National Broadband Network

Opening Address to Senate Select Committee

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About C-COR Broadband
An independent provider of integrated broadband carrier-grade products, complex VAS and accessories from best-of-breed vendors.

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My colleagues and I are pleased that we have this opportunity to raise the profile of cable broadband in the Australian context.

The purpose of the February Submission was to highlight the as yet untapped potential for Australia's existing cable networks to deliver the lowest cost broadband infrastructure to major cities and towns around Australia using cable broadband technology, and in doing so communicate the latent competitive advantages of CableLabs DOCSIS 3.0 when implemented over HFC (Hybrid Fibre Coaxial) and / or the fast emerging RFoG solution architecture.

The next wave of cable broadband technology development is be driven by the world's leading cable operators to meet customers' increasing demand for more bandwidth and video-centric applications like iPTV, interactive video, distance education and video telephony. Note the emphasis is on video as the emerging choice of user interface.

Cable broadband technology and network architecture continues to evolve and prosper against a competitive back drop where fibre (GPON/GePON) and VDSL2 vendors are urging traditional carriers to invest in their technology.

Cable broadband networks can deliver open access where the operators are prepared to open their networks. Because cable networks use internet networking standard products, like modems, in the customers' home or office, the operators could quickly launch new wholesale products and services for on-sale via independent retailers, creating diversity and energy in the retailing of broadband.

Beyond Australia, cable broadband is an established, highly competitive alternative for superfast internet and video rich media; preferred by many experienced carriers as their broadband technology of choice. In the Australian context the owners of existing cable broadband networks can invest and modernise with confidence, knowing that they can meet the market's latent demand for rich multi-media experience, choice of connectivity and innovation in services.

In Australia we have 4 cable broadband network operators. These networks are fibre-to-the node, now. These networks serve about 7 million Australians today.

At the centre of the NBN discussion is a requirement for downloads speeds of 12 Mbps. This begs the question 'Is this a peak-download or a minimum download speed'? Is it QoS enabled? Just like wireless broadband, VDSL2 technology performance suffers when a lot of customers use the network simultaneously. In this common occurrence there is not enough bandwidth capacity to ensure or guarantee these 'peak' downloads.

In the Submission I asked what is the NBN's expectation for uplink speed? Uplink bandwidth requirements are rarely discussed because to date they have not been a critical performance factor in measuring residential high speed data networks. However, residential and small-medium business user behaviours are rapidly changing and uplink bandwidth is becoming a driver in determining adequate network performance.

Cost-benefit: Modernise or New Build

The capital cost to modernise the existing Australian cable networks is by far the lowest cost option available to the Government. I also suggested that these cable broadband networks also deliver the lowest cost of bandwidth today. They are highly reliable and robust; the technicians to maintain and service them are in place.

I put it to the Senate Committee that this modernisation of, one or all, the cable networks is a much more compelling proposition. It is low risk. It means more NBN funds can be channelled into building new networks for those more disadvantaged than our fellow Australians within access to the existing cable broadband networks.

I considered some industry white papers on the relative performance differences between the fixed broadband platforms. Some simple findings from that research are:

- Residential Users are projected to need downstream access speeds of between 26 Mbps (Average User) and 44 Mbps (Power User) in the next few years based on the adoption of iPTV with multiple High Definition TVs in the home, interactive video, file transfers and of course VoIP;
- Users bandwidth requirements are increasing at a significant rate for guidance between 20% to 30% compound growth per annum;
- Today, GPON delivers 2.4Gbps in the forward path (downstream). Keeping it simple, that equates up to 75 Mbps for 32 concurrent Users;
- To be mischievous, if we redesigned the existing Australian HFC networks to 32 Users per node just like GPON then the comparable speed would be 135 Mbps per User; and finally,
- VDSL2, the touted fibre-to-the-node technology of choice, does not meet the projected bandwidth consumption for an Average User in just a few years.

These simple findings suggest that building a broadband network on VDSL2 exposes us to a policy outcome that will need to be reviewed in just a few years. We need to anticipate implications for VDSL3, VDSL4, and VDSL5 which are projected variants of this DSL technology branch. Will the street cabinets have to be uplifted and moved closer to the users to get the better performance?

In the Submission, I asserted the Australian cable networks could be rapidly modernised and ready to deliver the very best broadband experiences for residential and small-medium business substantively by Christmas 2009.

Of course, these existing networks could also be expanded and new cable networks built in regional towns and townships of Australia by a real broadband challenger, but this will take a little longer.

Let's be clear. Australia does not have iPTV capability, or other innovations, in the major networks today because they choose not to deploy this technology and because of the issues surrounding media ownership and such.

Subject only to investment, Australian cable broadband networks are ready for iPTV technology.

The Submission asked the question does the Government understand how simple and cost effective it will be to make the existing cable broadband networks deliver superfast speeds like 40, 60, 80, or 100Mbps downlinks to a significant number of small and medium business and residential customers (7 million Australians)? And where is the discussion about uplink speeds? This is important. The traditional carriers already acknowledge their customers are increasingly seeking services with faster and better quality of services attributes to support their increasing appetite for video-centric applications and the emerging applications with high demands on interactivity.

Has the Government evaluated the cost-benefit of modernising these cable broadband networks to solve the broadband issues immediately with no-fuss or risk? Has the Government obtained advice on the specific techniques for modernising the existing HFC cable broadband networks in Australia? Why haven't the cable operators made investments across their cable networks? Why have they under-invested in their HFC networks?

Does the Government understand why the leading Australian cable operators, Optus, and Telstra, choose not to 'drop' a new (physical) cable connection to business and residential customers. The lack of investment in a $200 cable connection provides a barrier-to-entry to real network-based competition and means no choice for business and residential customers. At $14 odd per ULLS (Band 2), it's a no-brainer for those that don't have a passion to build alternative competitive fixed infrastructure.

Fragmented Networks

The delivery of fast internet, telephony and video is increasingly being delivered over fragmented fixed networks in Australia: life-line voice on copper, internet on ADSL2plus, and video via satellite dish on the roof. Of course mobility is best delivered by the wireless networks. Is it not a paradox to the Government that

the operators are over-building their own fixed broadband networks? For example operators are deploying less attractive ADSL2plus electronics in Telstra exchanges where cable networks already exist.

Three of the world's 10 largest ISPs are cable operators. And, I emphasise these networks are growing.

The Challenge

The objective of the Submission to the Senate Select Committee was to communicate two key insights:

- how to utilize DOCSIS 3.0 technology as a means of delivering high-bit rate data services to residential and small-medium business customers while leveraging the cable operators' extensive Hybrid Fibre Coax (HFC) Network, Network Access Layer Equipment, Device Activation Systems and Back Offices, *and secondly*;

- The implications of an emerging technology called RF over Glass (RFoG), an all fibre-to-the-premises (FTTP) solution architecture that lends itself to new access network builds.

Traditional telecommunications carriers have chosen to evolve their wired networks to either VDSL2 or fibre using either GPON (Gigabit PON) or GePON (Gigabit Ethernet PON) in the belief that these technologies deliver superior access economics to cable technologies.

In the Submission, I set out to challenge this myth. And in the process debunk other myths.

To conclude, the Submission suggested that the current policy mix seems to have caused a dire lack of investment in cable broadband over too many years. Cable broadband is a real alternate fixed broadband asset that can deliver superfast broadband outcomes, simply and economically. It deserves a change in attitude and it warrants an investment kick start. The money saved can be used to build

new (GPON or RFoG) fibre networks in regional Australia. Cable should be part of the policy mix.

Addendum

Network Diagram

The CableLabs DOCSIS 3.0 specification delivers new features and benefits to the Cable industry when compared to its predecessors. Perhaps one of the most recognized benefits is a higher bandwidth capability. This new capability results from a DOCSIS 3.0 feature known as channel bonding. The use of channel bonding technology allows DOCSIS 3.0 systems to use multiple bandwidth channels simultaneously, thus creating the high-bit rate capability. IP Telephony quality, or VoIP, is high.

A cable data network system consists of cable modems (CMs) at subscriber premises, a CMTS at the cable plant operations area, a data-over-cable management software suite integrated with the operator's other management systems, and the Hybrid Fibre Coaxial (HFC) cabling that connects it all. DOCSIS defines the standard for communication among these elements.

The CMTS, or provider edge router, provides data switching functions as well as the radio frequency (RF) interface to and from the cable plant. It also provides Ethernet interfaces to the Internet Service Provider(s). The CMTS provides carrier-grade integrated Layer 3 edge router function.

The data-over-cable management system provides both the end-to-end network management solution and the support for subscriber provisioning.

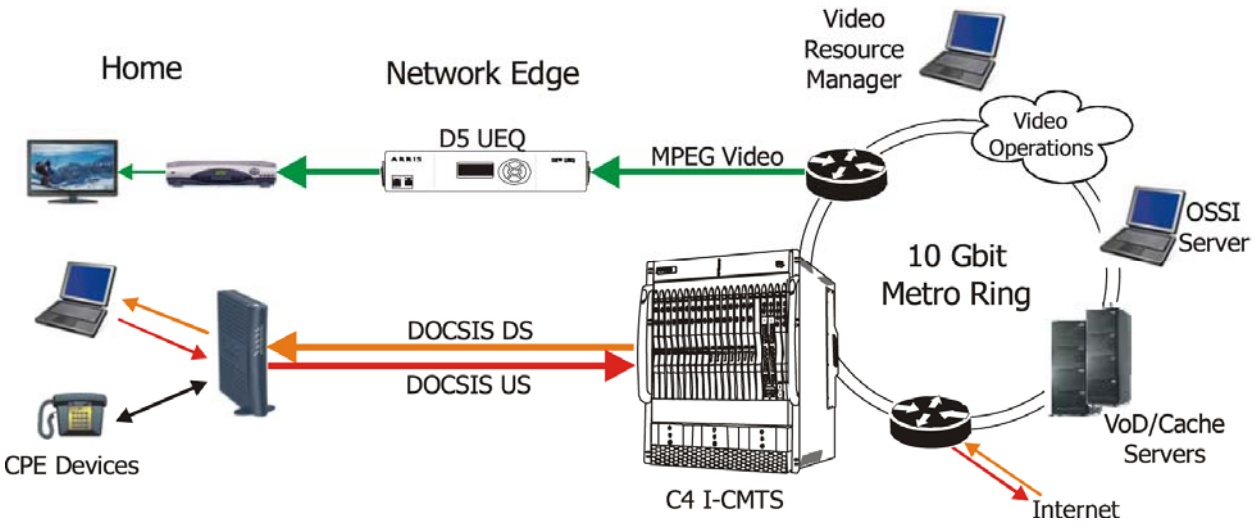

Figure 1: Reference Network Diagram

By combining (DOCSIS 3.0 bonding) channels together, a single Cable Modem can experience superfast internet up to:

- 160 Mbps downstream per customer cable modem
- 120 Mbps upstream per customer cable modem.