【MVS】思科交换机快速生成树典型组网配置案例

网络相关 **韦家宁** 2024-07-03 发表

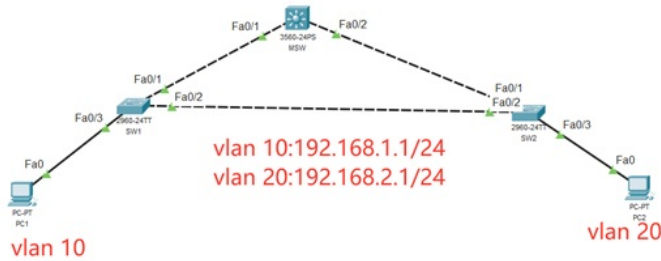## 组网及说明

本案例采用思科PT模拟器来模拟快速典型组网配置案例，其中MSW为主根，SW1为备根，断开SW2时，PC2也能正常互通。

配置步骤

1、按照网络拓扑图配置VLAN和IP地址。

2、启用MSW的快速生成树，优先级为4096.

3、启用SW1的快速生成树，优先级为8192

4、启用SW2的快速生成树，优先级为默认的32768

5、查看生成树的状态

6、关闭SW1的F0/1端口，并检查PC2的业务是否能恢复。

配置关键点

MSW:

Switch>ena

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hos MSW

MSW(config)#vlan 10

MSW(config-vlan)#exit

MSW(config)#vlan 20

MSW(config-vlan)#exit

MSW(config)#ip routing

MSW(config)#int vlan 10

MSW(config-if)#ip address 192.168.1.1 255.255.255.0

MSW(config-if)#no shutdown

MSW(config-if)#exit

MSW(config)#int vlan 20

MSW(config-if)#ip address 192.168.2.1 255.255.255.0

MSW(config-if)#no shutdown

MSW(config-if)#exit

MSW(config)#int range fastEthernet 0/1-2

MSW(config-if-range)#sw tr enc do

MSW(config-if-range)#sw mo tr

MSW(config-if-range)#sw tr all vlan 10,20

MSW(config-if-range)#exit

MSW(config)#spanning-tree mode rapid-pvst //配置生成树的模式为快速生成树

MSW(config)#spanning-tree vlan 10,20 priority 4096 //配置生成树的的优先级为4096

SW1：

Switch>ena

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hos SW1

SW1(config)#vlan 10

SW1(config-vlan)#exit
SW1(config)#vlan 20
SW1(config-vlan)#exit
SW1(config)#int f 0/3
SW1(config-if)#sw mo acc
SW1(config-if)#sw acc vlan 10
SW1(config-if)#exit
SW1(config)#int range f 0/1-2
SW1(config-if-range)#sw mo tr
SW1(config-if-range)#sw tr all vlan 10,20
SW1(config-if-range)#exit
SW1(config)#spanning-tree mode rapid-pvst
SW1(config)#spanning-tree vlan 10,20 priority 8192

SW2：
Switch>ena
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hos SW2
SW2(config)#vlan 10
SW2(config-vlan)#exit
SW2(config)#vlan 20
SW2(config-vlan)#exit
SW2(config)#int f 0/3
SW2(config-if)#sw mo acc
SW2(config-if)#sw acc vlan 20
SW2(config-if)#exit
SW2(config)#int range f 0/1-2
SW2(config-if-range)#sw mo tr
SW2(config-if-range)#sw tr all vlan 10,20
SW2(config-if-range)#exit
SW2(config)#spanning-tree mode rapid-pvst

分别查看每台交换机生成树的状态显示信息：
在MSW、SW1、SW2分别使用show span summary命令查看生成树的状态
MSW为根桥，所有VLAN都是转发的，没有被生成树堵塞的。

在SW1中，VLAN20被生成树堵塞的。

SW2有VLAN10和VLAN20被生成树堵塞的。

```
SW2#sh spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for:
Extended system ID          is enabled
Portfast Default            is disabled
PortFast BPDU Guard Default is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default           is disabled
EtherChannel misconfig guard is disabled
UplinkFast                  is disabled
BackboneFast                is disabled
Configured Pathcost method used is short

Name           Blocking Listening Learning Forwarding STP Active
-------------- -------- --------- -------- ---------- ----------
VLAN0001          2        0         0         1          3
VLAN0010          2        0         0         1          3
VLAN0020          1        0         0         2          3

-------------- -------- --------- -------- ---------- ----------
3 vlans           5        0         0         4          9
```

分别在MSW、SW1、SW2使用show span active查看生成树接口的状态：

其中MSW的所有接口状态都是转发的状态

```
MSW#show spanning-tree active
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority    32769
             Address     0000.0CE9.0931
             Cost        19
             Port        1(FastEthernet0/1)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
             Address     0030.F261.95CD
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface       Role Sts Cost      Prio.Nbr Type
--------------- ---- --- --------- -------- --------------------------------
Fa0/2           Desg FWD 19        128.2    P2p
Fa0/1           Root FWD 19        128.1    P2p

VLAN0010
  Spanning tree enabled protocol rstp
  Root ID    Priority    4106
             Address     0030.F261.95CD
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    4106  (priority 4096 sys-id-ext 10)
             Address     0030.F261.95CD
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface       Role Sts Cost      Prio.Nbr Type
--------------- ---- --- --------- -------- --------------------------------
Fa0/2           Desg FWD 19        128.2    P2p
Fa0/1           Desg FWD 19        128.1    P2p

VLAN0020
  Spanning tree enabled protocol rstp
  Root ID    Priority    4116
             Address     0030.F261.95CD
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    4116  (priority 4096 sys-id-ext 20)
             Address     0030.F261.95CD
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface       Role Sts Cost      Prio.Nbr Type
--------------- ---- --- --------- -------- --------------------------------
Fa0/2           Desg FWD 19        128.2    P2p
Fa0/1           Desg FWD 19        128.1    P2p
```

SW1的所有接口状态都是转发的状态

```
SW1#show spanning-tree active
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority    32769
             Address     0000.0CE9.0931
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
             Address     0000.0CE9.0931
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface       Role Sts Cost      Prio.Nbr Type
--------------- ---- --- --------- -------- --------------------------------
Fa0/2           Desg FWD 19        128.2    P2p
Fa0/1           Desg FWD 19        128.1    P2p

VLAN0010
  Spanning tree enabled protocol rstp
  Root ID    Priority    4106
             Address     0030.F261.95CD
             Cost        19
             Port        1(FastEthernet0/1)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    8202  (priority 8192 sys-id-ext 10)
             Address     0000.0CE9.0931
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface       Role Sts Cost      Prio.Nbr Type
--------------- ---- --- --------- -------- --------------------------------
Fa0/3           Desg FWD 19        128.3    P2p
Fa0/2           Desg FWD 19        128.2    P2p
Fa0/1           Root FWD 19        128.1    P2p

VLAN0020
  Spanning tree enabled protocol rstp
  Root ID    Priority    4116
             Address     0030.F261.95CD
             Cost        19
             Port        1(FastEthernet0/1)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    8212  (priority 8192 sys-id-ext 20)
             Address     0000.0CE9.0931
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface       Role Sts Cost      Prio.Nbr Type
--------------- ---- --- --------- -------- --------------------------------
Fa0/2           Desg FWD 19        128.2    P2p
Fa0/1           Root FWD 19        128.1    P2p
```
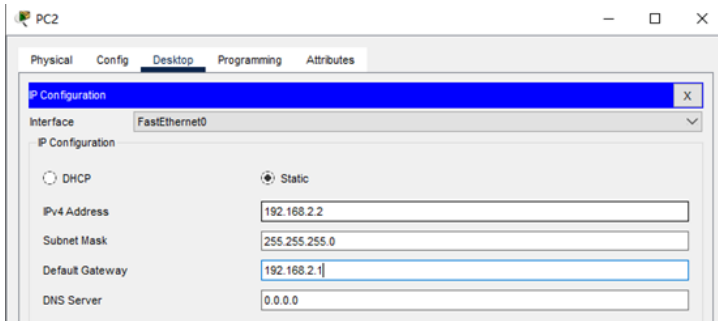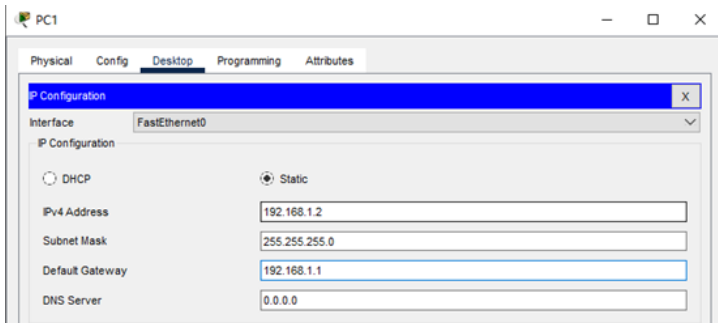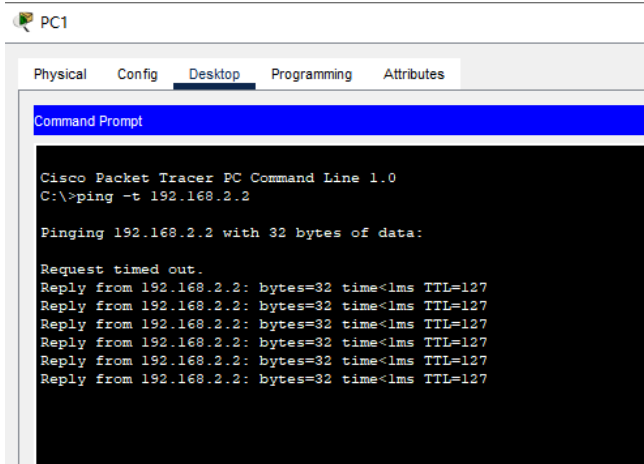
SW2的F0/2接口已经被生成树给堵塞

综上所述，快速生成树已经把环路给消除。

测试：
分别给PC填写IP地址。

在PC1能PING通PC2，同时开长PING

关闭SW2的F0/1端口，并观察业务情况，没有丢包。
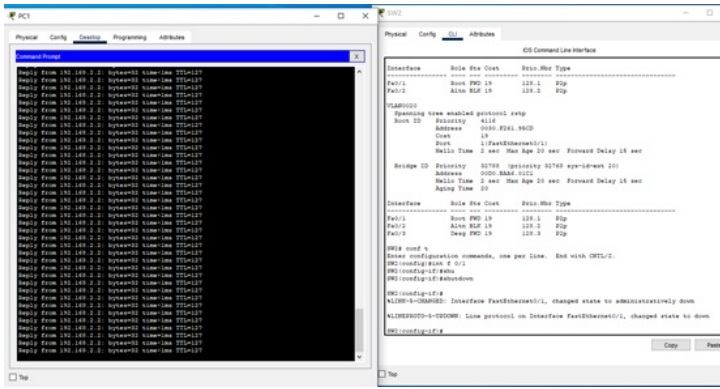
同时查看SW2的接口生成树状态，发现F0/2端口已经切换为生成树根端口。

开启SW2的F0/1端口，并观察业务情况：

丢包1个即可恢复。

查看SW2的接口生成树状态，发现状态已经切换回来。

```
SW2#show spanning-tree active
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority    32769
             Address     0000.0CE9.0931
             Cost        19
             Port        2(FastEthernet0/2)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
             Address     00D0.BAA6.01C1
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface         Role Sts Cost      Prio.Nbr Type
----------------- ---- --- --------- -------- --------------------------------
Fa0/1             Altn BLK 19        128.1    P2p
Fa0/2             Root FWD 19        128.2    P2p
VLAN0010
  Spanning tree enabled protocol rstp
  Root ID    Priority    4106
             Address     0030.F261.95CD
             Cost        19
             Port        1(FastEthernet0/1)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32770  (priority 32768 sys-id-ext 10)
             Address     00D0.BAA6.01C1
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface         Role Sts Cost      Prio.Nbr Type
----------------- ---- --- --------- -------- --------------------------------
Fa0/1             Root FWD 19        128.1    P2p
Fa0/2             Altn BLK 19        128.2    P2p
VLAN0020
  Spanning tree enabled protocol rstp
  Root ID    Priority    4116
             Address     0030.F261.95CD
             Cost        19
             Port        1(FastEthernet0/1)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32788  (priority 32768 sys-id-ext 20)
             Address     00D0.BAA6.01C1
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  20

Interface         Role Sts Cost      Prio.Nbr Type
----------------- ---- --- --------- -------- --------------------------------
Fa0/1             Root FWD 19        128.1    P2p
Fa0/2             Altn BLK 19        128.2    P2p
Fa0/3             Desg FWD 19        128.3    P2p
```
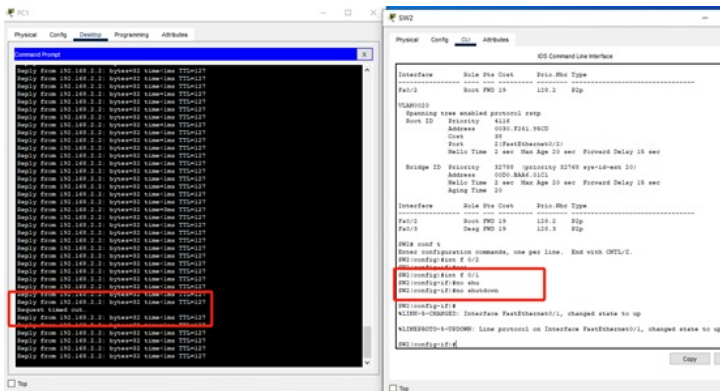
至此，思科交换机快速生成树典型组网配置案例已完成。