解决由于路径开销不匹配导致的STP根不一致问题

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简介

本文档介绍接入交换机和分布交换机之间的路径开销不匹配导致的生成树协议(STP)根不一致。

先决条件

要求

Cisco建议您了解STP概念。

使用的组件

本文档不限于特定的软件和硬件版本。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

功能描述

根防护功能提供了在网络中强制执行根网桥安置的方法。

根防护可确保启用了根防护的端口为指定端口。通常，除非根网桥的两个或多个端口连接在一起，否则根网桥端口全部为指定端口。如果网桥在启用了根防护的端口上收到高级 STP 网桥协议数据单元 (BPDU)，根防护会将此端口转换为根不一致 STP 状态。此根不一致状态实际上等效于监听状态。此时不会通过此端口转发任何流量。根防护以这种方式强制确定根网桥的位置。

问题

本部分中的示例说明当接入交换机和分布交换机之间的路径开销不匹配时，向网络添加新接入交换机如何导致根防护端口在分布交换机上进入根不一致状态。

在图1中，交换机1和交换机2构成网络的分布层，交换机1充当偶数VLAN的根网桥，交换机2充当奇数VLAN的根网桥。交换机1和交换机2之间已建立第2层PortChannel。交换机3用作接入层交换机。对于奇数VLAN，交换机1和交换机3之间的链路在交换机3端被阻塞；而对于偶数VLAN，交换机2和交换机3之间的链路在交换机3端被阻塞。

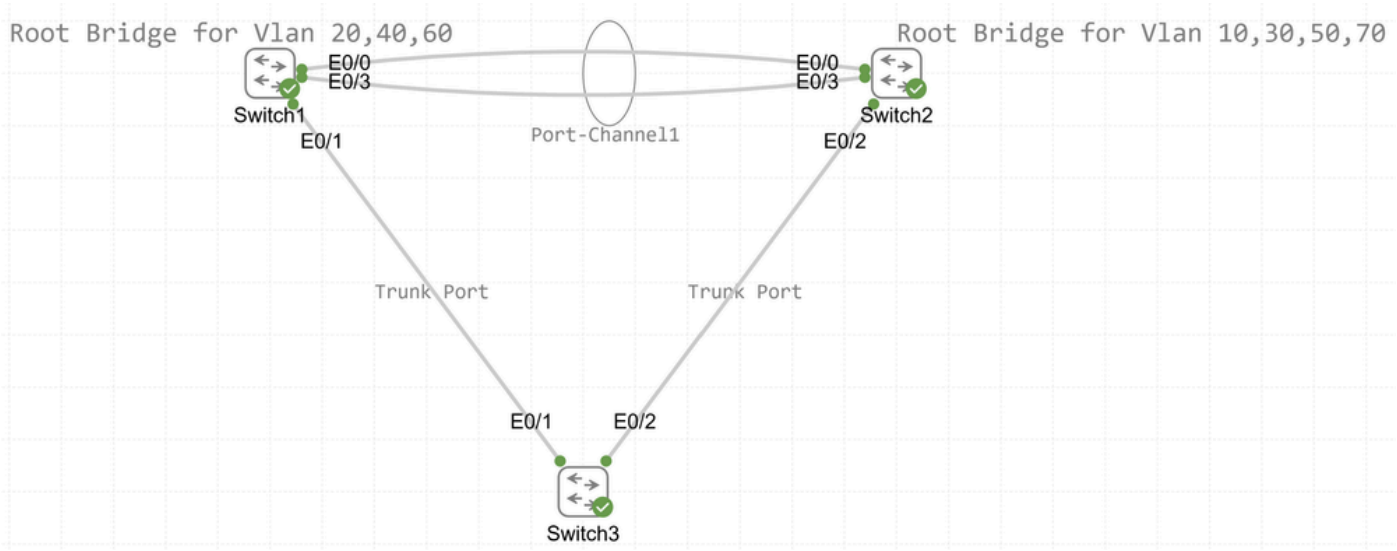


图1.分布层交换机和接入层交换机的连通性

```
SW1#show spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for: VLAN0001, VLAN0020, VLAN0040, VLAN0060
EtherChannel misconfig guard is enabled
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
UplinkFast is disabled
BackboneFast is disabled
Configured Pathcost method used is long
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0001 0 0 0 3 3
VLAN0010 0 0 0 2 2
VLAN0020 0 0 0 2 2
VLAN0030 0 0 0 2 2
VLAN0040 0 0 0 2 2
VLAN0050 0 0 0 2 2
VLAN0060 0 0 0 2 2
VLAN0070 0 0 0 2 2
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
---------------------- -------- --------- -------- ---------- ----------
8 vlans 0 0 0 17 17
```

SW1所有Vlan均处于转发状态

```
SW1#show spanning-tree vlan 10
VLAN0010
Spanning tree enabled protocol rstp
Root ID Priority 24586
Address aabb.cc00.0400
Cost 1000000
Port 65 (Port-channel1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address aabb.cc00.0300
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
Interface Role Sts Cost Prio.Nbr Type
------------------ ---- --- --------- -------- --------------------------------
Et0/1 Desg FWD 2000000 128.2 P2p
Po1 Root FWD 1000000 128.65 P2p

SW1#show spanning-tree vlan 20
VLAN0020
Spanning tree enabled protocol rstp
Root ID Priority 24596
Address aabb.cc00.0300
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 24596 (priority 24576 sys-id-ext 20)
Address aabb.cc00.0300
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Aging Time 300 sec
Interface Role Sts Cost Prio.Nbr Type
------------------ ---- --- --------- -------- --------------------------------
Et0/1 Desg FWD 2000000 128.2 P2p
Po1 Desg FWD 1000000 128.65 P2p

SW1#show running-config | section spanning
spanning-tree vlan 20,40,60 priority 24576
```

SW1生成树，用于Vlan10和Vlan20

```
SW2#show spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for: VLAN0010, VLAN0030, VLAN0050, VLAN0070
EtherChannel misconfig guard is enabled
Extended system ID is enabled
Portfast Default is disabled
PortFast BPD
U Guard Default is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default is disabled
UplinkFast is disabled
BackboneFast is disabled
Configured Pathcost method used is long
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0001 0 0 0 3 3
VLAN0010 0 0 0 2 2
VLAN0020 0 0 0 2 2
VLAN0030 0 0 0 2 2
VLAN0040 0 0 0 2 2
VLAN0050 0 0 0 2 2
VLAN0060 0 0 0 2 2
VLAN0070 0 0 0 2 2
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
---------------------- -------- --------- -------- ---------- ----------
8 vlans 0 0 0 17 17

SW2#show spanning-tree vlan 10
VLAN0010
Spanning tree enabled protocol rstp
Root ID Priority 24586
Address aabb.cc00.0400
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 24586 (priority 24576 sys-id-ext 10)
Address aabb.cc00.0400
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
Interface Role Sts Cost Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Et0/2 Desg FWD 2000000 128.3 P2p
Po1 Desg FWD 1000000 128.65 P2p
```

SW2所有Vlan均处于转发状态

```
SW2#show spanning-tree vlan 20
VLAN0020
Spanning tree enabled protocol rstp
Root ID Priority 24596
Address aabb.cc00.0300
Cost 1000000
Port 65 (Port-channel1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32788 (priority 32768 sys-id-ext 20)
Address aabb.cc00.0400
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
Interface Role Sts Cost Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Et0/2 Desg FWD 2000000 128.3 P2p
Po1 Root FWD 1000000 128.65 P2p

SW2#show running-config | section spanning
spanning-tree vlan 10,30,50,70 priority 24576
```

SW2生成树，用于Vlan20

```
SW3#show spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for: none
EtherChannel misconfig guard is enabled
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
UplinkFast is disabled
BackboneFast is disabled
Configured Pathcost method used is long
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0001 1 0 0 3 4
VLAN0010 1 0 0 1 2
VLAN0020 1 0 0 1 2
VLAN0030 1 0 0 1 2
VLAN0040 1 0 0 1 2
VLAN0050 1 0 0 1 2
VLAN0060 1 0 0 1 2
VLAN0070 1 0 0 1 2
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
---------------------- -------- --------- -------- ---------- ----------
8 vlans 8 0 0 10 18

SW3#show spanning-tree blockedports
Name Blocked Interfaces List
-------------------- ------------------------------------
VLAN0001 Et0/2
VLAN0010 Et0/1
VLAN0020 Et0/2
VLAN0030 Et0/1
VLAN0040 Et0/2
VLAN0050 Et0/1
VLAN0060 Et0/2
VLAN0070 Et0/1
Number of blocked ports (segments) in the system : 8
```

SW3阻止的奇数和偶数个Vlan的端口详细信息

```
SW3#show spanning-tree blockedports
Name Blocked Interfaces List
-------------------- ------------------------------------
VLAN0001 Et0/2
VLAN0010 Et0/1
VLAN0020 Et0/2
VLAN0030 Et0/1
VLAN0040 Et0/2
VLAN0050 Et0/1
VLAN0060 Et0/2
VLAN0070 Et0/1
Number of blocked ports (segments) in the system : 8

SW3#show spanning-tree root port
VLAN0001 Ethernet0/1
VLAN0010 Ethernet0/2
VLAN0020 Ethernet0/1
VLAN0030 Ethernet0/2
VLAN0040 Ethernet0/1
VLAN0050 Ethernet0/2
VLAN0060 Ethernet0/1
VLAN0070 Ethernet0/2
```

SW3根端口有关奇数和偶数个Vlan的详细信息

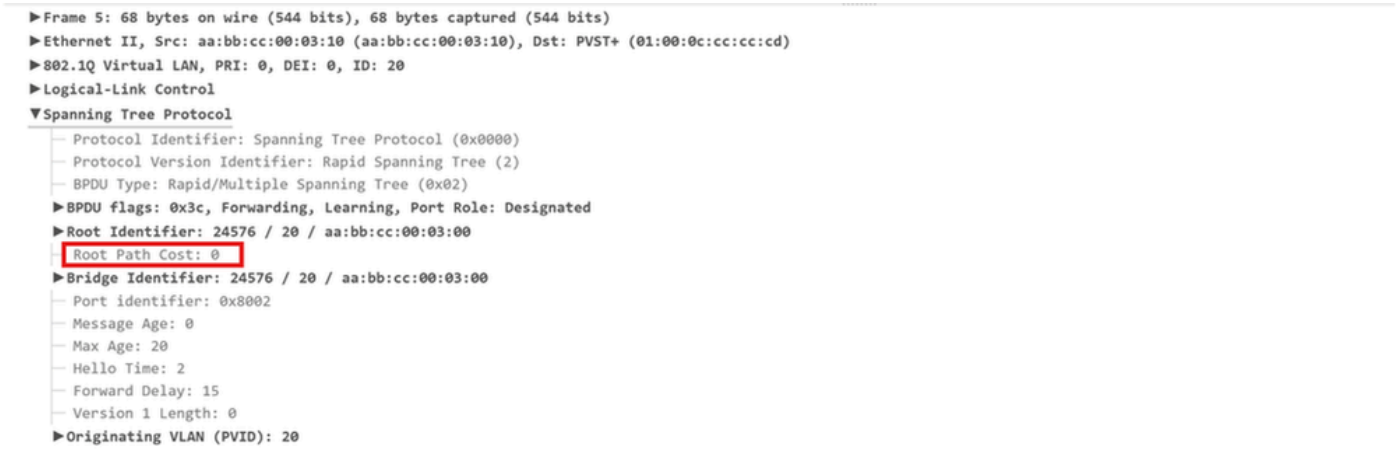
```
SW3#show spanning-tree vlan 10
VLAN0010
Spanning tree enabled protocol rstp
Root ID Priority 24586
Address aabb.cc00.0400
Cost 2000000
Port 3 (Ethernet0/2)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address aabb.cc00.0500
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
Interface Role Sts Cost Prio.Nbr Type
------------------ ---- --- --------- -------- --------------------------------
Et0/1 Altn BLK 2000000 128.2 P2p
Et0/2 Root FWD 2000000 128.3 P2p

SW3#show spanning-tree vlan 20
VLAN0020
Spanning tree enabled protocol rstp
Root ID Priority 24596
Address aabb.cc00.0300
Cost 2000000
Port 2 (Ethernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32788 (priority 32768 sys-id-ext 20)
Address aabb.cc00.0500
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec
Interface Role Sts Cost Prio.Nbr Type
------------------ ---- --- --------- -------- --------------------------------
Et0/1 Root FWD 2000000 128.2 P2p
Et0/2 Altn BLK 2000000 128.3 P2p
```

SW3生成树，用于Vlan10和Vlan20

在Switch3 Eth0/1端口上捕获的数据包表明，从Switch1收到的VLAN20的STP帧的根路径开销为

0，以到达根网桥。



SW3 Eth0/1端口上用于Vlan20的数据包捕获

在Switch3 Eth0/2端口上捕获的数据包表明，从Switch2收到的VLAN20的STP帧到达根网桥的根路径开销为1000000。

SW3 Eth0/2端口上用于Vlan20的数据包捕获

在Switch3 Eth0/1端口上捕获的数据包表明，从Switch1收到的VLAN10的STP帧到达根网桥的根路径开销为1000000。

SW3 Eth0/1端口上用于Vlan10的数据包捕获

在Switch3 Eth0/2端口上捕获的数据包显示，从Switch2收到的VLAN10的STP帧具有到达根网桥的根路径开销0。

```
▶Frame 6: 68 bytes on wire (544 bits), 68 bytes captured (544 bits)
▶Ethernet II, Src: aa:bb:cc:00:04:20 (aa:bb:cc:00:04:20), Dst: PVST+ (01:00:0c:cc:cc:cd)
▶802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10
▶Logical-Link Control
▼Spanning Tree Protocol
    Protocol Identifier: Spanning Tree Protocol (0x0000)
    Protocol Version Identifier: Rapid Spanning Tree (2)
    BPDU Type: Rapid/Multiple Spanning Tree (0x02)
  ▶BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
  ▶Root Identifier: 24576 / 10 / aa:bb:cc:00:04:00
    Root Path Cost: 0
  ▶Bridge Identifier: 24576 / 10 / aa:bb:cc:00:04:00
    Port identifier: 0x8003
    Message Age: 0
    Max Age: 20
    Hello Time: 2
    Forward Delay: 15
    Version 1 Length: 0
  ▶Originating VLAN (PVID): 10
```

SW3 Eth0/2端口上用于Vlan10的数据包捕获

现在，接入交换机 — 交换机3发生故障，已被新的接入交换机取代。在网络中添加新的接入交换机（交换机3）后，发现STP阻塞了分布交换机上的端口，并且交换机1和交换机2上的指定端口进入了“根不一致”状态。

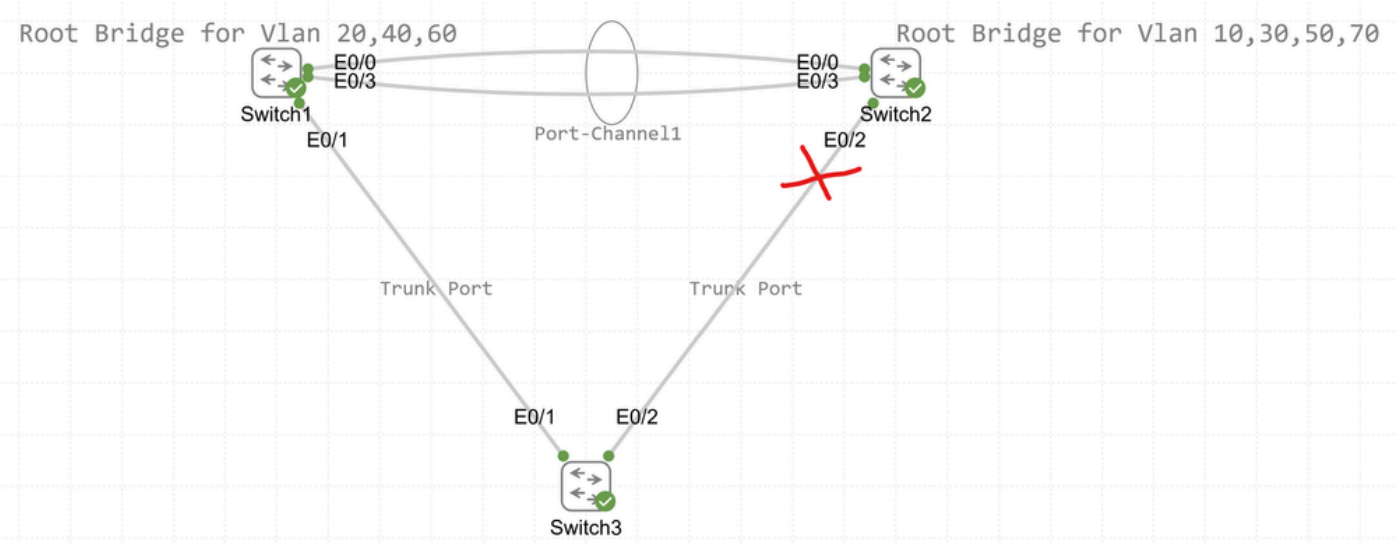


图 2：交换机2的Eth0/2端口变为阻塞状态

此图显示交换机2的Eth0/2端口进入偶数VLAN的阻塞模式。

交换机1是VLAN 20、40、60的根网桥，通过PO1到达交换机2上的根网桥的开销为1000000，通过Eth0/2到达根网桥的开销为2000100(2000000+100)。
交换机3在Eth0/1上到达根桥的开销为100，通过Eth0/2到达根桥的开销为1000100。
由于交换机2的Eth0/2开销较高，因此它阻塞了VLAN 20、40、60的端口Eth0/2。

Feb 10 04:31:55.516: %SPANTREE-2-ROOTGUARD_BLOCK: Received a superior STP BPDU from bridge aabb.cc00.0500. Root guard blocking port Ethernet0/2 on VLAN0060. Feb 10 04:32:26.086: %SPANTREE-2-ROOTGUARD_BLOCK: Received a superior STP BPDU from bridge aabb.cc00.0500. Root guard blocking port Ethernet0/2 on VLAN0040

```
SW2#show spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for: VLAN0010, VLAN0030, VLAN0050, VLAN0070
EtherChannel misconfig guard is enabled
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
UplinkFast is disabled
BackboneFast is disabled
Configured Pathcost method used is long
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0001 1 0 0 2 3
VLAN0010 0 0 0 2 2
VLAN0020 1 0 0 1 2
VLAN0030 0 0 0 2 2
VLAN0040 1 0 0 1 2
VLAN0050 0 0 0 2 2
VLAN0060 1 0 0 1 2
VLAN0070 0 0 0 2 2
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
---------------------- -------- --------- -------- ---------- ----------
8 vlans 4 0 0 13 17

SW2#show spanning-tree blockedports
Name Blocked Interfaces List
-------------------- ------------------------------------
VLAN0001 Et0/2
VLAN0020 Et0/2
VLAN0040 Et0/2
VLAN0060 Et0/2
Number of blocked ports (segments) in the system : 4

SW2#show spanning-tree inconsistentports
Name Interface Inconsistency
-------------------- ------------------------------ ------------------
VLAN0001 Ethernet0/2 Root Inconsistent
VLAN0020 Ethernet0/2 Root Inconsistent
VLAN0040 Ethernet0/2 Root Inconsistent
VLAN0060 Ethernet0/2 Root Inconsistent
Number of inconsistent ports (segments) in the system : 4
```

即使没有Vlan，SW2根不一致端口详细信息

```
SW2#show spanning-tree vlan 20,40,60 | include P2p
Et0/2 Desg BKN*2000000 128.3 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p
Et0/2 Desg BKN*2000000 128.3 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p
Et0/2 Desg BKN*2000000 128.3 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p

SW3#show spanning-tree vlan 20,40,60 | include P2p
Et0/1 Root FWD 100 128.2 P2p
Et0/2 Desg FWD 100 128.3 P2p
Et0/1 Root FWD 100 128.2 P2p
Et0/2 Desg FWD 100 128.3 P2p
Et0/1 Root FWD 100 128.2 P2p
Et0/2 Desg FWD 100 128.3 P2p

SW3#show spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for: none
EtherChannel misconfig guard is enabled
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
UplinkFast is disabled
BackboneFast is disabled
Configured Pathcost method used is short
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0001 0 0 0 4 4
VLAN0010 0 0 0 2 2
VLAN0020 0 0 0 2 2
VLAN0030 0 0 0 2 2
VLAN0040 0 0 0 2 2
VLAN0050 0 0 0 2 2
VLAN0060 0 0 0 2 2
VLAN0070 0 0 0 2 2
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
---------------------- -------- --------- -------- ---------- ----------
8 vlans 0 0 0 18 18
```

SW3所有Vlan均处于转发状态

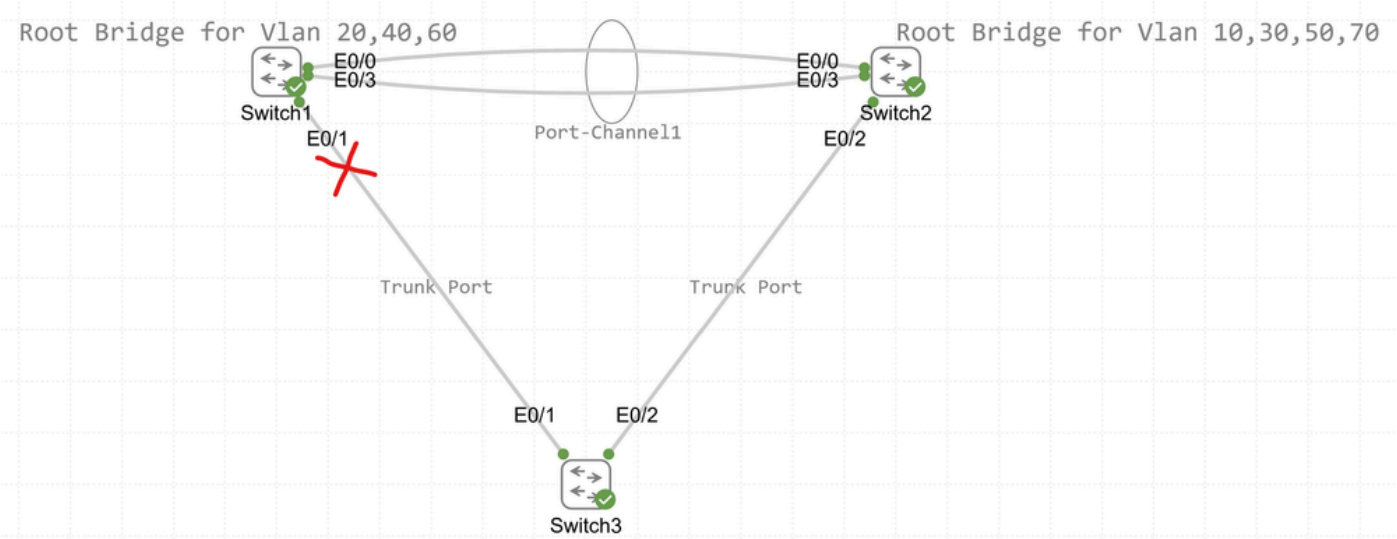


图 3：交换机1的Eth0/1端口变为阻塞状态

此图显示交换机1的Eth0/1端口为奇数VLAN进入阻塞模式。

交换机2是VLAN 10、30、50、70的根网桥，通过PO1到达交换机1上的根网桥的开销为1000000，通过Eth0/1到达根网桥的开销为2000100(2000000+100)。
交换机3在Eth0/2上到达根桥的开销为100，通过Eth0/1到达根桥的开销为1000100。
由于交换机1的Eth0/1开销较高，因此它阻塞了VLAN 10、30、50、70的端口Eth0/2。

Feb 10 14:49:58.952: %SPANTREE-2-ROOTGUARD_BLOCK: Received a superior STP BPDU from bridge aabb.cc00.0500. Root guard blocking port Ethernet0/1 on VLAN0010.

```
SW1#show spanning-tree inconsistentports
Name Interface Inconsistency
------------------- ------------------------------ ------------------
VLAN0010 Ethernet0/1 Root Inconsistent
VLAN0030 Ethernet0/1 Root Inconsistent
VLAN0050 Ethernet0/1 Root Inconsistent
VLAN0070 Ethernet0/1 Root Inconsistent
Number of inconsistent ports (segments) in the system : 4

SW1#show spanning-tree blockedports
Name Blocked Interfaces List
------------------- ------------------------------ ------------------
VLAN0010 Ethernet0/1
VLAN0030 Ethernet0/1
VLAN0050 Ethernet0/1
VLAN0070 Ethernet0/1
Number of blocked ports (segments) in the system : 4

SW1#show spanning-tree vlan 10,30,50,70 | include P2p
Et0/1 Desg BKN*2000000 128.2 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p
Et0/1 Desg BKN*2000000 128.2 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p
Et0/1 Desg BKN*2000000 128.2 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p
Et0/1 Desg BKN*2000000 128.2 P2p *ROOT_Inc
Po1 Root FWD 1000000 128.65 P2p

SW3#show spanning-tree vlan 10,30,50,70 | include P2p
Et0/1 Desg FWD 100 128.2 P2p
Et0/2 Root FWD 100 128.3 P2p
Et0/1 Desg FWD 100 128.2 P2p
Et0/2 Root FWD 100 128.3 P2p
Et0/1 Desg FWD 100 128.2 P2p
Et0/2 Root FWD 100 128.3 P2p
Et0/1 Desg FWD 100 128.2 P2p
Et0/2 Root FWD 100 128.3 P2p
```

SW1根不一致Vlan奇数的端口详细信息

在Switch1 Eth0/1端口上捕获的数据包表明，从Switch3收到的VLAN10的STP帧到达根网桥的根路径开销为100。

```
▶Frame 4: 68 bytes on wire (544 bits), 68 bytes captured (544 bits)
▶Ethernet II, Src: aa:bb:cc:00:05:10 (aa:bb:cc:00:05:10), Dst: PVST+ (01:00:0c:cc:cc:cd)
▶802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10
▶Logical-Link Control
▼Spanning Tree Protocol
    Protocol Identifier: Spanning Tree Protocol (0x0000)
    Protocol Version Identifier: Rapid Spanning Tree (2)
    BPDU Type: Rapid/Multiple Spanning Tree (0x02)
  ▶BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
  ▶Root Identifier: 24576 / 10 / aa:bb:cc:00:04:00
    Root Path Cost: 100
  ▶Bridge Identifier: 32768 / 10 / aa:bb:cc:00:05:00
    Port identifier: 0x8002
    Message Age: 1
    Max Age: 20
    Hello Time: 2
    Forward Delay: 15
    Version 1 Length: 0
  ▶Originating VLAN (PVID): 10
```

在SW1的Eth0/1上为Vlan10捕获数据包

在交换机2 Eth0/2端口上捕获的数据包表明，从交换机3接收的VLAN20的STP帧到达根网桥的根路径开销为100。

```
▶Frame 3: 68 bytes on wire (544 bits), 68 bytes captured (544 bits)
▶Ethernet II, Src: aa:bb:cc:00:05:20 (aa:bb:cc:00:05:20), Dst: PVST+ (01:00:0c:cc:cc:cd)
▶802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20
▶Logical-Link Control
▼Spanning Tree Protocol
    Protocol Identifier: Spanning Tree Protocol (0x0000)
    Protocol Version Identifier: Rapid Spanning Tree (2)
    BPDU Type: Rapid/Multiple Spanning Tree (0x02)
  ▶BPDU flags: 0x3c, Forwarding, Learning, Port Role: Designated
  ▶Root Identifier: 24576 / 20 / aa:bb:cc:00:03:00
    Root Path Cost: 100
  ▶Bridge Identifier: 32768 / 20 / aa:bb:cc:00:05:00
    Port identifier: 0x8003
    Message Age: 1
    Max Age: 20
    Hello Time: 2
    Forward Delay: 15
    Version 1 Length: 0
  ▶Originating VLAN (PVID): 20
```

SW2 Eth0/2端口上为Vlan20捕获的数据包

交换机3使用指定为“短”的路径开销方法集成到网络中。 相比之下，交换机1和交换机2采用路径开销方法，分类为“长”。 交换机3将上级BPDU传输到交换机1和交换机2。收到上级BPDU后，根防护将端口置于根不一致STP状态。

解决方案

当pathcost配置在接入交换机3上从“short”更改为“long”时，解决了此问题。

```
SW3(config)#spanning-tree pathcost method long

SW1#
*Feb 10 08:07:40.188: %SPANTREE-2-ROOTGUARD_UNBLOCK: Root guard unblocking port Ethernet0/1 on VLAN0010

SW2#
```

```
*Feb 10 08:07:39.188: %SPANTREE-2-ROOTGUARD_UNBLOCK: Root guard unblocking port Ethernet0/2 on VLAN0020
*Feb 10 08:07:40.188: %SPANTREE-2-ROOTGUARD_UNBLOCK: Root guard unblocking port Ethernet0/2 on VLAN0040
```

```
SW1#show spanning-tree vlan 10,30,50,70 | include P2p
Et0/1 Desg FWD 2000000 128.2 P2p
Po1 Root FWD 1000000 128.65 P2p
Et0/1 Desg FWD 2000000 128.2 P2p
Po1 Root FWD 1000000 128.65 P2p
Et0/1 Desg FWD 2000000 128.2 P2p
Po1 Root FWD 1000000 128.65 P2p
Et0/1 Desg FWD 2000000 128.2 P2p
Po1 Root FWD 1000000 128.65 P2p

SW2#show spanning-tree vlan 20,40,60 | include P2p
Et0/2 Desg FWD 2000000 128.3 P2p
Po1 Root FWD 1000000 128.65 P2p
Et0/2 Desg FWD 2000000 128.3 P2p
Po1 Root FWD 1000000 128.65 P2p
Et0/2 Desg FWD 2000000 128.3 P2p
Po1 Root FWD 1000000 128.65 P2p

SW3#show spanning-tree vlan 20,40,60 | include P2p
Et0/1 Root FWD 2000000 128.2 P2p
Et0/2 Altn BLK 2000000 128.3 P2p
Et0/1 Root FWD 2000000 128.2 P2p
Et0/2 Altn BLK 2000000 128.3 P2p
Et0/1 Root FWD 2000000 128.2 P2p
Et0/2 Altn BLK 2000000 128.3 P2p
```

SW3的Eth0/2变为阻塞状态，即使没有Vlan

```
SW3#show spanning-tree vlan 10,30,50,70 | include P2p
Et0/1 Altn BLK 2000000 128.2 P2p
Et0/2 Root FWD 2000000 128.3 P2p
Et0/1 Altn BLK 2000000 128.2 P2p
Et0/2 Root FWD 2000000 128.3 P2p
Et0/1 Altn BLK 2000000 128.2 P2p
Et0/2 Root FWD 2000000 128.3 P2p
Et0/1 Altn BLK 2000000 128.2 P2p
Et0/2 Root FWD 2000000 128.3 P2p

SW3#show spanning-tree summary
Switch is in rapid-pvst mode
Root bridge for: none
EtherChannel misconfig guard is enabled
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
UplinkFast is disabled
BackboneFast is disabled
Configured Pathcost method used is long
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
VLAN0001 1 0 0 3 4
VLAN0010 1 0 0 1 2
VLAN0020 1 0 0 1 2
VLAN0030 1 0 0 1 2
VLAN0040 1 0 0 1 2
VLAN0050 1 0 0 1 2
VLAN0060 1 0 0 1 2
VLAN0070 1 0 0 1 2
Name Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
---------------------- -------- --------- -------- ---------- ----------
8 vlans 8 0 0 10 18
```

SW3的Eth0/1变为阻塞状态，因为Vlan为奇数

关于此翻译
思科采用人工翻译与机器翻译相结合的方式将此文档翻译成不同语言，希望全球的用户都能通过各自的语言得到支持性的内容。

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