Submission to
The Senate Select Committee
on the
National Broadband Network

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01 About

My name is Derek Bell. I operate from home as a sole trader under the name Lucid Web Design. I develop web pages for mainly small business clients.

A normal part of my workflow consists of uploading data to up websites and synchronising work files using various cloud services. I rely upon the ability to upload for my bread and butter.

An upgrade to the network to is an absolute priority.

02 Principles

A National Broadband Network should:

- Be seen as an essential utility like gas, electricity, water or telephone.
- Provide decent coverage for all Australians.
- Uniform national prices.
- Should be a wholesale provider that operates as a level playing field for service providers of all sizes from small businesses to large corporations to allow an effective, competitive market.
- Be separate from any retail provider such as Telstra.
- Provide an efficient upgrade path for future technologies. It should avoid locking in legacy technologies.
- Provide Internet that adapts to the needs of users

03 My ADSL Connection

I have an ADSL connection. My ISP is Internode. They use Telstra infrastructure to connect to their network.

My current ADSL connection is barely adequate for my needs. Due to distance from the exchange and an aging copper network, I can't expect to get any major improvement from ADSL. It has reached it limits.

These are the figures my modem regularly gives me for expected connections

ADSL Link	Downstream	Upstream
Connection Speed	4.310 Mbps	0.646 kbps
Line Attenuation	56.5 dB	38.3 dB
Noise Margin	5.5 db	5.5 db

The reality of what I get it quite different. It is much lower and quite variable.
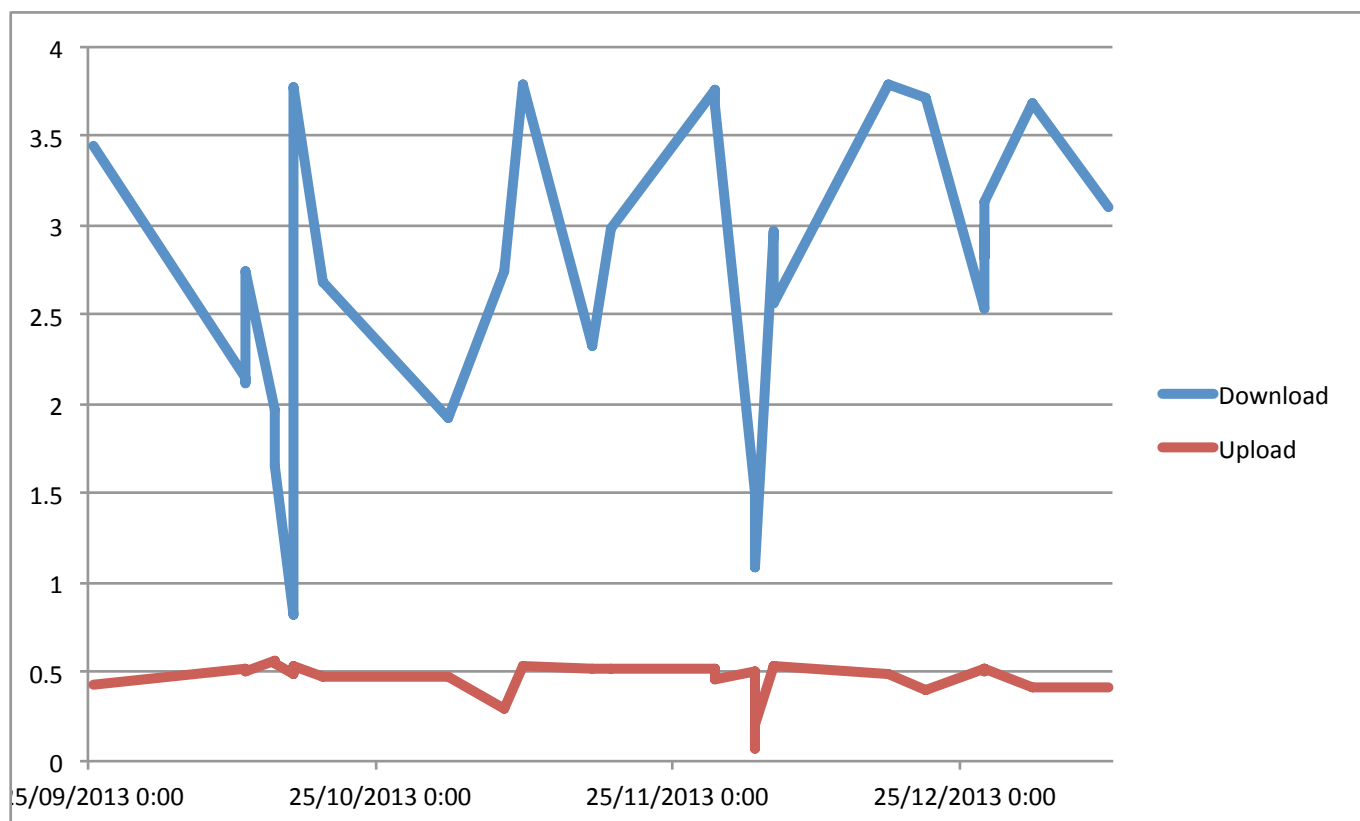
Measurements taken from speedtest.com. Speed is in Mbps

The graph above shows my Internet upload and download speeds. The average speed is 2.67Mbps for downloads and 0.467Mbps for uploads. The Internet becomes degraded when several users are online at the same time. This is particularly true if one person uploads a file. Other users in the house experience significantly slower speeds which makes the Internet almost unusable.

Problems also occur with network congestion at peak times such as early evenings, weekends and school holidays.

The Internet also slows down after it rains.

04 My Internet use

As you would expect, my work is heavily entwined with the Internet.   My usage can be broken down to the following:

- Synchronising web sites using FTP and RSYNC.
- Use of cloud applications such as Adobe Creative Cloud and Microsoft Office
- Heavy use of social media
- Use of the web for self education.
- Updates of software are done online.
- Phone calls made using VOIP

My current ADSL connection prevents me from:

- Backing up data from my NAS to the cloud.
- Efficiently mirroring web servers on my local network.
- Efficiently using cloud services such as Adobe Creative Cloud.

05 Uploads

A lot has been said about downloads in the debate but virtually no focus has been put on uploads. Uploads are becoming more and more important as the Internet continues to evolve.

The web started out pretty much as a one-way street. We looked up information and jumped from link to link. That has changed. The web runs 2 ways. The same thing will happen to how we use broadband.

Sites like Facebook, YouTube & Twitter don't create content. The users do. At the moment, around 30 billion pieces of content are shared each month on Facebook. That includes news stories, photos, links, posts and notes etc. The average user creates around 90 pieces of content each month.

Twitter handles 500 million Tweets a day which means about 5,700 Tweets a second, on average. That's a lot of data.

Looking at YouTube, the figures are equally staggering. More than 1 billion unique users visit YouTube each month. Over 6 billion hours of video are watched each month on YouTube—that's almost an hour for every person on Earth, and 50% more than last year. 100 hours of video are uploaded to YouTube every minute.

These figures are current for around the latter half of 2013. One thing you can be sure of is that these figures will only grow.

5 Years ago, Facebook & Twitter barely existed. They way we use the web has fundamentally altered. The old model of the web being a giant online library still exists. It has been supplemented by people adding their own content. Businesses and private citizens alike have embraced these changes.

This is a fundamental change in the way we use the Internet. More is coming. Cloud storage is slowly taking off. If you take out a subscription to MS Office or use Adobe Creative Cloud, you get storage with it. If you use Apple's iPhoto, you will be familiar with photostream. Then there is Dropbox. Dropbox is an almost indispensible tool for me. It helps to streamline my work. If often get files from clients via Dropbox.

06 What about backing up files?

Currently, we back our files up to a NAS (network attached storage). We have around 1.5 terabytes of data backed up. That back up is on site. That could be a problem. What if disaster struck? If we gabbed the NAS then everything would be ok. However, if we don't then we have lost our data There is a solution to this problem. Store backup data online. The problem is that storing data to a

cloud back up service is not as practical as it sounds. The table below give an approximation of how it would take to do an initial back up of all my data.

Technology	Speed	Approx. Time
My current internet ADSL 2	2.67/0.47 Mbps	10 months
Telstra Cable HFC	30/1 Mbps	5 months
Telstra Cable HFC	100/2 Mbps	11 Weeks
FTTN	25/5 Mbps	1 month
FTTN	50/10 Mbps	16 days
Fibre to the home	100/40Mbps	3.75 days
Fibre to the home	1000/400Mbps	9 hours

Upload speed is important. It is vital for businesses. Imagine the possibilities if we had decent upload speeds. Video production would become a whole new world. Businesses would benefit from it being easy to connect offices. Working from home and home-based offices would have a whole new world.

07 Services requiring uploads

These are some common services now that rely on 2-way Internet traffic

- Dropbox
- Photostream for iPhoto
- Photo libraries such as Flickr
- Video such as YouTube, Vimeo etc.
- Videoconferencing
- Skype
- VOIP
- Adobe Creative Cloud
- Microsoft Office 360
- Synchronising files with other servers.
- Connecting servers between offices
- Telecommuting.

08 Technologies

08.1 ADSL

- Inadequate for current needs
- Slow upload speeds
- Slows down during peak times due to congestion
- Slows down during rain.
- Degrades over distance which makes it unworkable for many rural areas that are more than 5km from a telephone exchange.
- Unknown state of the copper network.

08.2 Fibre to the node

FTTN represents an improvement on current ADSL. However, VDSL is still a download based technology uploads are still restricted.

FTTN like ADSL requires significant maintenance.

The FTTN rollout requires around 60,000 cabinets to be installed. There will be a significant lead in time to order in the required number of cabinets and build a skilled workforce to install the nodes.

The Coalition pledge to have "download speeds of between 25 and 100 megabits per second by the end of 2016 and 50 to 100 megabits per second by 2019."[1] seems unobtainable. Firstly, the deadline is unlikely to be met. Time blowouts are nothing unusual for large projects. The second problem with this policy is that it indicates there will be 2 rounds to a FTTN rollout. The first being the deployment of the cabinets and the connection to the user. The second is the speed upgrade. Logically, this can only mean extra costs to complete the second phase of a FTTN rollout.

Many other countries such as New Zealand and the UK are now replacing FTTN with FTTP. It is highly likely the technology will be obsolete within 5 years of technology being deployed.

My ADSL speeds are slower than line attenuation figures would predict. This suggests a degraded copper network. Running VDSL over the same copper without extensive remediation would result in speeds well below those promised by the Coalition. The state of the copper network remains open for debate. A network riddled with corrosion will never achieve the speeds touted by the Minister.

08.4 HFC

A HFC runs outside my house. I did have a connection through Telstra Bigpond Cable.   Cable is a shared connection. When other users came online, speeds would drop dramatically. The promised speeds very rarely met their target. HFC cable is not designed for uploads. ADSL can upload faster.

Cable Internet in Australia is largely monopoly based. 3 providers currently supply cable Internet. Telstra, Optus & iiNet. Each provider operates an independent network. Consumers cannot choose another provide to supply cable Internet other than the owner of the network.

Opening the HFC network to competition will be easier said than done. The owners of the network infrastructure will not just give the HFC network away. They have a duty to their shareholders to maintain during negotiations. Gaining access to the network alone could become a slow and costly exercise.

DOCSICS 3.1 can deliver speeds similar to fibre. However, HFC would require significant upgrades. It would need vastly more nodes for it to become competitive with fibre.

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1   http://www.liberal.org.au/fast-affordable-sooner-coalitions-plan-better-nbn

08.4 Fibre to the premises

The expected minimum lifetime of optical fibre is 60 years. It does not rust or corrode when exposed to water for long periods of time.

Fibre is passive. It does not require electricity to run. Fibre is essentially made up of strands of glass and optical prisms. Maintenance required is minimal.

To upgrade the speed of fibre, it is simply a matter of replacing the equipment at each end of the fibre. If further capacity is required, more fibre can be rolled out.

Fibre is fast. Speeds exceeding 40,000 Mbps have already been demonstrated in research laboratories using the same type of fibre as the NBN.

09 Conclusions

Fast broadband represents significant improvements to Australia's ability to compete on a global market. Not only that, it also ahs the ability to bring the country together. It can bring resources back to rural areas a bridge the rural urban divide. One example is telemedicine. Fast broadband can be used in bush nursing hospitals to gain the expertise of specialists.

I often hear people question why the need for such speed? Will we ever need it? Cast your mind back to the days of Internet Explorer 5. Microsoft made it available as a download. It was 50meg. If you were on dial up, you left it running overnight. These days, those of us with broadband don't give it a second thought

FTTN is an interim measure. We see little sense to widely deploy a technology that will not meet the future needs of the country and require a second FTTN upgrade followed by an eventual upgrade to FTTP. FTTN does not allow for synchronous upload/download speeds. The lack of upload capacity means Australia will soon be struggling.

HFC can be a viable option in the short to medium term. It will undoubtedly take time to complete the commercial negotiations to gain wholesale access to the network. It will require substantial upgrades to make it as fast as fibre. There is still the question of whether or not it will have the upload capacity required. HFC too will need to be eventually upgraded to a full fibre network. However, HFC faces two major technical challenges. Upload speeds and congestion.

FTTP means it will become possible to have Internet connections of 1 Gbps and beyond if required. It is still much faster than any alternative.

FTTP allows for upload and download speeds to be the same.

Uploads are vital now, but will play an increasing role in the future. We need technology that will deliver decent upload speeds and have room for future demand.