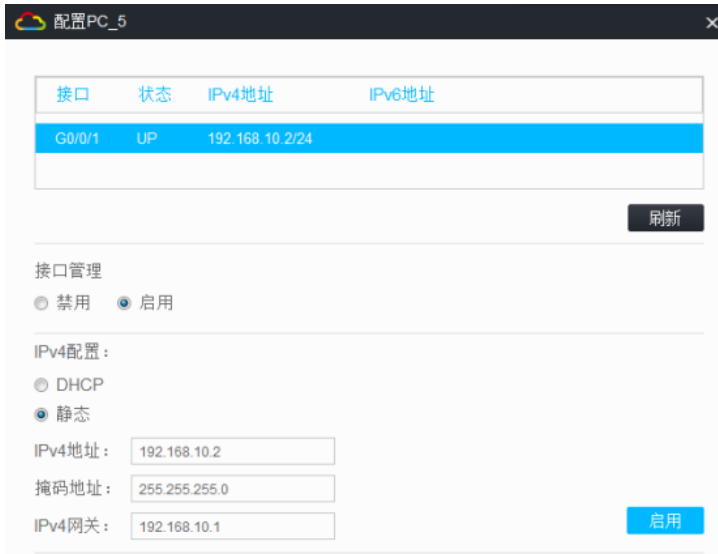
#### SW3配置:

```
<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 pvst
```

```
[SW3]int gi 1/0/2
[SW3-GigabitEthernet1/0/2]stp vlan 10 20 cost 100
[SW3-GigabitEthernet1/0/2]quit
```

填写PC的IP，并测试PING网关：



## 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
VLAN ID  Root Bridge ID      ExtPathCost  IntPathCost  Root Port
1         32768.8852-017f-0100    0             0
10        0.8852-017f-0100       0             0
20        0.8852-017f-0100       0             0
[SW]dis stp brief
VLAN ID  Port                Role  STP State  Protection
10       GigabitEthernet1/0/1  DESI  FORWARDING  NONE
10       GigabitEthernet2/0/1  DESI  FORWARDING  NONE
20       GigabitEthernet1/0/1  DESI  FORWARDING  NONE
20       GigabitEthernet2/0/1  DESI  FORWARDING  NONE
[SW]
```

SW2:

```
[SW2-GigabitEthernet1/0/2]dis stp root
VLAN ID  Root Bridge ID      ExtPathCost  IntPathCost  Root Port
1         32768.8852-0f8f-0300    0             0
10        0.8852-017f-0100       0             20      GE1/0/1
20        0.8852-017f-0100       0             20      GE1/0/1
[SW2-GigabitEthernet1/0/2]dis stp brief
VLAN ID  Port                Role  STP State  Protection
10       GigabitEthernet1/0/1  ROOT  FORWARDING  NONE
10       GigabitEthernet1/0/2  DESI  FORWARDING  NONE
10       GigabitEthernet1/0/3  DESI  FORWARDING  NONE
20       GigabitEthernet1/0/1  ROOT  FORWARDING  NONE
20       GigabitEthernet1/0/2  DESI  FORWARDING  NONE
[SW2-GigabitEthernet1/0/2]
```

SW3:

```
[SW3]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-1397-0400 0 0
10 0.8852-017f-0100 0 20 GE1/0/1
20 0.8852-017f-0100 0 20 GE1/0/1
[SW3]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 ROOT FORWARDING NONE
10 GigabitEthernet1/0/2 ALTE DISCARDING NONE
20 GigabitEthernet1/0/1 ROOT FORWARDING NONE
20 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]int gi 1/0/1
[SW-GigabitEthernet1/0/1]shu
[SW-GigabitEthernet1/0/1]shutdown
*Oct 25 14:41:56:716 2020 SW IFNET/3/PHY_UPDOWN: Physical state on the interface GigabitEthernet1/0/1 changed to down.
*Oct 25 14:41:56:716 2020 SW IFNET/5/LINK_UPDOWN: Line protocol state on the interface GigabitEthernet1/0/1 changed to down.
[SW-GigabitEthernet1/0/1]
```

SW:

```
[SW-GigabitEthernet1/0/1]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-017f-0100 0 0
10 0.8852-017f-0100 0 0
20 0.8852-017f-0100 0 0
[SW-GigabitEthernet1/0/1]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet2/0/1 DESI FORWARDING NONE
20 GigabitEthernet2/0/1 DESI FORWARDING NONE
[SW-GigabitEthernet1/0/1]
```

SW2:

```
[SW2-GigabitEthernet1/0/2]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-0f8f-0300 0 0
10 0.8852-017f-0100 0 120 GE1/0/2
20 0.8852-017f-0100 0 120 GE1/0/2
[SW2-GigabitEthernet1/0/2]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/2 ROOT FORWARDING NONE
10 GigabitEthernet1/0/3 DESI FORWARDING NONE
20 GigabitEthernet1/0/2 ROOT FORWARDING NONE
[SW2-GigabitEthernet1/0/2]
```

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
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-1397-0400 0 0
10 0.8852-017f-0100 0 20 GE1/0/1
20 0.8852-017f-0100 0 20 GE1/0/1
[SW3]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 ROOT FORWARDING NONE
10 GigabitEthernet1/0/2 DESI FORWARDING NONE
20 GigabitEthernet1/0/1 ROOT FORWARDING NONE
20 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：

```

hc1_uuidfi
S5820V2-54QS-GE_1 x S5820V2-54QS-GE_2 x S5820V2-54QS-GE_3 x S5820V2-54QS-GE_4 x PC_5 x
56 bytes from 192.168.10.1: icmp_seq=153 ttl=255 time=4.000 ms
56 bytes from 192.168.10.1: icmp_seq=154 ttl=255 time=3.000 ms
56 bytes from 192.168.10.1: icmp_seq=155 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=156 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=157 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=158 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=159 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=160 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=161 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=162 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=163 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=164 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=165 ttl=255 time=3.000 ms
56 bytes from 192.168.10.1: icmp_seq=166 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=167 ttl=255 time=2.000 ms
56 bytes from 192.168.10.1: icmp_seq=168 ttl=255 time=1.000 ms
56 bytes from 192.168.10.1: icmp_seq=169 ttl=255 time=3.000 ms

--- Ping statistics for 192.168.10.1 ---
170 packet(s) transmitted, 170 packet(s) received, 0.0% packet loss
round-trip min/avg/max/std-dev = 1.000/2.100/20.000/1.626 ms
<H3C>%Oct 25 17:18:06:755 2020 H3C PING/6/PING STATISTICS: Ping statistics for 192.168.
1: 170 packet(s) transmitted, 170 packet(s) received, 0.0% packet loss, round-trip min/
/max/std-dev = 1.000/2.100/20.000/1.626 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 14:48:53:614 2020 SW IFNET/3/PHY_UPDOWN: Physical state o
n the interface GigabitEthernet2/0/1 changed to down.
%Oct 25 14:48:53:615 2020 SW IFNET/5/LINK_UPDOWN: Line protocol state on the interface Gi
gabitEthernet2/0/1 changed to down.

```

查看SW：

```

[SW-GigabitEthernet2/0/1]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-017f-0100 0 0
10 0.8852-017f-0100 0 0
20 0.8852-017f-0100 0 0
[SW-GigabitEthernet2/0/1]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 DESI FORWARDING NONE
20 GigabitEthernet1/0/1 DESI FORWARDING NONE
[SW-GigabitEthernet2/0/1]

```

SW2：

```

[SW2-GigabitEthernet1/0/2]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-0f8f-0300 0 0
10 0.8852-017f-0100 0 20 GE1/0/1
20 0.8852-017f-0100 0 20 GE1/0/1
[SW2-GigabitEthernet1/0/2]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 ROOT FORWARDING NONE
10 GigabitEthernet1/0/2 DESI FORWARDING NONE
10 GigabitEthernet1/0/3 DESI FORWARDING NONE
20 GigabitEthernet1/0/1 ROOT FORWARDING NONE
20 GigabitEthernet1/0/2 DESI FORWARDING NONE
[SW2-GigabitEthernet1/0/2]

```

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：

```

[SW3]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-1397-0400 0 0
10 0.8852-017f-0100 0 120 GE1/0/2
20 0.8852-017f-0100 0 120 GE1/0/2
[SW3]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/2 ROOT FORWARDING NONE
20 GigabitEthernet1/0/2 ROOT FORWARDING NONE
[SW3]

```

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 14:49:59:927 2020 SW IFNET/3/PHY_UPDOWN: Physical state o
n the interface GigabitEthernet2/0/1 changed to up.
Oct 25 14:49:59:928 2020 SW IFNET/5/LINK_UPDOWN: Line protocol state on the interface Gi
gabitEthernet2/0/1 changed to up.
Oct 25 14:50:00:692 2020 SW LLDP/6/LLDP_CREATE_NEIGHBOR: -Slot=2; Nearest bridge agent ne
ighbor created on port GigabitEthernet2/0/1 (IfIndex 130), neighbor's chassis ID is 8852-1
97-0400, port ID is GigabitEthernet1/0/1.
[SW-GigabitEthernet2/0/1]

```

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
[SW-GigabitEthernet2/0/1]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-017f-0100 0 0
10 0.8852-017f-0100 0 0
20 0.8852-017f-0100 0 0
[SW-GigabitEthernet2/0/1]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 DESI FORWARDING NONE
10 GigabitEthernet2/0/1 DESI FORWARDING NONE
20 GigabitEthernet1/0/1 DESI FORWARDING NONE
20 GigabitEthernet2/0/1 DESI FORWARDING NONE
[SW-GigabitEthernet2/0/1]
```

```
[SW2-GigabitEthernet1/0/2]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-0f8f-0300 0 0
10 0.8852-017f-0100 0 20 GE1/0/1
20 0.8852-017f-0100 0 20 GE1/0/1
[SW2-GigabitEthernet1/0/2]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 ROOT FORWARDING NONE
10 GigabitEthernet1/0/2 DESI FORWARDING NONE
10 GigabitEthernet1/0/3 DESI FORWARDING NONE
20 GigabitEthernet1/0/1 ROOT FORWARDING NONE
20 GigabitEthernet1/0/2 DESI FORWARDING NONE
[SW2-GigabitEthernet1/0/2]
```

```
[SW3]dis stp root
[SW3]dis stp root
VLAN ID Root Bridge ID ExtPathCost IntPathCost Root Port
1 32768.8852-1397-0400 0 0
10 0.8852-017f-0100 0 20 GE1/0/1
20 0.8852-017f-0100 0 20 GE1/0/1
[SW3]dis stp brief
VLAN ID Port Role STP State Protection
10 GigabitEthernet1/0/1 ROOT FORWARDING NONE
10 GigabitEthernet1/0/2 ALTE DISCARDING NONE
20 GigabitEthernet1/0/1 ROOT FORWARDING NONE
20 GigabitEthernet1/0/2 ALTE DISCARDING NONE
[SW3]
```

至此，S5820 PVST典型组网配置案例1及切换演练已完成！