



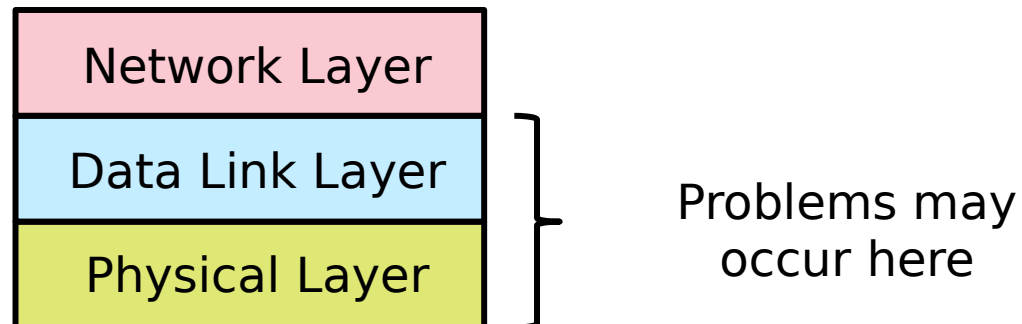
SPNGN1 v1.01—2-1

Objectives

- Describe troubleshooting layer 2 switch issues using a layered approach
- Identify and resolve common switched network copper media issues
- Describe common issues with fiber media
- Describe how to use the **show interfaces** command to troubleshoot media issues
- Describe how to identify excessive noise
- Describe how to identify and correct excessive numbers of collisions
- Identify and resolve common access port issues
- Describe how to identify and correct duplex-related issues
- Describe how to identify and correct speed-related issues
- Identify and resolve common configuration issues

Layered Troubleshooting

- 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 can arise related to access to the management functions of the switch.



Copper Media Issues

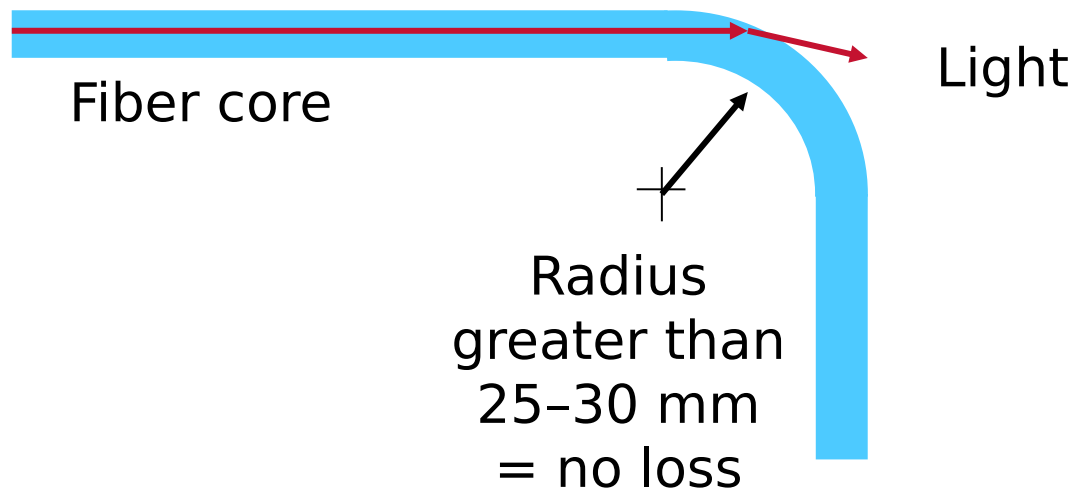
Copper media issues have several possible sources:

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

Fiber Media Issues

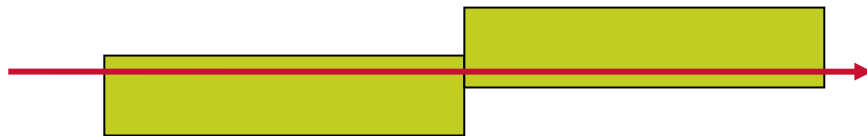
Fiber media issues have several possible sources:

- Macrobend losses
 - Bending the fiber in too small a radius causes light to escape.
 - Light strikes the core or cladding at less than the critical angle.
 - Total internal reflection no longer happens—light leaks out.

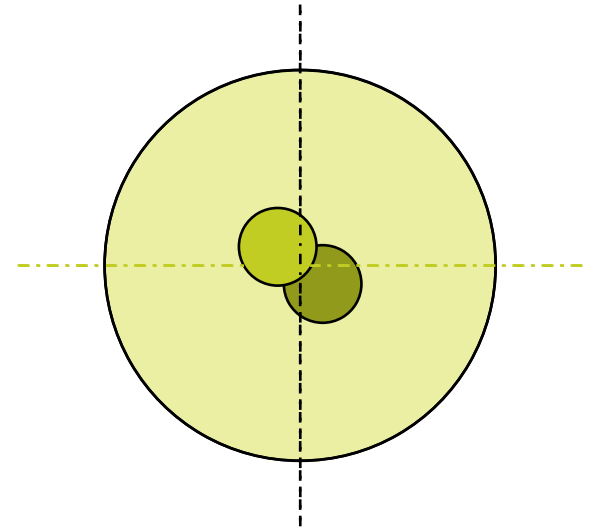


Fiber Media Issues (Cont.)

- Splice losses
 - Nonconcentric cores can cause losses for both splices and connectors.
 - Both rely on the outer diameter of the fiber being concentric with the cores.



Core-to-core



show interfaces Command

```
Switch#show interfaces FastEthernet 0/1
```

```
FastEthernet0/1 is up, line protocol is up (connected) [1
```

```
Hardware is Fast Ethernet, address is e8ba.70e1.fa83 (bia e8ba.70e1.fa83)
```

```
.
```

```
.
```

```
Output omitted
```

```
.
```

```
.
```

```
352886 packets input, 38282538 bytes, 0 no buffer
```

```
Received 54681 broadcasts (54678 multicasts)
```

```
0 runts, 0 giants, 0 throttles
```

```
3 input errors, 3 CRC, 0 frame, 0 overrun, 0 ignored [2
```

```
0 watchdog, 54678 multicast, 0 pause input ]
```

```
0 input packets with dribble condition detected
```

```
298340 packets output, 19093760 bytes, 0 underruns
```

```
[3 8 output errors, 1790 collisions [4 10 interface resets
```

```
] 0 babbles, 0 late collision, 0 deferred
```

```
0 lost carrier, 0 no carrier, 0 PAUSE output
```

```
0 output buffer failures, 0 output buffers swapped out
```

Excessive Noise

Suggested steps:

- Use the **show interface ethernet** EXEC command:
 - The command determines the status of the device Ethernet interfaces.
 - The presence of many CRC errors but not many collisions is an indication of excessive noise.
- Inspect the cables for damage.

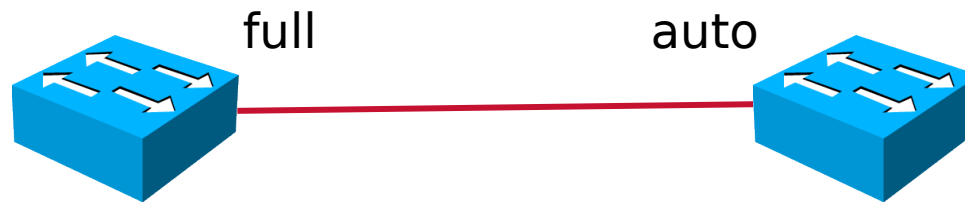
Excessive Collisions

Suggested steps:

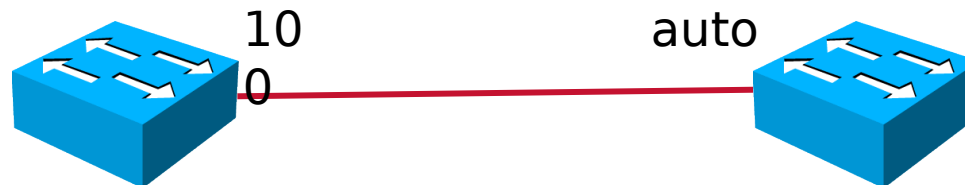
- Use the **show interface** command to check the rate of collisions:
 - The total number of collisions as a percentage of the total number of output packets should be 0.1 percent or less.
- Use a time domain reflectometer (TDR) to find any unterminated Ethernet cables:
 - A TDR is a device that sends signals through a network medium to check cable continuity and other attributes.
- Look for a jabbering transceiver attached to a host:
 - This might require host-by-host inspection or the use of a protocol analyzer.
 - Jabber occurs when a device that is experiencing circuitry or logic failure continuously sends random (garbage) data.

Port Issues

- Media-related issues
- Duplex-related issues



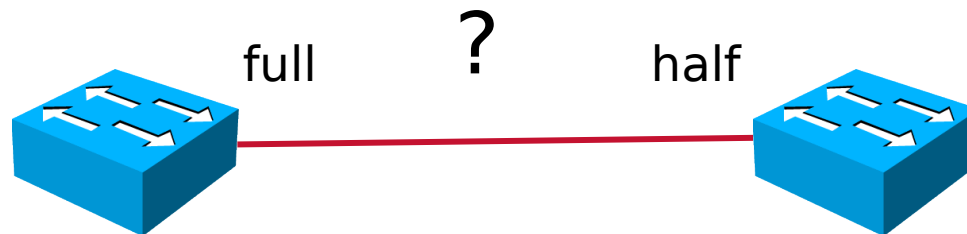
- Speed-related issues



Duplex-Related Issues

Examples:

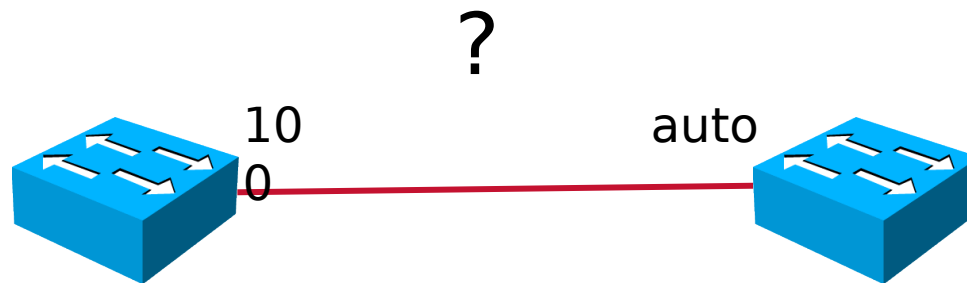
- One end set to full and the other set to half results in mismatch
- One end set to full and autonegotiation set on the other end
- One end set to half and autonegotiation set on the other end
- Autonegotiation set on both ends



Speed-Related Issues

Examples:

- One end set to one speed and the other set to another speed, resulting in a mismatch
- One end set to a higher speed and autonegotiation enabled on the other end
- Autonegotiation set on both ends



Configuration Issues

- 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

Summary

- Use a layered approach to troubleshooting.
- Issues in copper media are common and have different sources.
- Macrobends are typical sources of losses in fiber media.
- Use the **show interface** command to troubleshoot media issues.
- When you troubleshoot issues that are related to excessive noise, you should inspect the cable for damage.
- Collisions should never occur in properly designed switched network.
- Common port issues are duplex or speed-related.
- If autonegotiation of duplex fails, both ends could revert to different settings and there is a mismatch.
- If autonegotiation of speed fails, both ends could revert to different settings and there is a mismatch.
- Keep a copy of configurations and protect the running

