Beware the USB adaptor slowing your laptop down!

In this modern era of super thin laptops there is less and less space for the traditional RJ45 socket on the side or back of your device. The solution is to use a smaller form factor connection, such as a USB-C, using an adaptor to plug your RJ45 into. The large range in prices for these adapters raises the question, are they all the same?

The Test

We had two such adapters available to test:

1) a USB hub style one for the desk top, which offers added USB connectivity

2) a smaller, neater one for the laptop bag

The profile used was a 1Gig throughput test. An RFC2544 test specifically, testing to 1Gig each the time, but using a range of different frame sizes. For example, a 64Byte frame size, where 1.486 million frames per second are generated to reach 1Gig, compared to 81,269 frames per second with a 1518 Byte frame size. Basically, small frames make a network work harder.

SETUP

Name	10.0.1.76
Target	10.0.1.76
Type	Reflector
Target Rate	1.00 Gbps
Duration	10 s
Frame Size	RFC 2544 Sweep
DSCP	0
Port	3842
Loss Limit	1.00%

Results

A summary of the test results can be seen in the table below:

Adaptor	Worst Result	Best result
1) USB hub style adapter	95% Loss – 50Mbps Throughput	2% Loss – 980Mbps Throughput
2) Smaller RJ45 adapter	96% Loss – 40Mbps Throughput	80% Loss- 200Mbps Throughput

The results above show that both adapters just don't cope with small frame sizes, thus lower throughput, very well. Bearing in mind there are many technologies that use small packets deliberately, such as VoIP, Video and Terminal Services such as Citrix, this end of the packet spectrum is of great interest in the real world. The significant difference in the numbers is at the bigger packets sizes where the data rate is the same but there are less on/off frequency changes going on.

Conclusions

The results confirmed that working with small packets is a challenge for both adapters tested. The nature of the on/off required to send the frames and the gaps that need to be left are inefficient at best and clearly there are limits as to how fast the adapters can cope with the frequency changes in broadcasting this fast.

However, to bring a real-world element into this, there are a number of technologies that rely on small packets, such as VoIP, Video, Citrix etc, but these technologies are designed to operate on a few Mbps of bandwidth anyway. Based on these figures, running a Video call and a Citrix session on you Laptop simultaneously is not really going to cause any issues.

The flipside is when you first logon in the mornings or pull large files to your laptop, these processes use large packet sizes, as they are meant to be more efficient and faster. Here your choice of adapter could be making a huge difference to the performance you see.

So, when you spec your new laptop with fast drives and multiple USB3 ports etc, to make sure you have the fastest technology available, don't forget to spend a little more on a better-quality adapter for your RJ45 connection.

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