

Ethernet LANs

Troubleshooting Switch Issues



The Layered Approach

- Switches operate at Layer 2 of the OSI model.
- Switches provide an interface with the physical media.
- Problems are generally seen at Layer 1 and Layer 2.
- Layer 3 issues could arise that are related to access to the management functions of the switch.

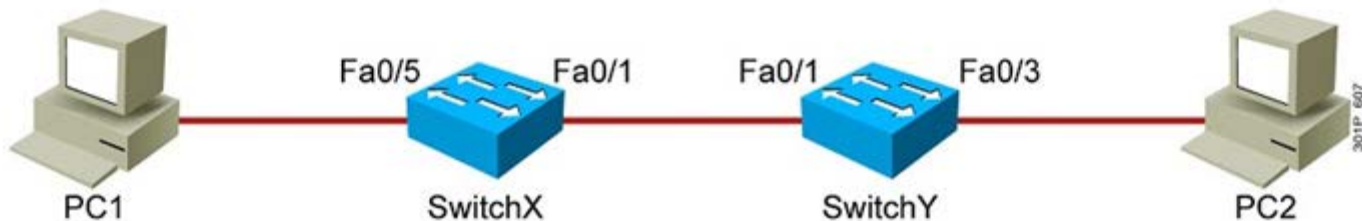
Port Access Issues

- Media-related issues
- Duplex-related issues
- Speed-related issues

Duplex-Related Issues

Duplex modes:

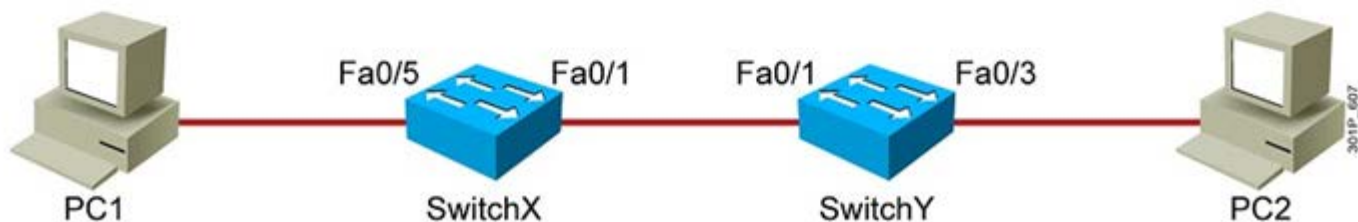
- One end set to full and the other set to half results in a mismatch.
- One end set to full and autonegotiation set on the other end:
 - Autonegotiation fails, and that end reverts to half.
 - Results in a mismatch.
- One end set to half and autonegotiation set on the other end:
 - Autonegotiation fails, and that end reverts to half.
 - Both ends at half; no mismatch.



Duplex-Related Issues (Cont.)

Duplex modes:

- Autonegotiation on both ends:
 - One end fails to full, and the other end fails to half.
 - Example: A Gigabit Ethernet interface defaults to full-duplex mode, while a FastEthernet interface defaults to 10/100 Mb/s speed and half-duplex mode.
- Autonegotiation on both ends:
 - Autonegotiation fails on both ends, and they revert to half.
 - Both end at half; no mismatch.



Speed-Related Issues

Speed modes:

- One end set to one speed and the other set to another, resulting in a mismatch.
- One end set to a higher speed and autonegotiation enabled on the other end.
 - If autonegotiation fails, the autonegotiation end reverts to its lowest speed.
 - Results in a mismatch.
- Autonegotiation on both ends:
 - Autonegotiation fails on both ends, and they revert to their lowest speed.
 - Both end at half; no mismatch.

Switched Media Issues

Media issues have several possible sources:

- Wiring gets damaged
- New EMI sources are introduced
- Traffic patterns change
- New equipment is installed

show interface

```
SwitchX#show interface fastethernet 0/0
FastEthernet 0 is up, line protocol is up 1
Hardware is Fast Ethernet, address is 0022.91c4.0e01 (bia 0022.91c4.0e01)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    .
    .
    Output Omitted
    .
    .
2295197 packets input, 305539992 bytes, 0 no buffer
Received 1925500 broadcasts, 0 runts, 0 giants, 0 throttles
3 input errors, 3 CRC, 0 frame, 0 overrun, 0 ignored 2
0 watchdog, 68 multicast, 0 pause input
0 input packets with dribble condition detected
3594664 packets output, 436549843 bytes, 0 underruns
8 output errors, 3
1790 collisions, 4
10 interface resets, 5
...
```


Excessive Noise

Suggested steps:

- Use the **show interface fastethernet** EXEC command to determine the status of the FastEthernet interfaces of the device. The presence of many CRC errors, but not many collisions, is an indication of excessive noise.
- Inspect the cables for damage.
- If you are using 100BASE-TX, make sure you are using Category 5 cabling.

Excessive Collisions

Suggested steps:

- Use the **show interface fastethernet** command to verify the rate of collisions.
- Use a TDR to find any Ethernet cables that are not terminated.
- Look for a jabbering transceiver attached to a host. This might require host-by-host inspection or the use of a protocol analyzer.

Late Collisions

Suggested steps:

- Use a protocol analyzer to check for late collisions. Late collisions should never occur in a properly designed Ethernet network. They usually occur when Ethernet cables are too long or when there are too many repeaters in the network.
- Verify that the distance between the first and last host on the segment is within specification.
- Verify that duplex setting on interfaces match.

Configuration Recommended Practices

- Know what you have before you start.
 - Hard copy
 - Text file
 - TFTP server
- Verify changes before you save.
 - Confirm that the issue was corrected and no new issues were created.
- Save the current configuration.
 - copy running-config start-config
- Secure the configuration.
 - Password-protect the console.
 - Password-protect the vty.
 - Password-protect EXEC mode.

Example of Configuration Issues



```
SwitchX#show running-config
Building configuration...

Current configuration : 1056 bytes
!
<output omitted>
!
interface FastEthernet0/1
  duplex half
  speed 10
!
<output omitted>
```

```
SwitchY#show running-config
Building configuration...

Current configuration : 1056 bytes
!
<output omitted>
!
interface FastEthernet0/1
  duplex full
  speed 100
!
<output omitted>
```

Summary

- Use a layered approach to troubleshooting.
- Use the **show interfaces** command to troubleshoot these issues:
 - Media issues
 - Duplex issues
 - Speed issues
- Media issues have several possible sources.
- Keep a copy of configurations and protect the running configuration.