

# Troubleshoot STP Root Inconsistency Due to Path Cost Mismatch

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## Introduction

This document describes the Spanning Tree Protocol (STP) Root Inconsistency due to Path Cost Mismatch between access and distribution switch.

## Prerequisites

### Requirements

Cisco recommends that you have knowledge of STP concepts.

### Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

## Feature Description

The root guard feature provides a way to enforce the root bridge placement in the network.

The root guard ensures that the port on which root guard is enabled is the designated port. Normally, root bridge ports are all designated ports, unless two or more ports of the root bridge are connected together. If the bridge receives superior STP Bridge Protocol Data Units (BPDUs) on a root guard-enabled port, root guard moves this port to a root-inconsistent STP state. This root-inconsistent state is effectively equal to a listening state. No traffic is forwarded across this port. In this way, the root guard enforces the position of the root bridge.

## Problem

The example in this section illustrates how the addition of a new access switch to the network can cause the root guard port to enter a root inconsistency state on the distribution switch when there is a path cost mismatch between the access and distribution switches.

In Image 1, Switches 1 and 2 constitute the distribution layer of the network, with Switch 1 serving as the root bridge for Even VLANs and Switch 2 acting as the root bridge for Odd VLANs. A Layer 2 PortChannel has been established between Switch 1 and Switch 2. Switch 3 functions as an access layer switch. The link between Switch 1 and Switch 3 is blocked on the Switch 3 side for Odd VLANs, while the link between Switch 2 and Switch 3 is blocked on the Switch 3 side for Even VLANs.

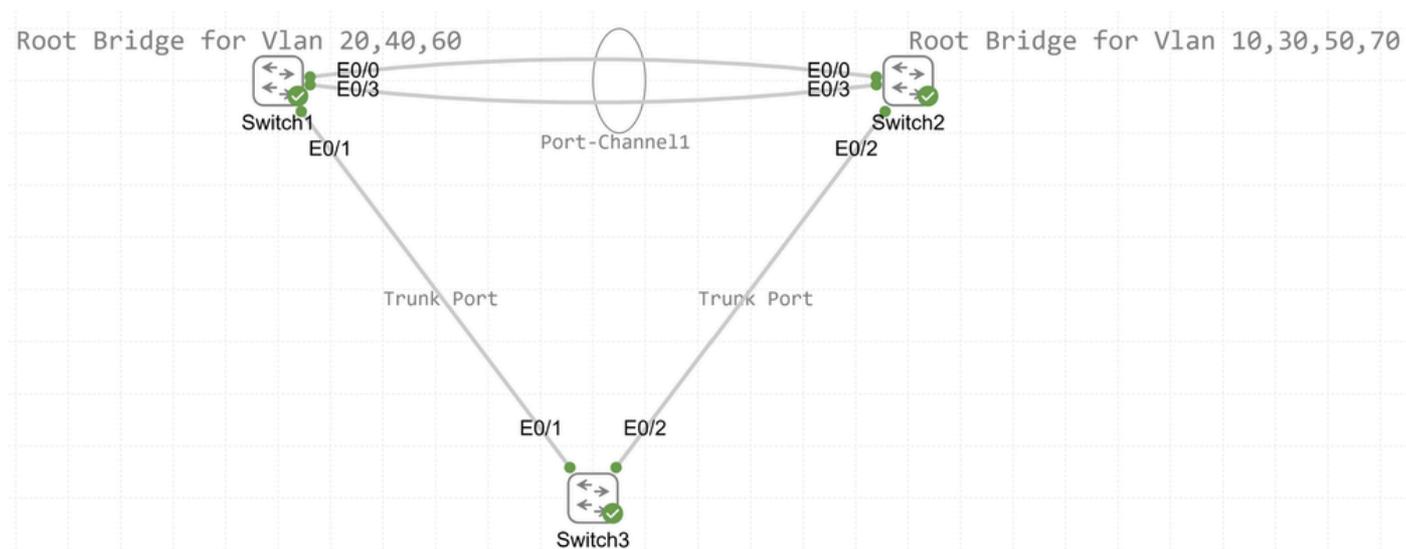


Figure 1. Distribution and Access Switch Connectivity

```
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 all Vlans are in Forwarding State

```

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 Spanning-Tree for Vlan10 and 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 all Vlans are in Forwarding state
```

```

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-channell)
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 Spanning-Tree for 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 Blocked port details for Odd and Even no of Vlans*

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 Root Port Details for Odd and Even no of Vlans*

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 Spanning-Tree for Vlan10 and Vlan20*

Packet capture taken on Switch3 Eth0/1 port indicates that the STP frame received from Switch1 for VLAN20 has a Root Path Cost of 0 to reach the root bridge.

```

▶Frame 5: 68 bytes on wire (544 bits), 68 bytes captured (544 bits)
▶Ethernet II, Src: aa:bb:cc:00:03:10 (aa:bb:cc:00:03:10), 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: 0
  ▶Bridge Identifier: 24576 / 20 / aa:bb:cc:00:03:00
  - Port identifier: 0x8002
  - Message Age: 0
  - Max Age: 20
  - Hello Time: 2
  - Forward Delay: 15
  - Version 1 Length: 0
  ▶Originating VLAN (PVID): 20

```

*Packet Capture on SW3 Eth0/1 port for Vlan20*

Packet capture taken on Switch3 Eth0/2 port indicates that the STP frame received from Switch2 for VLAN20 has a Root Path Cost of 1000000 to reach the root bridge.

```

▶Frame 7: 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: 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: 1000000
  ▶Bridge Identifier: 32768 / 20 / aa:bb:cc:00:04:00
  - Port identifier: 0x8003
  - Message Age: 1
  - Max Age: 20
  - Hello Time: 2
  - Forward Delay: 15
  - Version 1 Length: 0
  ▶Originating VLAN (PVID): 20

```

*Packet Capture on SW3 Eth0/2 port for Vlan20*

Packet capture taken on Switch3 Eth0/1 port indicates that the STP frame received from Switch1 for VLAN10 has a Root Path Cost of 1000000 to reach the root bridge.

```

▶Frame 4: 68 bytes on wire (544 bits), 68 bytes captured (544 bits)
▶Ethernet II, Src: aa:bb:cc:00:03:10 (aa:bb:cc:00:03:10), 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: 1000000
  ▶Bridge Identifier: 32768 / 10 / aa:bb:cc:00:03:00
  - Port identifier: 0x8002
  - Message Age: 1
  - Max Age: 20
  - Hello Time: 2
  - Forward Delay: 15
  - Version 1 Length: 0
  ▶Originating VLAN (PVID): 10

```

*Packet Capture on SW3 Eth0/1 port for Vlan10*

Packet capture taken on Switch3 Eth0/2 port shows that that STP frame received from Switch2 for VLAN10 has Root Path Cost 0 to reach root bridge.

```

▶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

```

Packet Capture on SW3 Eth0/2 port for Vlan10

Now, the Access Switch - Switch 3 has encountered a fault and has been replaced with a new Access Switch. Upon the addition of the new Access Switch (Switch 3) to the network, it is observed that STP blocked the port on the distribution switch, and the designated ports on Switch 1 and Switch 2 entered a 'Root Inconsistency' state.

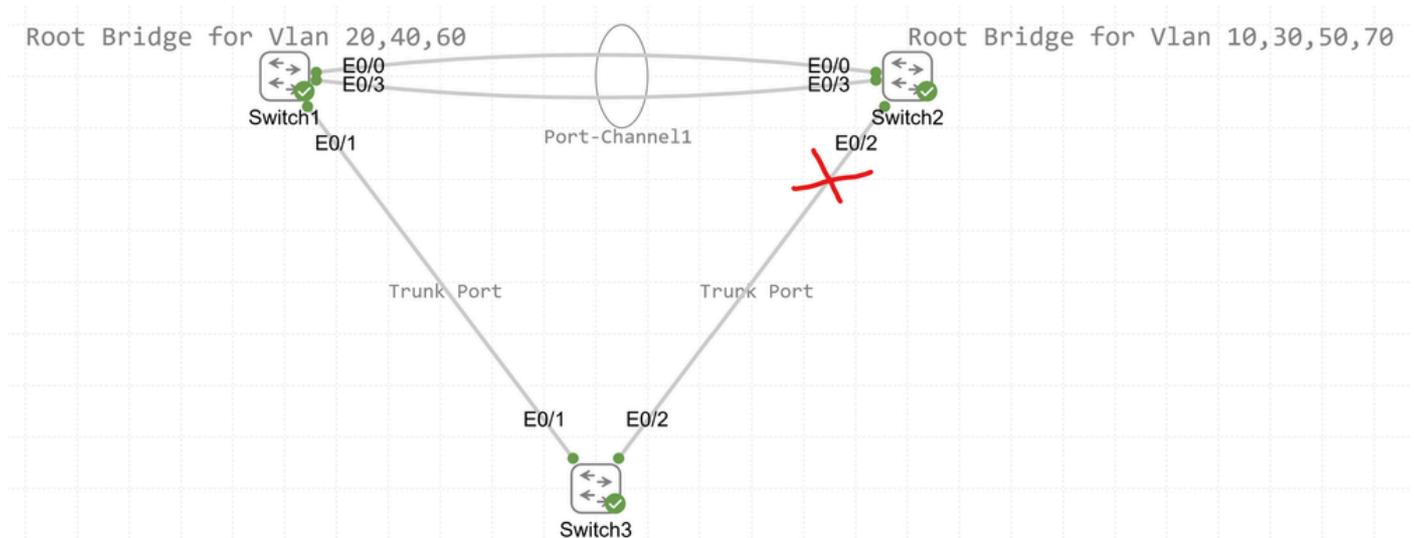


Figure 2: Switch2 Eth0/2 port moved to Blocking state

This diagram shows that Switch 2 Eth0/2 port goes to blocking mode for Even number of VLANs.

Switch 1 is the root bridge for VLAN 20, 40, 60 and the cost to reach the root bridge on Switch 2 via PO1 is 1000000 and via Eth0/2 is 2000100 (2000000+100).

Switch 3 has the cost of 100 on Eth0/1 to reach root bridge and cost of 1000100 via Eth0/2 to reach the root bridge.

Since the cost on Switch 2 Eth0/2 was on higher side, it blocked the port Eth0/2 for VLAN 20, 40, 60.

```

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
```

*SW2 Root Inconsistency Port Details for Even no of Vlans*

```
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 all Vlans are in Forwarding State*

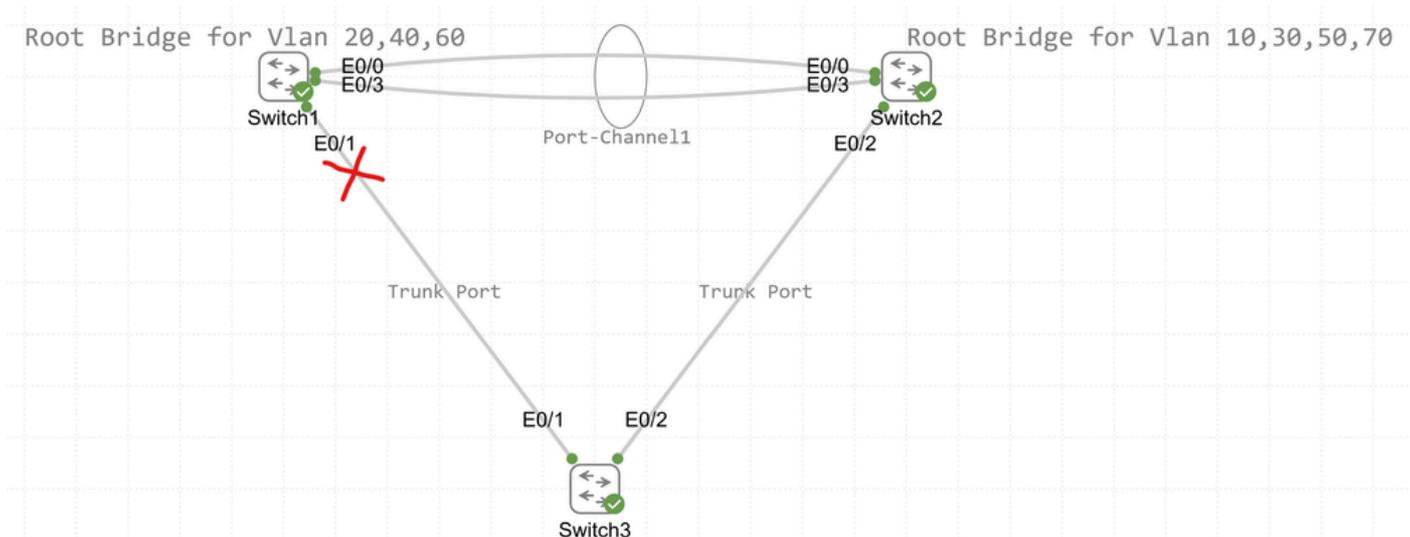


Figure 3: Switch1 Eth0/1 port moved to Blocking state

This diagram shows that Switch 1 Eth0/1 port goes to blocking mode for Odd number of VLANs.

Switch 2 is the root bridge for VLAN 10, 30, 50, 70 and the cost to reach the root bridge on Switch 1 via PO1 is 1000000 and via Eth0/1 is 2000100 (2000000+100).

Switch 3 has the cost of 100 on Eth0/2 to reach root bridge and cost of 1000100 via Eth0/1 to reach the root bridge.

Since the cost on Switch 1 Eth0/1 was on higher side it blocked the port Eth0/2 for VLAN 10, 30, 50, 70.

Feb 10 14:49:58.952: %SPANNTREE-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 Root Inconsistency Port Details for Odd no of Vlans

Packet capture taken on Switch1 Eth0/1 port indicates that the STP frame received from Switch3 for VLAN10 has a Root Path Cost of 100 to reach the root bridge.

```

▶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

```

*Packet Capture taken on SW1 Eth0/1 for Vlan10*

Packet capture taken on Switch 2 Eth0/2 port indicates that the STP frame received from Switch 3 for VLAN20 has a Root Path Cost of 100 to reach the root bridge.

```

▶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

```

*Packet Capture Taken on SW2 Eth0/2 port for Vlan20*

Switch 3 was integrated into the network utilizing the path cost method designated as 'short'. In contrast, Switch 1 and Switch 2 employed the path cost method classified as 'long'. Switch 3 transmitted a superior BPDU to both Switch 1 and Switch 2. Upon receiving the superior BPDU, the Root Guard placed the port into the root-inconsistent STP state.

## Solution

This issue was solved when the pathcost configuration was modified from 'short' to 'long' on Access Switch 3.

```
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 Eth0/2 moved to Blocking state for Even no of 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 Eth0/1 moved to Blocking State for Odd no of Vlan*