Multiple Switches can Slow a Network Down

1 Overview

A question is, can multiple network switches, slow down either the network or the WAN. The answer is yes. Let's discuss a working example today.

2 The Previous IT Guys

Today I was working at an office. They had a firewall connected to a Verizon FIOS modem. They had a gigabit [1]switch immediately downstream, and then a network cable ran about 50-75 feet to their office. Here they had another Gigabit switch, and then the cables went off to either computers or other switches. Let's forget about what was downstream of that last switch except for the computers.

2.1 Internet Speeds

The internet speed from the two computers in the office was about 10Mbps down and roughly the same upload. However, I tested the speed directly from the IT closet, and found 100Mbps down and 100Mbps up. At this point, it was a simple case of following the signal path and seeing where things slowed down. At least, I knew that they *should* be getting 100/100Mbps.

2.2 The Tests

What I found is that as soon as I had two switches after the firewall [2]the speed would drop to 10/10. It was not dependent upon any brand of switch. I tried swapping from one other model that was available. The slowdown appeared to be switch independent. So in summary:

- Firewall - computer - 100/100

- Firewall - switch - computer - 100/100

- Firewall - switch - 50 foot wire - computer - 100/100

- Firewall - switch - 50 foot wire - Switch A- computer - 10/10

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[1]Actually, all switches were gigabit, but it didn't make a difference.
[2]which has its own internal switch

- Firewall - switch - 50 foot wire - Switch B- computer - 10/10

What I did was remove the switch at the outside of the firewall. Now I had only
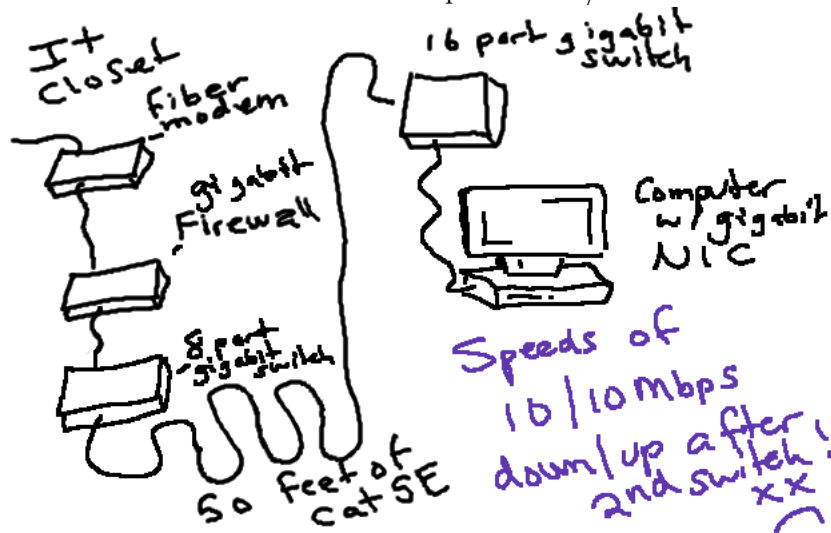
Firewall - 50 foot wire - Switch - Computer - 100/100

Figure 1: Here, removing the first switch after the firewall, resolved the low speed issues.

3 Additional Background

I've heard an IT person mention that he didn't like multiple switches in network deployments, due to speed issues. On the other hand, I've setup Video Recording Networks with multiple switches all connecting serially to each other without issue. It seems that this is not a simple black and white issue. With the right hardware you may get away with it. Or if you avoid WAN access. In any case, the only way to know, is to test.

4 Conclusion

If you are going to put >1 switches downstream of the firewall, make sure to double check the speed tests of WAN access. LAN access was no impacted in any significant way.