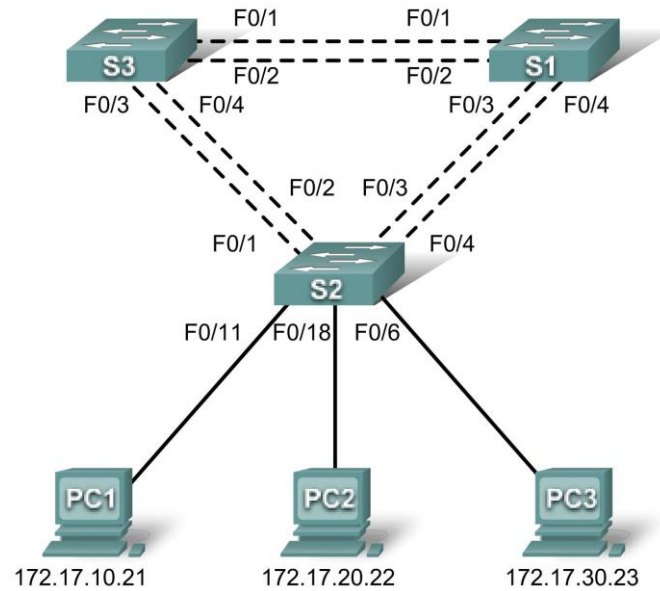


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## PT Activity 5.5.3: Troubleshooting Spanning Tree Protocol

### Topology Diagram



### Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	172.17.99.11	255.255.255.0	N/A
S2	VLAN 99	172.17.99.12	255.255.255.0	N/A
S3	VLAN 99	172.17.99.13	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.1
PC2	NIC	172.17.20.22	255.255.255.0	172.17.20.1
PC3	NIC	172.17.30.23	255.255.255.0	172.17.30.1

### Port Assignments – S2

Ports	Assignment	Network
Fa0/1 - 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 - 0/10	VLAN 30 – Guests(Default)	172.17.30.0 /24
Fa0/11 - 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 - 0/24	VLAN 20 - Students	172.17.20.0 /24

## Learning Objectives

- Identify the initial state of all trunks.
- Correct the source of the problem.
- Document the switch configuration.

## Scenario

You are responsible for the operation of the redundant switched LAN shown in the topology diagram. You and your users have been observing increased latency during peak usage times, and your analysis points to congested trunks. You recognize that of the six trunks configured, only two are forwarding packets in the default STP configuration currently running. The solution to this problem requires more effective use of the available trunks.

This activity is complete when all wired trunks are carrying traffic, and all three switches are participating in per-VLAN load balancing for the three user VLANs.

### Task 1: Identify the Initial State of All Trunks

Use **cisco** for the user EXEC password and **class** for the privileged EXEC password on all switches. On each of the switches, display the spanning tree table with the **show spanning-tree** command. Note which ports are forwarding on each switch, and identify which trunks are not being used in the default configuration. You can use your network topology drawing to document the initial state of all trunk ports.

### Task 2: Correct the Source of the Problem

Modify the spanning tree configuration so that all three trunks are in use. Assume that the three user VLANs (10, 20, and 30) carry an equal amount of traffic. Aim for a solution that will have a different set of ports forwarding for each of the three user VLANs.

In order for the activity to be correctly graded, you must meet the following guidelines:

- S1 is root for VLAN 10 (priority 4096) and backup root for VLAN 20 (priority 16384)
- S2 is root for VLAN 20 (priority 4096) and backup root for VLAN 30 (priority 16384)
- S3 is root for VLAN 30 (priority 4096) and backup root for VLAN 10 (priority 16384)

### Task 3: Document the Switch Configuration

When you have completed your solution, capture the output of the **show run** command and save it to a text file for each switch.

```
S1#sh ru
Building configuration...

Current configuration : 1799 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname S1
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
!
```

```
no ip domain-lookup
!
spanning-tree mode pvst
spanning-tree vlan 10 priority 4096
spanning-tree vlan 20 priority 16384
!
interface FastEthernet0/1
  switchport trunk native vlan 99
  switchport mode trunk
!
interface FastEthernet0/2
  switchport trunk native vlan 99
  switchport mode trunk
!
interface FastEthernet0/3
  switchport trunk native vlan 99
  switchport mode trunk
!
interface FastEthernet0/4
  switchport trunk native vlan 99
  switchport mode trunk
!
interface FastEthernet0/5
  switchport trunk native vlan 99
  switchport mode trunk
  shutdown
!
interface FastEthernet0/6
  shutdown
!
interface FastEthernet0/7
  shutdown
!
interface FastEthernet0/8
  shutdown
!
interface FastEthernet0/9
  shutdown
!
interface FastEthernet0/10
  shutdown
!
interface FastEthernet0/11
  shutdown
!
interface FastEthernet0/12
  shutdown
!
interface FastEthernet0/13
  shutdown
!
interface FastEthernet0/14
  shutdown
!
interface FastEthernet0/15
  shutdown
!
interface FastEthernet0/16
  shutdown
!
interface FastEthernet0/17
```

```
shutdown
!
interface FastEthernet0/18
shutdown
!
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
shutdown
!
interface FastEthernet0/24
shutdown
!
interface GigabitEthernet1/1
shutdown
!
interface GigabitEthernet1/2
!
interface Vlan1
no ip address
shutdown
!
interface Vlan99
ip address 172.17.99.11 255.255.255.0
!
!
line con 0
password cisco
login
!
line vty 0
no login
line vty 1 4
password cisco
login
line vty 5 15
password cisco
login
!
!
End
```

**S2#sh ru**

Building configuration...

Current configuration : 2745 bytes

```
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname S2  
!  
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1  
!  
!  
no ip domain-lookup  
!  
spanning-tree mode pvst  
spanning-tree vlan 20 priority 4096  
spanning-tree vlan 30 priority 16384  
!  
interface FastEthernet0/1  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/2  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/3  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/4  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/5  
  switchport access vlan 20  
  switchport trunk native vlan 99  
  switchport mode access  
!  
interface FastEthernet0/6  
  switchport access vlan 30  
  switchport mode access  
!  
interface FastEthernet0/7  
  switchport access vlan 30  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/8  
  switchport access vlan 30  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/9  
  switchport access vlan 30  
  switchport mode access  
  shutdown
```

```
!  
interface FastEthernet0/10  
  switchport access vlan 30  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/11  
  switchport access vlan 10  
  switchport mode access  
!  
interface FastEthernet0/12  
  switchport access vlan 10  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/13  
  switchport access vlan 10  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/14  
  switchport access vlan 10  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/15  
  switchport access vlan 10  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/16  
  switchport access vlan 10  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/17  
  switchport access vlan 10  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/18  
  switchport access vlan 20  
  switchport mode access  
!  
interface FastEthernet0/19  
  switchport access vlan 20  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/20  
  switchport access vlan 20  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/21  
  switchport access vlan 20  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/22  
  switchport access vlan 20
```

```
switchport mode access
shutdown
!
interface FastEthernet0/23
switchport access vlan 20
switchport mode access
shutdown
!
interface FastEthernet0/24
switchport access vlan 20
switchport mode access
shutdown
!
interface GigabitEthernet1/1
shutdown
!
interface GigabitEthernet1/2
shutdown
!
interface Vlan1
no ip address
shutdown
!
interface Vlan99
ip address 172.17.99.12 255.255.255.0
!
!
line con 0
password cisco
login
!
line vty 0 4
password cisco
login
line vty 5 15
password cisco
login
!
!
End
```

**S3#sh ru**

Building configuration...

Current configuration : 2765 bytes

```
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname S3  
!  
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1  
!  
!  
no ip domain-lookup  
!  
spanning-tree mode pvst  
spanning-tree vlan 30 priority 4096  
spanning-tree vlan 10 priority 16384  
!  
interface FastEthernet0/1  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/2  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/3  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/4  
  switchport trunk native vlan 99  
  switchport mode trunk  
!  
interface FastEthernet0/5  
  switchport access vlan 20  
  switchport trunk native vlan 99  
  switchport mode access  
!  
interface FastEthernet0/6  
  switchport access vlan 30  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/7  
  switchport access vlan 30  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/8  
  switchport access vlan 30  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/9  
  switchport access vlan 30  
  switchport mode access
```



```
shutdown
!
interface FastEthernet0/10
  switchport access vlan 30
  switchport mode access
  shutdown
!
interface FastEthernet0/11
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/12
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/13
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/14
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/15
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/16
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/17
  switchport access vlan 10
  switchport mode access
  shutdown
!
interface FastEthernet0/18
  switchport access vlan 20
  switchport mode access
  shutdown
!
interface FastEthernet0/19
  switchport access vlan 20
  switchport mode access
  shutdown
!
interface FastEthernet0/20
  switchport access vlan 20
  switchport mode access
  shutdown
!
interface FastEthernet0/21
  switchport access vlan 20
  switchport mode access
  shutdown
```

```
!  
interface FastEthernet0/22  
  switchport access vlan 20  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/23  
  switchport access vlan 20  
  switchport mode access  
  shutdown  
!  
interface FastEthernet0/24  
  switchport access vlan 20  
  switchport mode access  
!  
interface GigabitEthernet1/1  
  shutdown  
!  
interface GigabitEthernet1/2  
  shutdown  
!  
interface Vlan1  
  no ip address  
  shutdown  
!  
interface Vlan99  
  ip address 172.17.99.13 255.255.255.0  
!  
!  
line con 0  
  password cisco  
  login  
!  
line vty 0 4  
  password cisco  
  login  
line vty 5 15  
  password cisco  
  login  
!  
!  
end
```