Lab 7.2.6 Spanning-Tree Recalculation – 2900XL Series

Objective

- Create a basic switch configuration and verify it.
- Observe the behavior of spanning-tree algorithm in presence of switched network topology changes.

Background/Preparation

Cable a network similar to one of the diagram. The configuration output used in this lab is produced from a 2950 series switch. Any other switch used may produce different output. The following steps are to be executed on each switch unless specifically instructed otherwise.

Start a HyperTerminal session.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on all switches in this lab assignment before continuing.

Step 1 Configure the switches

Configure the hostname, access and command mode passwords, as well as the management LAN settings. These values are shown in the chart. If problems occur while performing this configuration, refer to the Basic Switch Configuration lab.

Step 2 Configure the hosts attached to the switches

Configure the host to use the same IP subnet for the address, mask, and default gateway as on the switch.
Step 3 Verify connectivity
a. To verify that the hosts and switches are correctly configured, ping the switches from the hosts.
b. Were the pings successful? Yes
c. If the answer is no, troubleshoot the hosts and switches configurations.

Step 4 Look at the show interface information
a. On both switches, type the command `show interface VLAN 1` at the Privileged EXEC prompt as follows:

```
Switch_A#show interface vlan 1
```

b. What is the MAC address of the switch? `0090.b1a6.d080`

```
Switch_B#show interface vlan 1
```

c. What is the MAC address of the switch? `0001.4234.f340`

d. Which switch should be the root of the spanning-tree for VLAN 1? Switch B

Step 5 Look at the spanning-tree table on each switch
a. At the Privileged EXEC mode prompt, type the following on Switch_A:

```
Switch_A#show spanning-tree brief
```

Note: Type `show spanning-tree brief` if running version 12.0 of the IOS. If running version 12.1 of the IOS, type just `show spanning-tree`. Different versions of IOS have different options for this command.

```
Switch_A#show spanning-tree brief
```

b. On Switch_B type `show spanning-tree brief` at the Privileged EXEC mode prompt as follows:

```
Switch_B#show spanning-tree brief
```

c. Examine the command output and answer the following questions.
d. Which switch is the root switch? Switch B
e. Record the states of the first 12 interfaces and ports of each switch.

<table>
<thead>
<tr>
<th>Switch A</th>
<th>Port #</th>
<th>Switch B</th>
</tr>
</thead>
<tbody>
<tr>
<td>FWD</td>
<td>1</td>
<td>FWD</td>
</tr>
<tr>
<td>Down</td>
<td>2</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>3</td>
<td>Down</td>
</tr>
<tr>
<td>BLK</td>
<td>4</td>
<td>FWD</td>
</tr>
<tr>
<td>Down</td>
<td>5</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>6</td>
<td>Down</td>
</tr>
<tr>
<td>FWD</td>
<td>7</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>8</td>
<td>FWD</td>
</tr>
<tr>
<td>Down</td>
<td>9</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>10</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>11</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>12</td>
<td>Down</td>
</tr>
</tbody>
</table>

Step 6 Remove a cable on the switch

a. Remove the cable from the forwarding port on the non-root switch. For this example this is interface FastEthernet 0/1 on Switch_B.
b. Wait for at least two minutes.
c. What has happened to the switch port LEDs?

*The port LEDs on both switches for FastEthernet 0/1 turned off.*

Step 7 Look at the spanning-tree table on each switch

a. Type the following on Switch_A at the Privileged EXEC mode prompt.

*Note:* Type `show spanning-tree brief` if running version 12.0 of the IOS. If running version 12.1 of the IOS, type just `show spanning-tree`. Different versions of IOS have different options for this command.

```
Switch_A#show spanning-tree brief
```

b. On Switch_B type `show spanning-tree brief` at the Privileged EXEC mode prompt as follows:

```
Switch_B#show spanning-tree brief
```

c. What changes have taken place in the command output?

On Switch_A? *Information and statistics for FastEthernet 0/1 are not displayed and FastEthernet 0/4 went from BLK mode into FWD mode*

On Switch_B? *Information and statistics for FastEthernet 0/1 are not displayed.*

Step 8 Replace the cable in the switch

a. Replace the cable in the port that it was removed from. For this example this is interface FastEthernet 0/1 on Switch_B.
b. Wait for at least two minutes.
c. What has happened to the switch port LEDs? *Both light up green*
Step 9 Look at the spanning-tree table on each switch

a. At the Privileged EXEC mode prompt, type the following on Switch_A:

   Note: Type `show spanning-tree brief` if running version 12.0 of the IOS. If running version 12.1 of the IOS, type just `show spanning-tree`. Different versions of IOS have different options for this command.

   Switch_A#show spanning-tree brief

b. On Switch_B type `show spanning-tree brief` at the Privileged EXEC mode prompt as follows:

   Switch_B#show spanning-tree brief

c. What changes have taken place in the command output?

   On Switch_A? FastEthernet 0/1 goes back into FWD mode and FastEthernet 0/4 went back to BLK mode.

   On Switch_B? FastEthernet 0/1 goes back into FWD mode.

Once the steps are completed, log off by typing `exit`, and turn all the devices off. Then remove and store the cables and adapter.

Switch_A#show interface vlan 1
Vlan1 is up, line protocol is up
   Hardware is CPU Interface, address is 0009.b7f5.6d80 (bia 0009.b7f5.6d80)
   Internet address is 192.168.1.2/24
   MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
   reliability 255/255, txload 1/255, rxload 1/255
   Encapsulation ARPA, loopback not set
   ARP type: ARPA, ARP Timeout 04:00:00
   Last input 00:02:05, output never, output hang never
   Last clearing of "show interface" counters never
   Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
   Queueing strategy: fifo
   Output queue :0/40 (size/max)
   5 minute input rate 3000 bits/sec, 5 packets/sec
   5 minute output rate 6000 bits/sec, 1 packets/sec
   1453 packets input, 104542 bytes, 0 no buffer
   Received 10 broadcasts, 0 runts, 0 giants, 0 throttles
   0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
   375 packets output, 189108 bytes, 0 underruns
   0 output errors, 4 interface resets
   0 output buffer failures, 0 output buffers swapped out

Switch_B#show interface vlan 1
Vlan1 is up, line protocol is up
   Hardware is CPU Interface, address is 0009.b7f5.5a40 (bia 0009.b7f5.5a40)
   Internet address is 192.168.1.3/24
   MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
   reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:02:27, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 1 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  9119 packets input, 648668 bytes, 0 no buffer
  Received 76 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
  17084 packets output, 611644 bytes, 0 underruns
  0 output errors, 4 interface resets
  0 output buffer failures, 0 output buffers swapped out

Switch A#show spanning-tree

VLAN1 is executing the ieee compatible Spanning Tree protocol
  Bridge Identifier has priority 32768, address 0009.b7f5.6d81
  Configured hello time 2, max age 20, forward delay 15
  Current root has priority 32768, address 0009.b7f5.5a41
  Root port is 1 (FastEthernet0/1), cost of root path is 19
  Topology change flag not set, detected flag not set
  Number of topology changes 1 last change occurred 00:10:00 ago
    from FastEthernet0/1
    Times:   hold 1, topology change 35, notification 2
    hello 2, max age 20, forward delay 15
  Timers: hello 0, topology change 0, notification 0, aging 300

Port 1 (FastEthernet0/1) of VLAN1 is forwarding
  Port path cost 19, Port priority 128, Port Identifier 128.1.
  Designated root has priority 32768, address 0009.b7f5.5a41
  Designated bridge has priority 32768, address 0009.b7f5.5a41
  Designated port id is 128.1, designated path cost 0
  Timers: message age 1, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  BPDU: sent 1, received 316

Port 4 (FastEthernet0/4) of VLAN1 is blocking
  Port path cost 19, Port priority 128, Port Identifier 128.4.
  Designated root has priority 32768, address 0009.b7f5.5a41
  Designated bridge has priority 32768, address 0009.b7f5.5a41
  Designated port id is 128.4, designated path cost 0
  Timers: message age 1, forward delay 0, hold 0
  Number of transitions to forwarding state: 0
  BPDU: sent 2, received 316

Port 7 (FastEthernet0/7) of VLAN1 is forwarding
  Port path cost 19, Port priority 128, Port Identifier 128.7.
  Designated root has priority 32768, address 0009.b7f5.5a41
  Designated bridge has priority 32768, address 0009.b7f5.6d81
  Designated port id is 128.7, designated path cost 19
  Timers: message age 0, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  BPDU: sent 316, received 0
Switch_B#show spanning-tree

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 32768, address 0009.b7f5.5a41
Configured hello time 2, max age 20, forward delay 15
We are the root of the spanning tree
Topology change flag not set, detected flag not set
Number of topology changes 5 last change occurred 00:10:48 ago
from FastEthernet0/1
Times: hold 1, topology change 35, notification 2
hello 2, max age 20, forward delay 15
Timers: hello 1, topology change 0, notification 0, aging 300

Port 1 (FastEthernet0/1) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.1.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.1, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 679, received 1

Port 4 (FastEthernet0/4) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.4.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.4, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 679, received 1

Port 8 (FastEthernet0/8) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.8.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.8, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 2247, received 0

Switch_A#show spanning-tree

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 32768, address 0009.b7f5.6d81
Configured hello time 2, max age 20, forward delay 15
Current root has priority 32768, address 0009.b7f5.5a41
Root port is 4 (FastEthernet0/4), cost of root path is 19
Topology change flag not set, detected flag not set
Number of topology changes 5 last change occurred 00:03:08 ago
from FastEthernet0/4
Times: hold 1, topology change 35, notification 2
hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0, aging 300

Port 4 (FastEthernet0/4) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.4.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.4, designated path cost 0
Timers: message age 1, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 4, received 112

Port 7 (FastEthernet0/7) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.7.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.6d81
Designated port id is 128.7, designated path cost 19
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 637, received 0

Switch A#show spanning-tree brief

VLAN1
Spanning tree enabled protocol ieee
Root ID Priority 32768
    Address 0009.b7f5.5a41
    Cost    19
    Port 4 (FastEthernet0/4)
    Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID Priority 32768
    Address 0009.b7f5.6d81
    Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
    Aging Time 300

Interface                  Designated
Name                     Port ID Prio Cost  Sts Cost  Bridge ID            Port ID
-------------------------- ------- ---- ----- --- ----- -------------------- ---
FastEthernet0/4 128.4    128    19 FWD     0 32768 0009.b7f5.5a41 128.4
FastEthernet0/7 128.7    128    19 FWD    19 32768 0009.b7f5.6d81 128.7
Erasing and Reloading the Switch

For the majority of the labs in CCNA 3 and CCNA 4 it is necessary to start with an unconfigured switch. Use of a switch with an existing configuration may produce unpredictable results. These instructions allow preparation of the switch prior to performing the lab so previous configuration options do not interfere. The following is the procedure for clearing out previous configurations and starting with an unconfigured switch. Instructions are provided for the 2900, 2950, and 1900 Series switches.

2900 and 2950 Series Switches

1. Enter into the privileged EXEC mode by typing `enable`.
   If prompted for a password, enter `class` (if that does not work, ask the instructor).

   Switch>enable

2. Remove the VLAN database information file.

   Switch#delete flash:vlan.dat
   Delete filename [vlan.dat]? [Enter]
   Delete flash:vlan.dat? [confirm] [Enter]
   If there was no VLAN file, this message is displayed.
   %Error deleting flash:vlan.dat (No such file or directory)

3. Remove the switch startup configuration file from NVRAM.

   Switch#erase startup-config

   The responding line prompt will be:
   Erasing the nvram filesystem will remove all files! Continue? [confirm]

   Press Enter to confirm.
   The response should be:
   Erase of nvram: complete

4. Check that VLAN information was deleted.

   Verify that the VLAN configuration was deleted in Step 2 using the `show vlan` command. If previous VLAN configuration information (other than the default management VLAN 1) is still present it will be necessary to power cycle the switch (hardware restart) instead of issuing the `reload` command. To power cycle the switch, remove the power cord from the back of the switch or unplug it. Then plug it back in.

   If the VLAN information was successfully deleted in Step 2, go to Step 5 and restart the switch using the `reload` command.
5. Software restart (using the `reload` command)

   **Note:** This step is not necessary if the switch was restarted using the power cycle method.

   a. At the privileged EXEC mode enter the command `reload`.

      ```
      Switch#reload
      ```

      The responding line prompt will be:

      ```
      System configuration has been modified. Save? [yes/no]:
      ```

   b. Type `n` and then press Enter.

      The responding line prompt will be:

      ```
      Proceed with reload? [confirm] [Enter]
      ```

      The first line of the response will be:

      ```
      Reload requested by console.
      ```

      After the switch has reloaded, the line prompt will be:

      ```
      Would you like to enter the initial configuration dialog? [yes/no]:
      ```

   c. Type `n` and then press Enter.

      The responding line prompt will be:

      ```
      Press RETURN to get started! [Enter]
      ```

5. Software restart (using the `reload` command)

   **Note:** This step is not necessary if the switch was restarted using the power cycle method.

   a. At the privileged EXEC mode enter the command `reload`.

      ```
      Switch#reload
      ```

      The responding line prompt will be:

      ```
      System configuration has been modified. Save? [yes/no]:
      ```

   b. Type `n` and then press Enter.

      The responding line prompt will be:

      ```
      Proceed with reload? [confirm] [Enter]
      ```

      The first line of the response will be:

      ```
      Reload requested by console.
      ```

      After the switch has reloaded, the line prompt will be:

      ```
      Would you like to enter the initial configuration dialog? [yes/no]:
      ```

   c. Type `n` and then press Enter.

      The responding line prompt will be:

      ```
      Press RETURN to get started! [Enter]
      ```

**1900 Series Switches**

1. Remove VLAN Trunking Protocol (VTP) information.

   ```
   #delete vtp
   ```

   This command resets the switch with VTP parameters set to factory defaults.
   All other parameters will be unchanged.

   ```
   Reset system with VTP parameters set to factory defaults, [Y]es or [N]o?
   ```

   Enter `y` and press Enter.

2. Remove the switch startup configuration from NVRAM.

   ```
   #delete nvram
   ```

   This command resets the switch with factory defaults. All system parameters will revert to their default factory settings. All static and dynamic addresses will be removed.

   ```
   Reset system with factory defaults, [Y]es or [N]o?
   ```

   Enter `y` and press Enter.
Lab 7.2.6 Spanning-Tree Recalculation – 2950 Series

Objective

- Create a basic switch configuration and verify it.
- Observe the behavior of spanning-tree algorithm in presence of switched network topology changes.

Background/Preparation

Cable a network similar to one of the diagram. The configuration output used in this lab is produced from a 2950 series switch. Any other switch used may produce different output. The following steps are to be executed on each switch unless specifically instructed otherwise.

Start a HyperTerminal session.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on all switches in this lab assignment before continuing.

Step 1 Configure the switches

Configure the hostname, access and command mode passwords, as well as the management LAN settings. These values are shown in the chart. If problems occur while performing this configuration, refer to the Basic Switch Configuration lab.

Step 2 Configure the hosts attached to the switches

Configure the host to use the same IP subnet for the address, mask, and default gateway as on the switch.
Step 3 Verify connectivity
a. To verify that the hosts and switches are correctly configured, ping the switches from the hosts.
b. Were the pings successful? Yes
c. If the answer is no, troubleshoot the hosts and switches configurations.

Step 4 Look at the show interface information
a. On both switches, type the command `show interface VLAN 1` at the Privileged EXEC prompt as follows:

```
Switch_A#show interface vlan 1
```

b. What is the MAC address of the switch? 0002.4b21.3640

```
Switch_B#show interface vlan 1
```

c. What is the MAC address of the switch? 0002.4b20.9b80
d. Which switch should be the root of the spanning-tree for VLAN 1? Switch_B

Step 5 Look at the spanning-tree table on each switch
a. At the Privileged EXEC mode prompt, type the following on Switch_A:

   Note: Type `show spanning-tree brief` if running version 12.0 of the IOS. If running version 12.1 of the IOS, type just `show spanning-tree`. Different versions of IOS have different options for this command.

```
Switch_A#show spanning-tree brief
```

b. On Switch_B type `show spanning-tree brief` at the Privileged EXEC mode prompt as follows:

```
Switch_B#show spanning-tree brief
```

c. Examine the command output and answer the following questions.
d. Which switch is the root switch? Switch_B
e. Record the states of the first 12 interfaces and ports of each switch.

<table>
<thead>
<tr>
<th>Switch_A Port</th>
<th>Switch_B Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>FWD</td>
<td>FWD</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
</tr>
<tr>
<td>BLK</td>
<td>FWD</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
</tr>
<tr>
<td>FWD</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>FWD</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
</tr>
</tbody>
</table>
### Step 6 Remove a cable on the switch

a. Remove the cable from the forwarding port on the non-root switch. For this example this is interface FastEthernet 0/1 on Switch_B.

b. Wait for at least two minutes.

c. What has happened to the switch port LEDs?

   > The port LEDs on both switches for FastEthernet 0/1 turned off.

### Step 7 Look at the spanning-tree table on each switch

a. Type the following on Switch_A at the Privileged EXEC mode prompt.

   **Note:** Type `show spanning-tree brief` if running version 12.0 of the IOS. If running version 12.1 of the IOS, type just `show spanning-tree`. Different versions of IOS have different options for this command.

   ```
   Switch_A#show spanning-tree brief
   ```

b. On Switch_B type `show spanning-tree brief` at the Privileged EXEC mode prompt as follows:

   ```
   Switch_B#show spanning-tree brief
   ```

c. What changes have taken place in the command output?

   - On Switch_A? Information and statistics for FastEthernet 0/1 are not displayed and FastEthernet 0/4 went from BLK mode into FWD mode.
   - On Switch_B? Information and statistics for FastEthernet 0/1 are not displayed.

### Step 8 Replace the cable in the switch

a. Replace the cable in the port that it was removed from. For this example this is interface FastEthernet 0/1 on Switch_B.

b. Wait for at least two minutes.

c. What has happened to the switch port LEDs? Both light up GREEN

### Step 9 Look at the spanning-tree table on each switch

a. At the Privileged EXEC mode prompt, type the following on Switch_A:

   **Note:** Type `show spanning-tree brief` if running version 12.0 of the IOS. If running version 12.1 of the IOS, type just `show spanning-tree`. Different versions of IOS have different options for this command.

   ```
   Switch_A#show spanning-tree brief
   ```

b. On Switch_B type `show spanning-tree brief` at the Privileged EXEC mode prompt as follows:
Switch_B#show spanning-tree brief

c. What changes have taken place in the command output?

On Switch_A?

FastEthernet 0/1 goes back into FWD mode and FastEthernet 0/4 went back to BLK mode.

On Switch_B? FastEthernet 0/1 goes back into FWD mode.

Once the steps are completed, log off by typing exit, and turn all the devices off. Then remove and store the cables and adapter.

Switch_A#show interface vlan 1
Vlan1 is up, line protocol is up
  Hardware is CPU Interface, address is 0009.b7f5.6d80 (bia 0009.b7f5.6d80)
  Internet address is 192.168.1.2/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
  reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:02:05, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 3000 bits/sec, 5 packets/sec
  5 minute output rate 6000 bits/sec, 1 packets/sec
  1453 packets input, 104542 bytes, 0 no buffer
  Received 10 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
  375 packets output, 189108 bytes, 0 underruns
  0 output errors, 4 interface resets
  0 output buffer failures, 0 output buffers swapped out

Switch_B#show interface vlan 1
Vlan1 is up, line protocol is up
  Hardware is CPU Interface, address is 0009.b7f5.5a40 (bia 0009.b7f5.5a40)
  Internet address is 192.168.1.3/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
  reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:02:27, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 1 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
  9119 packets input, 648668 bytes, 0 no buffer
  Received 76 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
  17084 packets output, 611644 bytes, 0 underruns
  0 output errors, 4 interface resets
  0 output buffer failures, 0 output buffers swapped out
Switch A#show spanning-tree

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 32768, address 0009.b7f5.6d81
Configured hello time 2, max age 20, forward delay 15
Current root has priority 32768, address 0009.b7f5.5a41
Root port is 1 (FastEthernet0/1), cost of root path is 19
Topology change flag not set, detected flag not set
Number of topology changes 1 last change occurred 00:10:00 ago
from FastEthernet0/1
Times: hold 1, topology change 35, notification 2
        hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0, aging 300

Port 1 (FastEthernet0/1) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.1.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.1, designated path cost 0
Timers: message age 1, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 1, received 316

Port 4 (FastEthernet0/4) of VLAN1 is blocking
Port path cost 19, Port priority 128, Port Identifier 128.4.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.4, designated path cost 0
Timers: message age 1, forward delay 0, hold 0
Number of transitions to forwarding state: 0
BPDU: sent 2, received 316

Port 7 (FastEthernet0/7) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.7.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.7, designated path cost 19
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 316, received 0

Switch B#show spanning-tree

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 32768, address 0009.b7f5.5a41
Configured hello time 2, max age 20, forward delay 15
We are the root of the spanning tree
Topology change flag not set, detected flag not set
Number of topology changes 5 last change occurred 00:10:48 ago
from FastEthernet0/1
Times: hold 1, topology change 35, notification 2
        hello 2, max age 20, forward delay 15
Timers: hello 1, topology change 0, notification 0, aging 300

Port 1 (FastEthernet0/1) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.1.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.1, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 679, received 1

Port 4 (FastEthernet0/4) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.4.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.4, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 679, received 1

Port 8 (FastEthernet0/8) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.8.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.8, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 2247, received 0

Switch A#show spanning-tree

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 32768, address 0009.b7f5.6d81
Configured hello time 2, max age 20, forward delay 15
Current root has priority 32768, address 0009.b7f5.5a41
Root port is 4 (FastEthernet0/4), cost of root path is 19
Topology change flag not set, detected flag not set
Number of topology changes 5 last change occurred 00:03:08 ago
from FastEthernet0/4
Times: hold 1, topology change 35, notification 2
       hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0, aging 300

Port 4 (FastEthernet0/4) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.4.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.4, designated path cost 0
Timers: message age 1, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 4, received 112

Port 7 (FastEthernet0/7) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.7.
Designated root has priority 32768, address 0009.b7f5.5a41
Designated bridge has priority 32768, address 0009.b7f5.5a41
Designated port id is 128.7, designated path cost 19
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 637, received 0

Switch A#show spanning-tree brief

VLAN1
Spanning tree enabled protocol ieee
**Root ID**  
- **Priority**: 32768  
- **Address**: 0009.b7f5.5a41  
- **Cost**: 19  
- **Port**: 4 (FastEthernet0/4)  
- **Hello Time**: 2 sec  
- **Max Age**: 20 sec  
- **Forward Delay**: 15 sec

**Bridge ID**  
- **Priority**: 32768  
- **Address**: 0009.b7f5.6d81  
- **Hello Time**: 2 sec  
- **Max Age**: 20 sec  
- **Forward Delay**: 15 sec  
- **Aging Time**: 300

<table>
<thead>
<tr>
<th>Interface</th>
<th>Name</th>
<th>Port ID</th>
<th>Prio</th>
<th>Cost</th>
<th>Sts</th>
<th>Cost</th>
<th>Bridge ID</th>
<th>Port ID</th>
<th>Designated</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastEthernet0/4</td>
<td></td>
<td>128.4</td>
<td>128</td>
<td>19</td>
<td>FWD</td>
<td>0</td>
<td>32768 0009.b7f5.5a41</td>
<td>128.4</td>
<td></td>
</tr>
<tr>
<td>FastEthernet0/7</td>
<td></td>
<td>128.7</td>
<td>128</td>
<td>19</td>
<td>FWD</td>
<td>19</td>
<td>32768 0009.b7f5.6d81</td>
<td>128.7</td>
<td></td>
</tr>
</tbody>
</table>
Erasing and Reloading the Switch

For the majority of the labs in CCNA 3 and CCNA 4 it is necessary to start with an unconfigured switch. Use of a switch with an existing configuration may produce unpredictable results. These instructions allow preparation of the switch prior to performing the lab so previous configuration options do not interfere. The following is the procedure for clearing out previous configurations and starting with an unconfigured switch. Instructions are provided for the 2900, 2950, and 1900 Series switches.

2900 and 2950 Series Switches

1. Enter into the privileged EXEC mode by typing `enable`.

   If prompted for a password, enter `class` (if that does not work, ask the instructor).

   ```
   Switch>enable
   ```

2. Remove the VLAN database information file.

   ```
   Switch#delete flash:vlan.dat
   Delete filename [vlan.dat]? [Enter]
   Delete flash:vlan.dat? [confirm] [Enter]
   ```

   If there was no VLAN file, this message is displayed.

   `%Error deleting flash:vlan.dat (No such file or directory)`

3. Remove the switch startup configuration file from NVRAM.

   ```
   Switch#erase startup-config
   ```

   The responding line prompt will be:

   ```
   Erasing the nvram filesystem will remove all files! Continue? [confirm]
   ```

   Press Enter to confirm.

   The response should be:

   ```
   Erase of nvram: complete
   ```

4. Check that VLAN information was deleted.

   Verify that the VLAN configuration was deleted in Step 2 using the `show vlan` command. If previous VLAN configuration information (other than the default management VLAN 1) is still present it will be necessary to power cycle the switch (hardware restart) instead of issuing the `reload` command. To power cycle the switch, remove the power cord from the back of the switch or unplug it. Then plug it back in.

   If the VLAN information was successfully deleted in Step 2, go to Step 5 and restart the switch using the `reload` command.

5. Software restart (using the `reload` command)
**Note:** This step is not necessary if the switch was restarted using the power cycle method.

a. At the privileged EXEC mode enter the command `reload`.

```
Switch#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

b. Type `n` and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm] [Enter]
```

The first line of the response will be:

```
Reload requested by console.
```

After the switch has reloaded, the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

c. Type `n` and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started! [Enter]
```

### 1900 Series Switches

1. Remove VLAN Trunking Protocol (VTP) information.

```
#delete vtp
```

This command resets the switch with VTP parameters set to factory defaults.
All other parameters will be unchanged.

```
Reset system with VTP parameters set to factory defaults, [Y]es or [N]o?
```

Enter `y` and press **Enter**.

2. Remove the switch startup configuration from NVRAM.

```
#delete nvram
```

This command resets the switch with factory defaults. All system parameters will revert to their default factory settings. All static and dynamic addresses will be removed.

```
Reset system with factory defaults, [Y]es or [N]o?
```

Enter `y` and press **Enter**.