Packet Tracer - Lab 1 - 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.
- Manually configure the root bridge.
- Configure PortFast and BPDU Guard.

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. You will then alter the flow of traffic by changing the root bridge and observing the effects. Lastly, you will optimise the switched topology using PortFast and BPDU guard.

Instructions

Part 1: Observe a Converged Spanning-Tree Instance

Step 1: Verify Connectivity.

Ping from PC-A to PC-B and PC-C to PC-D to verify connectivity between the hosts. Your pings should be successful.

Step 2: View spanning-tree status on switches S1, S2 & S3.

Use the **show spanning-tree vlan 1** command on S1, S2 & S3 to gather information about the spanning tree status of each switch.

***NB* Go to the "Lab 1 - Investigate STP Operation – QUESTIONS" quiz on the Moodle page and fill out the answers to all of the questions (Q's 1-8) on Page 1 of the quiz. Leave the quiz open while you complete the rest of the lab sheet.**

*Note: The quiz will be **open during your lab slot only**. If you cannot access the quiz let your lecturer know.*

Step 3: View spanning-tree status on switches S4, S5, S6 & S7.

On S4, S5, S6 & S7 to gather information about the spanning tree status of each switch.

***NB* Go back to the "Lab 1 - Investigate STP Operation – QUESTIONS" quiz on the Moodle page and fill out the answers to all of the questions (Q's 9-11) on Page 2 of the quiz. Leave the quiz open while you complete the rest of the lab sheet.**

Part 2: Configure Root Bridge

Step 1: Configure root bridge.

a. Configure **S4** to be the root bridge using the **spanning-tree vlan 1 root primary** command.

b. Verify your configurations using the **show spanning-tree** command.

***NB* Go back to the "Lab 1 - Investigate STP Operation – QUESTIONS" quiz on the Moodle page and fill out the answers to all of the questions (Q's 12-16) on Page 3 of the quiz. Leave the quiz open while you complete the rest of the lab sheet.**

Part 3: Configure PortFast and BPDU Guard

```
S2(config)# interface FastEthernet 0/11
S2(config-if)# spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to
a single host. Connecting hubs, concentrators, switches,
bridges, etc... to this interface  when portfast is enabled,
can cause temporary bridging loops.
 Use with CAUTION

%Portfast has been configured on FastEthernet0/11 but will only
 have effect when the interface is in a non-trunking mode.
S2(config-if)# spanning-tree bpduguard enable
S2(config-if)# end
```

Step 1: Configure PortFast on the switches.

PortFast causes a port to enter the **forwarding** state almost immediately by dramatically decreasing the time of the listening and learning states. PortFast minimizes the time it takes for the server or workstation to come online. Configure PortFast on the switch interfaces that are connected to PCs:

- S3 – F0/1 (connected to PC-A)
- S2 – F0/3 (connected to PC-B)
- S7 – F0/1 (connected to PC-C)
- S6 – F0/3 (connected to PC-D)

Note: Enabling PortFast globally on a switch will apply it to all switch interfaces. PortFast should not be configured on interfaces connected to other switches. Make sure you only configure it on the specific interfaces listed above.

Step 2: Configure BPDU guard on the switches.

The STP PortFast BPDU guard enhancement allows network designers to enforce the STP domain borders and keep the active topology predictable. The devices behind the ports that have STP PortFast enabled are unable to influence the STP topology. At the reception of BPDUs, the BPDU guard operation disables the port that has PortFast configured. The BPDU guard transitions the port into the err-disable state, and a message appears on the console. Configure BPDU guard on switch interfaces that are connected to PCs.

- S3 – F0/1 (connected to PC-A)
- S2 – F0/3 (connected to PC-B)
- S7 – F0/1 (connected to PC-C)
- S6 – F0/3 (connected to PC-D)

Note: Enabling BPDU Guard globally on a switch will apply it to all switch interfaces. BPDU Guard should not be configured on interfaces connected to other switches. Make sure you only configure it on the specific interfaces listed above.

***NB* If you have correctly configured Part 2 & Part 3 above your activity score should now be showing as 100%. If so, click on "check results" in the activity window. Return to the Moodle quiz one last time and enter the code into the appropriate question box (Q17) on Page 4 of the quiz.**

You have completed the lab – please submit the Moodle quiz.