Increasing the Internet Speed and Bandwidth using the Laws of Physics

Sharad Shriram

sharad.sriram@gmail.com

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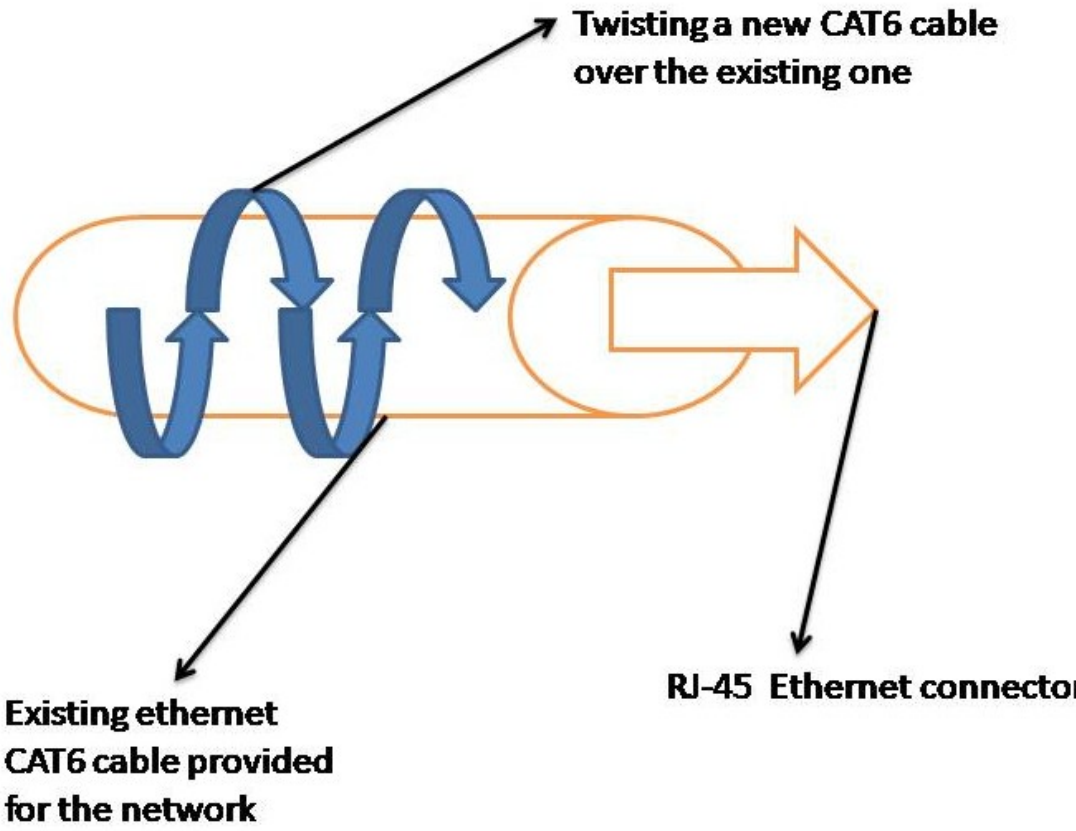
WHY IS MY INTERNET SLOW?

Introduction

- A slow internet is a frustrating thing in the information age.
- We want everything fast and the internet speed is the first on this list.
- Speed comes with a big price tag!!
- We aim to increase the internet speed in an efficient way with an effort to reduce extra costs.

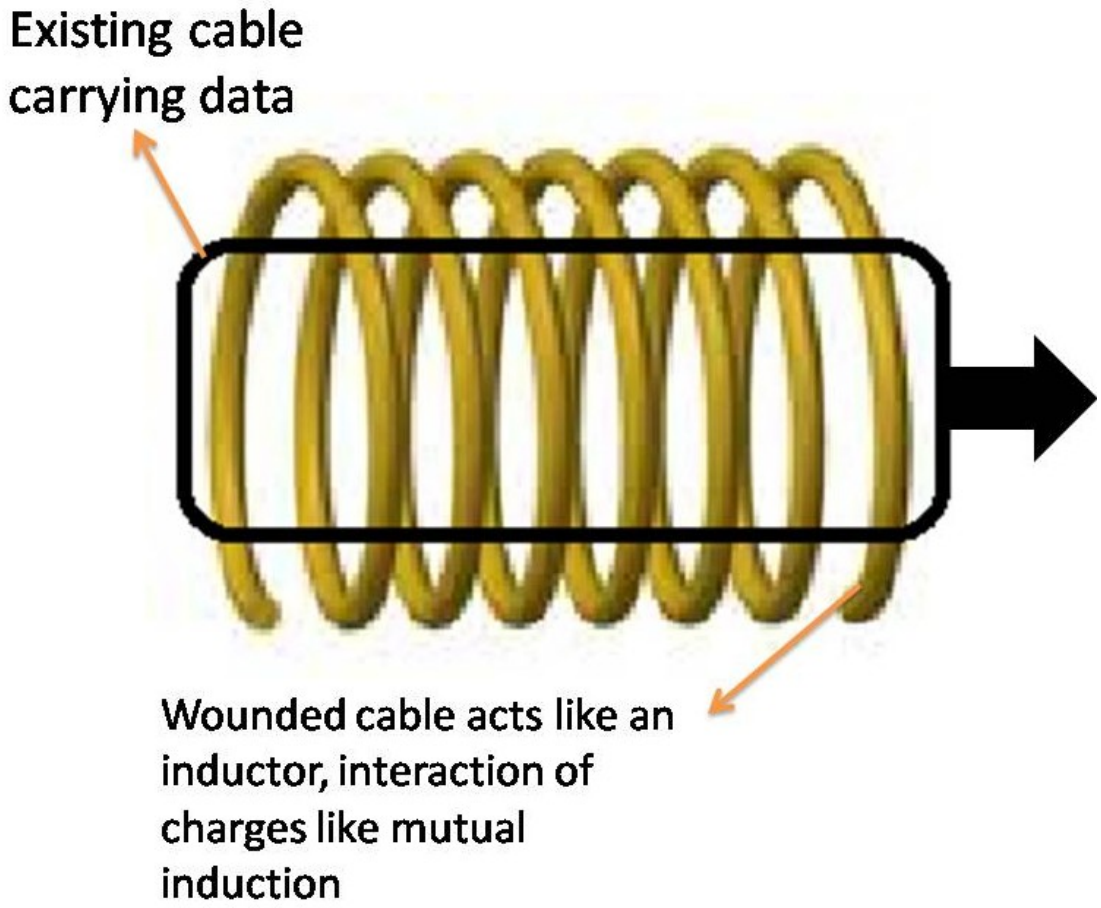
Proposed Solution

- The solution is to twist a new cable around the existing cable.
- The twisted cable acts as an amplifier of the signal flowing through the cable.



Assumptions Made..

- *Cables as Capacitor*: The cables acts as the parallel plates in a capacitor with air as the dielectric medium.
- *Cables as Inductor*: An Electromagnetic field produced in each cable. By mutual induction, we find out the net magnetic field is zero.



Laws Used and their Application

- *Gausss Law of Electrostatics* is used to establish a relationship between the electric field produced and the capacitance in the cable.
  Modification: A Gaussian surface is assumed and we get relations to the C.S.A. of cable and Flux produced.
- *Kirchhoffs Current Law* is used to prove that the current flowing in the cable and the twisted cable is equal and opposite in direction.
  Modification: Current is called Information Constant-rate of data flowing through the cable.
- *Ohms Laws* is used to deduce an equivalent relation between the Capacitance voltage and the current and inductance produced inside the cable.
  Modification: Capacitor voltage is deduced with relation to Inductance and Information Constant.

Theoritical Proof

After doing some calculations and factoring in the results of our assumptions, we get an expression that relates the Information Coefficient (amount data transmitted in the cable) and the total surface area of the cable (which is cylindrical).

$$L * I = \varepsilon_0 * \oint E * d(2\pi * r * l)$$

The above expression can be simplified, by substituting A for the formula $2\pi * r * l$ and by removing the constants,

$$I \propto \oint E * d(A) \Rightarrow \frac{I}{A} = constant$$

Theoritical Proof (contd..)

Now, we compare the physical nature of the cable before and after twisting. It is a noted that the cable is double in the measure of its radius and the surface area. This statement can be mathematically expressed as,

$$\frac{l_1}{l_2} = \frac{A_1}{A_2} = \frac{2\pi * r * l}{2\pi * (2 * r) * l} = \frac{1}{2}$$

Speed Graph

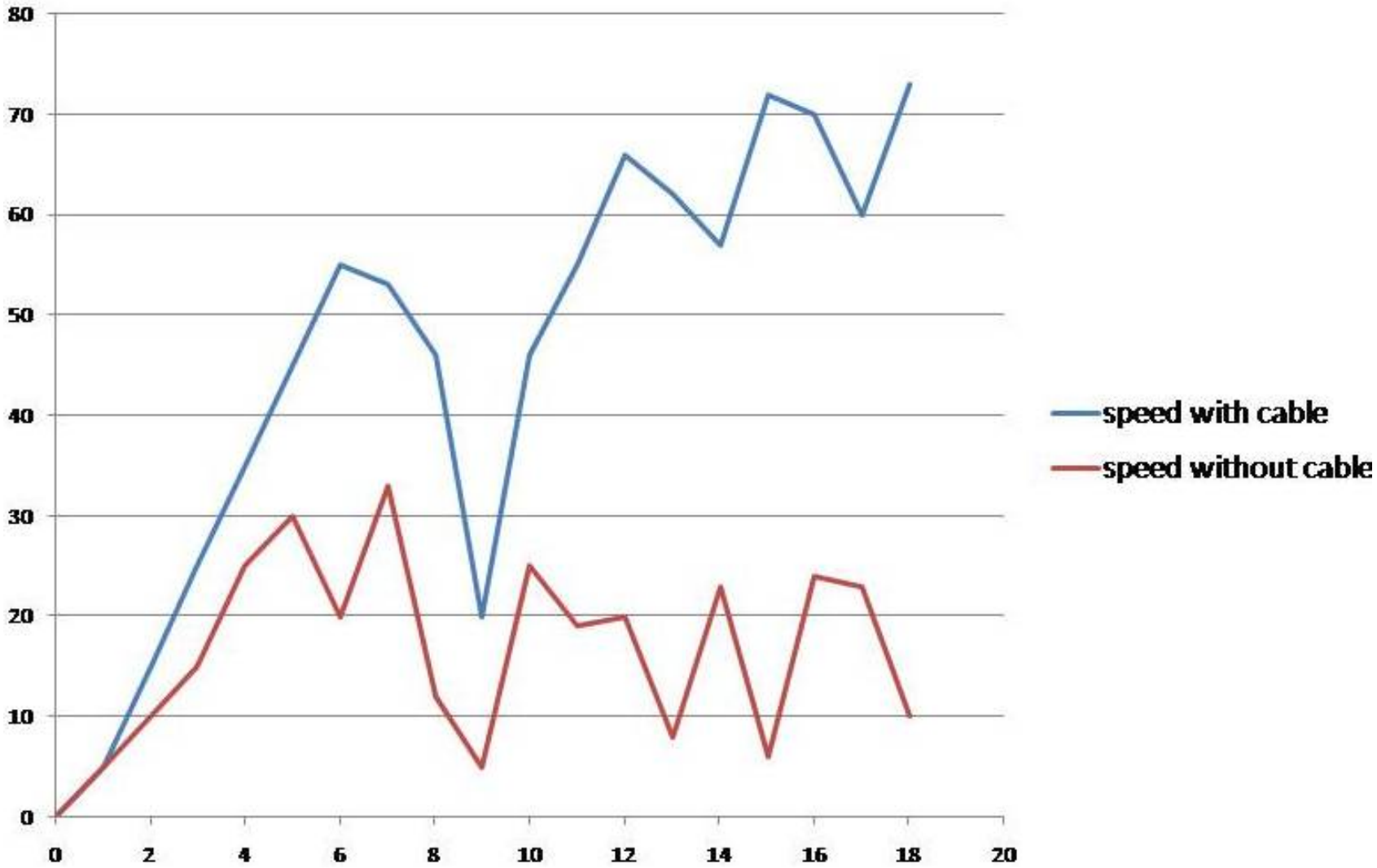


Figure: The variations in the internet speeds where the horizontal axis represents the time (in seconds) and the vertical axis represents the internet speeds in (Kbps)

Results of Speed and Packet Transmission Test

Model no.:	Description of the experimentes conducted	Ping (ms)		Download speed (Mbps)		Upload speed(Mbps)		Packets sent (bytes)		Packets received (bytes)	
		Without cable	With cable	Without cable	With cable	Without cable	With cable	Without cable	With cable	Without cable	With cable
1.	a) without internet	0	0	0	0	0	0	97	20,484	0	36,812
	b) only with browser	105	104	0.56	0.70	0.20	0.20	229	28,034	93	104,475
2.	a) browser with ms excel	95	105	0.48	0.86	0.20	0.20	236	28,250	99	104,475
	b) browser without ms excel	104	105	0.58	0.78	0.20	0.20	256	28,358	110	104,595
3.	a) browser with game(fruit ninja)	104	102	0.50	0.75	0.21	0.20	300	75,788	145	244,076
	b) browser without game(fruit ninja)	90	104	0.48	0.84	0.20	0.20	325	85,498	163	369,656

Results of Download Test

s.no	Name of the packet	Site from which packets downloaded	Size of the package (MB)	Download time (in min.)		% gain
				With the cable	Without cable	
1.	Dev C++ Portable v5.4.2	www.softpedia.com	31.08	17	23	35.29
2.	Mozilla Firefox v22.0	www.filehippo.com	20.83	10	14	40
3.	VLC media player v2.0.7	www.get.vediolan.org	21.9	9	13	44.4
4.	Mini tool partition wizard	www.download.cnet.com	14.4	9	12	33.3
5.	YTD Video Downloader	www.download.cnet.com	10.59	7	10	42.8
					Average % gain	39.2

Figure: Time taken to download depends on the existing internet speed.

Advantages and Disadvantages

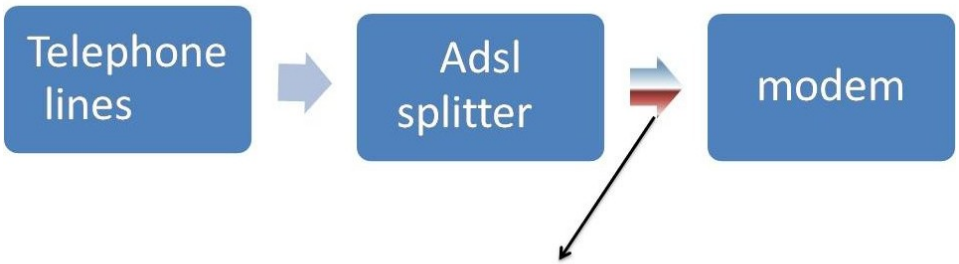
Advantages

1. Offers a faster internet in a simple and efficient way.
2. The cables keeps your computer safe -no malware, etc.
3. A cost-effective method to enhance existing networks for a faster internet .
4. Simpler because NO Registry Tweaks are done.

Disadvantages

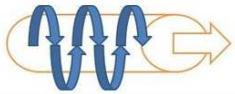
1. *Cable Strength* - The twisting done on the cable becomes loose over a period of time.
2. *Usability* - The quality of the cable used determines the usability and also the longevity of the cable.
3. *Restricted Movement* - The alteration in the topology of the network or its re-arrangement is difficult as the cable requirement varies .

Optimisations



Twisting a new cable over the existing cable from the ADSL splitter to the modem

When a long cable is used optimisation by twisting a new cable over the existing cable is done as described in this fig.

colour	pictorial representation	description
		a fractional length of the cable is twisted over the existing cable.
		Unoptimised normal cable.

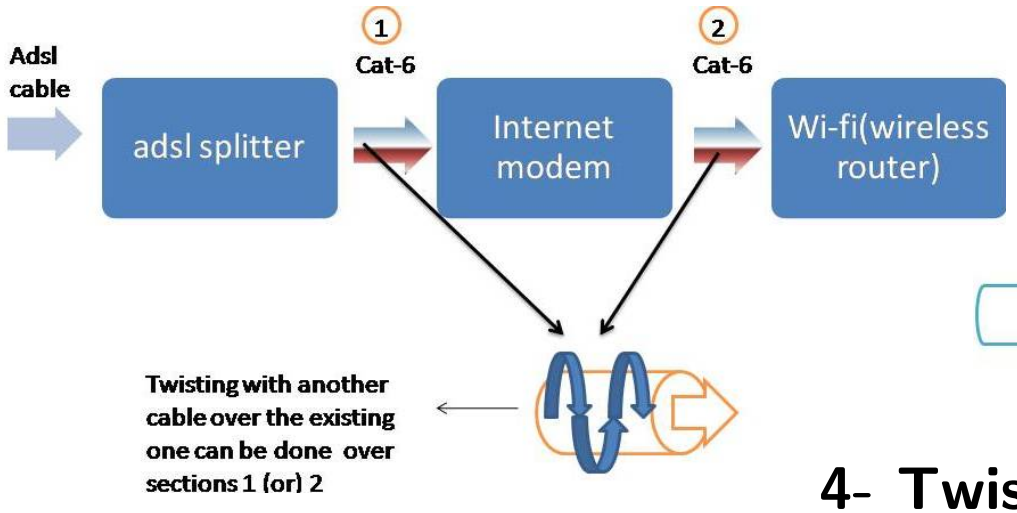
1- Twisting cable between modem and ADSL splitter

- Works, if CAT-5 cables are used from a ADSL splitter to the modem.
- We twist another CAT-5 cable over the existing cable and implement this idea.

2- Long distance optimisation

- Cables are long (like10 meters or more), we twist cables of smaller lengths (1-2 metres)*.
- Amplification is achieved by twisting small cables at fixed intervals and at the ends.

Optimisations (contd..)



3- Implementation Over Wi-Fi

- This offered the normal efficiency in terms of the internet speed that was got in the nodes of the network

4- Twisting only at the ends

- A small length of cable is twisted at the ends of the existing cable.
- This had a efficiency drop initially but, was giving an efficiency of 25% - 34% on a continuous use of over a week

Conclusion and Future Work

- More research has to be done to efficiently increase internet speeds.
- A method to establish new parameters in network communication, cabling standards and security must be done to provide high-speed internet.
- This idea is an application of a common day-to-day action of twisting cables for amplification results increases internet speeds.

References

Photo:
http://img.comptalks.com/uploads/2010/09/slowInternet-321x300.jpg
Paper:

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Thank you!