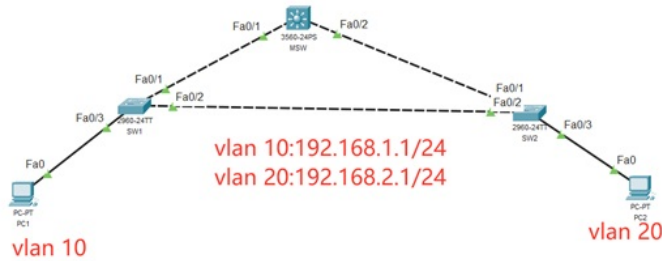


组网及说明



本案例采用思科PT模拟器来模拟PVST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PVST，优先级为4096。
- 3、启用SW1的PVST，优先级为8192
- 4、启用SW2的PVST，优先级为默认的32768
- 5、查看PVST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 pvst
```

```
MSW(config)#spanning-tree vlan 10,20 priority 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 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 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。

```

MSW#show spanning-tree summary
Switch is in pvst mode
Root bridge for: VLAN0010 VLAN0020
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	0	0	0	2	2
VLAN0010	0	0	0	2	2
VLAN0020	0	0	0	2	2
3 vlans	0	0	0	6	6

SW1所有VLAN都是转发的，没有被生成树堵塞的。

```

SW1#show spanning-tree summary
Switch is in pvst mode
Root bridge for: default
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	0	0	0	2	2
VLAN0010	0	0	0	3	3
VLAN0020	0	0	0	2	2
3 vlans	0	0	0	7	7

SW2有VLAN被生成树堵塞的。

```

[SW1]show spanning-tree summary
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 1 0 0 0 1 2
VLAN0010 1 0 0 0 1 2
VLAN0020 1 0 0 0 2 3
-----
3 vlans 3 0 0 4 7
SW1#

```

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 ieee
Root ID Priority 32768
Address 0030.0C29.0991
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32768 (priority 32768 sys-id-ext 1)
Address 0030.F241.95CD
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 ieee
Root ID Priority 4104
Address 0030.F241.95CD
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 4104 (priority 4096 sys-id-ext 10)
Address 0030.F241.95CD
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 ieee
Root ID Priority 4116
Address 0030.F241.95CD
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.F241.95CD
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
MSW#

```

SW1的所有接口状态都是转发的状态

```

[SW1] show spanning-tree active
Spanning tree enabled protocol ieee
Root ID Priority 32768
Address 0030.0C29.0991
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32768 (priority 32768 sys-id-ext 1)
Address 0030.0C29.0991
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 ieee
Root ID Priority 4104
Address 0030.F241.95CD
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 4104 (priority 4096 sys-id-ext 10)
Address 0030.0C29.0991
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 ieee
Root ID Priority 4116
Address 0030.F241.95CD
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 4116 (priority 4112 sys-id-ext 20)
Address 0030.0C29.0991
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#

```

SW2的F0/2接口已经被生成树给堵塞

```

[SW2] show spanning-tree active
VLAN0001
Spanning tree enabled protocol ieee
Root ID Priority 32768
Address 0030.0C29.0991
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32768 (priority 32768 sys-id-ext 1)
Address 0030.8A86.62C1
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

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

VLAN0010
Spanning tree enabled protocol ieee
Root ID Priority 4116
Address 0030.F241.95CD
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32768 (priority 32768 sys-id-ext 20)
Address 0030.8A86.62C1
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

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

VLAN0020
Spanning tree enabled protocol ieee
Root ID Priority 4104
Address 0030.F241.95CD
Cost 15
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32768 (priority 32768 sys-id-ext 10)
Address 0030.8A86.62C1
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

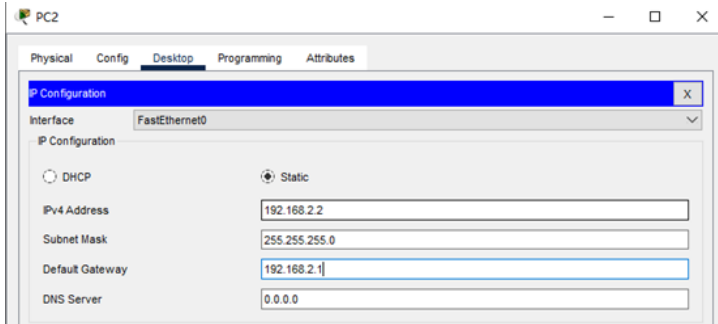
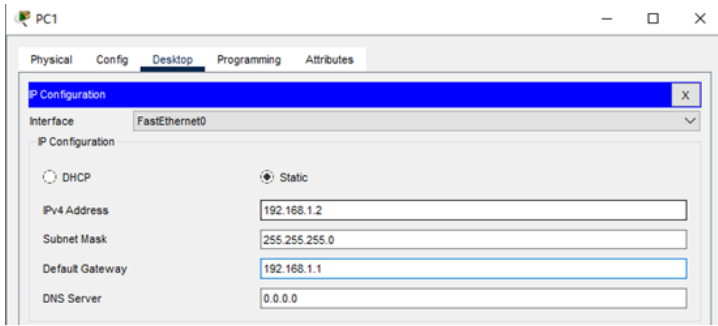
Interface Role Sts Cost Prio.Nbr Type
-----
Fa0/2 Root FWD 19 128.2 P2p
Fa0/1 Desg FWD 19 128.1 P2p
SW2#

```

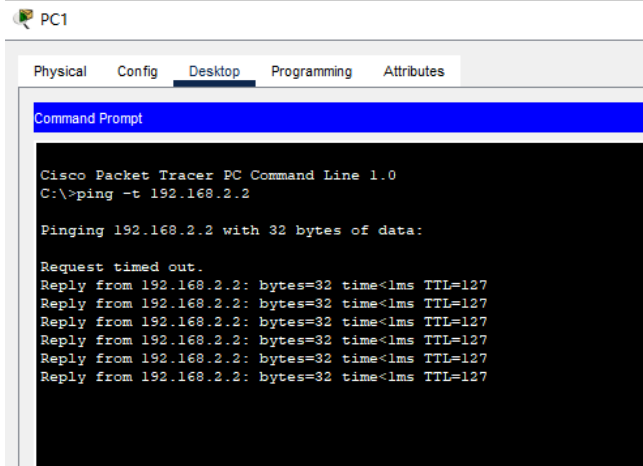
综上所述，PVST已经把环路给消除。

测试：

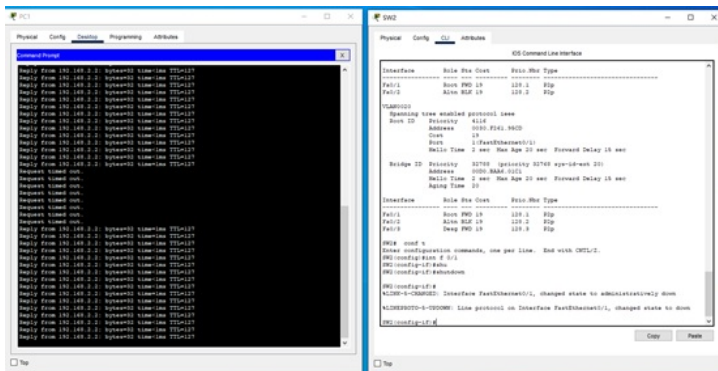
分别给PC填写IP地址。



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：



丢包8个即可恢复业务。

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。

```

SW2#show spanning-tree active
VLAN0001
Spanning tree enabled protocol ieee
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.BA46.01C1
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 ieee
Root ID Priority 4106
Address 0030.F241.95CD
Cost 38
Port 2 (FastEthernet0/2)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 00D0.BA46.01C1
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

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

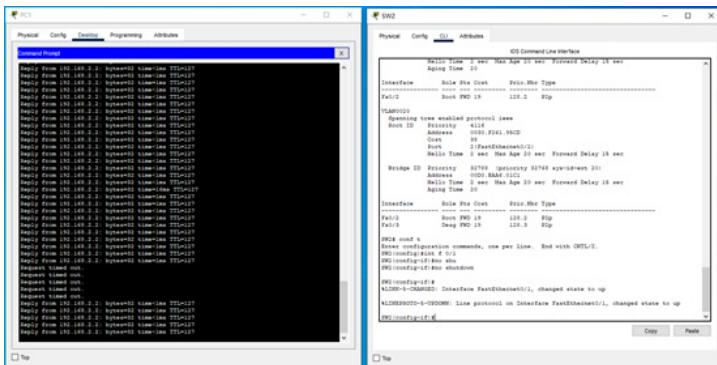
VLAN0020
Spanning tree enabled protocol ieee
Root ID Priority 4114
Address 0030.F241.95CD
Cost 38
Port 2 (FastEthernet0/2)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32788 (priority 32768 sys-id-ext 20)
Address 00D0.BA46.01C1
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

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

```

开启SW2的F0/1端口，并观察业务情况：



丢包5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 ieee
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.BA46.01C1
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 ieee
Root ID Priority 4106
Address 0030.F241.95CD
Cost 19
Port 1 (FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 00D0.BA46.01C1
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 ieee
Root ID Priority 4114
Address 0030.F241.95CD
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.BA46.01C1
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PVST生成树典型组网配置案例已完成。