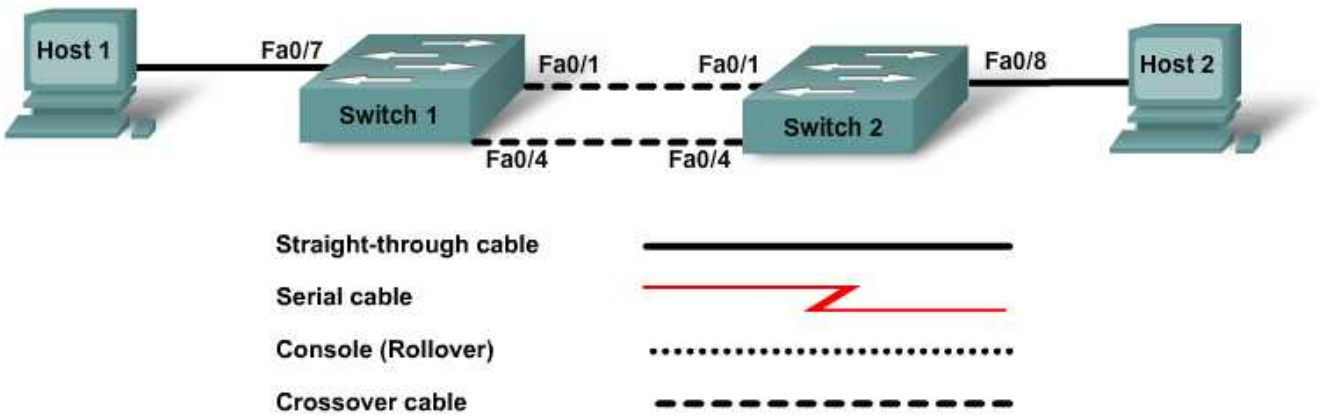
Lab 3.2.3 Building a Switched Network with Redundant Links



Switch Designation	Switch Name	Enable Secret Password	Enable, Console, and vty Passwords	VLAN 1 IP Address	Subnet Mask	Default Gateway
Switch 1	SwitchA	class	cisco	192.168.1.2	255.255.255.0	N/A
Switch 2	SwitchB	class	cisco	192.168.1.3	255.255.255.0	N/A

Objectives

- Create a switched network with redundant links.
- Determine which switch is selected to be the root bridge with the factory default settings.
- Configure the BID on a switch to control the selection of the root bridge.

Background / Preparation

This lab examines the effect that selection of a root bridge has on traffic patterns in a switched network with redundant links. You will configure the network with default factory settings and then reassign the root bridge by changing the bridge priority value. You will observe the spanning tree as the network adjusts to the changes.

The following resources are required:

- Two Cisco 2960 switches or other comparable switches
- Two Windows-based PCs, one with a terminal emulation program; one as the host, one as the server
- At least one RJ-45-to-DB-9 connector console cable to configure the switches
- Two straight-through Ethernet cables
- Two crossover Ethernet cables
- Access to the PC command prompt
- Access to PC network TCP/IP configuration

NOTE: Make sure that the routers and the switches have been erased and have no startup configurations. Instructions for erasing both switch and router are provided in the Lab Manual, located on Academy Connection in the Tools section.

NOTE: SDM Enabled Routers - If the startup-config is erased in an SDM enabled router, SDM will no longer come up by default when the router is restarted. It will be necessary to build a basic router configuration using IOS commands. The steps provided in this lab use IOS commands and do not require the use of SDM. If you wish to use SDM, refer to the instructions in the Lab Manual, located on the Academy Connection in the Tools section or contact your instructor if necessary.

Step 1: Cable the network

a. Connect Host 1 to Switch 1 Fast Ethernet port Fa0/7, using a straight-through Ethernet cable.

b. Connect Host 2 to Switch 2 Fast Ethernet port Fa0/8, using a straight-through Ethernet cable.

c. Connect Switch 1 Fast Ethernet port Fa0/1 to Switch 2 Fast Ethernet port Fa0/1, using a crossover Ethernet cable.

d. Create a redundant link between the switches by connecting Switch 1 Fast Ethernet port Fa0/4 to Switch 2 Fast Ethernet port Fa0/4, using a crossover Ethernet cable.

What typically undesirable traffic pattern have you created by using the two crossover cables between the two switches? _____

Predict: What do you think the switches will do to keep this from becoming a problem?

_____

_____

Step 2: Configure the switches

a. Establish a terminal emulation session to Switch 1 from Host 1.

b. Configure the switch hostname, passwords, interface VLAN 1 IP address, and subnet mask on Switch 1.

c. Save the configuration.

d. Establish a terminal emulation session to Switch 2 from either Host 1 or Host 2.

e. Configure the switch hostname, passwords, interface VLAN 1 IP address, and subnet mask on Switch 2.

f. Save the configuration.

Step 3: Configure the hosts

a. Configure each host to use an IP address in the same network as the switches.

b. Configure each host to use the same subnet mask as the switches.

Why is no default gateway specified for this network?

_____

Step 4: Verify connectivity

a. To verify that the network is set up successfully, ping from Host 1 to Host 2.

Was the ping successful? _____

b. If the ping is not successful, verify the connections and configurations again. Check to ensure that all cables are correct and that connections are seated.

If the ping is not successful, what utility could you use to determine where the connection is failing?

_____

Step 5: Examine interface VLAN 1 information

a. From the terminal emulation session on either switch, enter the command **show interface vlan1 ?** at the privileged EXEC mode prompt.

```
SwitchA#show interface vlan1 ?
```

List some of the options that are available.

_____

b. On SwitchA, enter the command **show hardware** at the privileged EXEC mode prompt.

```
SwitchA#show hardware
```

What is the MAC address of the switch? _____

What other term for MAC address is used? _____

c. On SwitchB, enter the command **show hardware** at the privileged EXEC mode prompt.

What is the MAC address of the switch? _____

Which switch should be the root of the spanning tree for this network? _____

Step 6: Examine the spanning-tree tables on each switch

a. On SwitchA, enter the command **show spanning-tree** at the privileged EXEC mode prompt.

b. On SwitchB, enter the command **show spanning-tree** at the privileged EXEC mode prompt.

c. Examine the outputs and answer the following questions:

Which switch is the root bridge? _____

What is the priority of the root bridge? _____

What is the bridge ID of the root bridge? _____

Which ports are forwarding on the root bridge? _____

Which ports are blocking on the root bridge? _____

What is the priority of the non-root bridge? _____

What is the bridge ID of the non-root bridge? _____

Which ports are forwarding on the non-root bridge? _____

Which ports are blocking on the non-root bridge? _____

d. Examine the link lights on both switches.

Can you tell which port is in blocking state? _____

Why is there no change in the link lights? _____

Step 7: Reassign the root bridge

What would you do if you wanted a different switch to be the root bridge for this network?

_____

Why might you want to do this?

_____

For the purposes of this lab, assume that the switch that is currently the root bridge is undesirable.

The example assumes that SwitchB is preferred as the root switch. To "force" SwitchB to become the new root bridge, you need to configure a new priority for it.

a. Go to the console and enter configuration mode on SwitchB.

b. Determine the options that can be configured for the Spanning Tree Protocol by issuing this command:

```
SwitchB(config)#spanning-tree ?
```

c. List the options that are available: _____

_____

d. Set the priority of the switch to 4096.

```
SwitchB(config)#spanning-tree vlan 1 priority 4096
SwitchB(config)#exit
```

Step 8: Look at the spanning-tree table

a. On SwitchA, enter **show spanning-tree** at the privileged EXEC mode prompt.

b. On SwitchB, enter **show spanning-tree** at the privileged EXEC mode prompt.

c. Examine the outputs and answer the following questions:

Which switch is the root bridge? _____

What is the priority of the root bridge? _____

What is the bridge ID of the root bridge? _____

Which ports are forwarding on the root bridge? _____

Which ports are blocking on the root bridge? _____

What is the priority of the non-root bridge? _____

What is the bridge ID of the non-root bridge? _____

Which ports are forwarding on the non-root bridge? _____

Which ports are blocking on the non-root bridge? _____

Step 9: Verify the running configuration file on the root bridge

a. On the switch that was changed to be the root bridge, enter the **show running-config** command at the privileged EXEC mode prompt.

b. Locate the spanning-tree priority information for this switch.

c. How can you tell from the information given that this switch is the root bridge?

_____

Step 10: Reflection

Suppose that you are adding new switches to a company's network. Why should you plan the physical design carefully? Why should you be prepared to make adjustments to factory default settings?

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