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## Packet Tracer - Investigate STP Loop Prevention

### Objectives

In this lab, you will observe spanning-tree port states and watch the spanning-tree convergence process.

- Describe the operation of Spanning Tree Protocol.
- Explain how Spanning Tree Protocol prevents switching loops while allowing redundancy in switched networks.

### Background / Scenario

In this activity you will use Packet Tracer to observe the operation of Spanning Tree Protocol in a simple switched network that has redundant paths.

### Instructions

#### Part 1: Observe a Converged Spanning-Tree Instance

##### Step 1: Verify Connectivity.

Ping from PC1 to PC2 to verify connectivity between the hosts. Your ping should be successful.

##### Step 2: View spanning-tree status on each switch.

Use the **show spanning-tree vlan 1** command to gather information about the spanning tree status of each switch. Complete the table. For the purposes of the activity, only consider information about the Gigabit trunk ports. The Fast Ethernet ports are access ports that have end devices connected and are not part of the inter-switch trunk-based spanning tree.

Switch	Port	Status (FWD, BLK...)	Port Role	Root Bridge?
S1	G0/1	FWD	Desg	No
	G0/2	FWD	Root	No
S2	G0/1	FWD	Desg	Root Bridge
	G0/2	FWD	Desg	Root Bridge
S3	G0/1	FWD	Root	No
	G0/2	BLK	Non-desg	No

Packet Tracer uses a different link light on one of the connections between the switches.

What do you think this link light means?

The orange light represents a blocked state for the port, while the green light means that the port can send and receive BPDUs.

What path will frames take from PC1 to PC2?

Port Fa0 of PC1 > Port Fa0/1 of S1 > Port Gig0/2 of S1 > Port Gig0/1 of S2 > Port Fa0/1 of S2 > Port Fa0 of PC2.

Why do the frames not travel through S3?

Because the path to S3 is blocked as a result of STP.

Why has spanning tree placed a port in blocking state?

To prevent broadcast storms, or infinite loops.

## Part 2: Observe spanning-tree convergence

### Step 1: Remove the connection between S1 and S2.

- Open a CLI window on switch S3 and issue the command **show spanning-tree vlan 1**. Leave the CLI window open.
- Select the delete tool from the menu bar and click the cable that connects S1 and S2.

### Step 2: Observe spanning-tree convergence.

- Quickly return to the CLI prompt on switch S3 and issue the **show spanning-tree vlan 1** command.
- Use the up-arrow key to recall the **show spanning-tree vlan 1** command and issue it repeatedly until the orange link light on the cable turns green. Observe the status of port G0/2.

What do you see happen to the status of the G0/2 port during this process?

G0/2 transitioned from blocking, to listening, then learning, and lastly forwarding. In addition, it went from a non-designated port to a designated port.

You have observed the transition in port status that occurs as a spanning-tree port moves from blocking to forwarding state.

- Verify Connectivity by pinging from PC1 to PC2. Your ping should be successful.

Are any ports showing an orange link light that indicates that the port is in a spanning-tree state other than forwarding? Why or why not?

There are no ports that show an orange link light. This is because there are no other paths connecting the network. Therefore, the links won't cause an infinite loop if they are all active, unlike the previous topology with the link connecting S1 to S2.