

**Objectives:**

- Describe a common Ethernet Auto-negotiation issue.
- Describe a common Ethernet Duplex Mismatch issue.

**Intro:**

Something is wrong at ACME Inc. network. They called you claiming one of the User PC is behaving strangely. Sometimes, after a reboot, a few packets are transmitted/received by the PC and then it loses network connectivity. Other times, the network access from this PC is extremely slow. Once more the company's Support Team reports they have already checked for viruses and malicious software running on the PC but nothing was found.

**The Scenario:**

You get to ACME office and, based on the fact the other user PCs are working fine (no complaints), assume the Central Switch and the server should not have any major issues. Because of that you go straight to the problematic PC.

The reports provided by the by ACME's Support Team are consistent and based on the tools, procedures and tests performed by them, you conclude no viruses or malicious software are running on that user PC as well.

A visual inspection on the mentioned PC's cabling leads to the belief that the link is up (led is lit/flashing). You start the troubleshoot process by rebooting the PC and accessing the network resources from it. It is really a lot slower than normal and it eventually loses connectivity. Since no other user PCs has such problems and the PC is clean of malicious software, you suspect of the NIC card.

The operational system on the PC reports the link between the PC and Central Switch was established but also reports a big amount of link errors on that NIC card. It also shows the card is configured to operate at 100Mbps, Full Duplex.

You go check the configuration on the Central Switch and learn that the port which the problematic user PC is connected to has the default configuration, (auto-negotiation set to AUTO) as do all the other ports. Because the NIC installed on the user PC has manual configuration (100Mbps, Full Duplex), the switch does not see any Ethernet auto-negotiation information from NIC and defaults to half-duplex when operating at 10/100 Mbps. Because the switch port ends up configured to work on half-duplex mode and the user PC to full-duplex, a Duplex Mismatch is created. Even though the link is established, no traffic is sent/received.

As you well know, a duplex mismatch can result in performance issues, intermittent connectivity, frame check sequence (FCS) errors that increment on the switch port and loss of communication.

Auto-negotiation issues can result from nonconforming implementation, hardware incapability, or software defects.

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Duplex mismatch and auto-negotiation problems can be caused by software defects on the installed NIC drivers or by physical failures on the NIC card hardware.

**Question 1:**

What would solve the problem?

**Answers:**

*Q1a. Have the NIC card set to work on the AUTO mode. This would force the card to negotiate link speed and duplex mode with the switch which would lead to a link characteristics agreement between both ends.*

*Q1b. Manually configure the switch port to operate at 100Mbps, Full Duplex.*

*Q1c. Updating NIC drivers is also a possible solution in cases of NIC software related problems.*