National Broadband Network

Submission to Senate Select Committee

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

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In addressing the terms of reference this submission will highlight and challenge several broadband myths and the efficacy of competing broadband technologies.

1 Terms of reference

The terms of reference are:

A select committee, to be known as the Select Committee on the National Broadband Network, be established to inquire into and report by 30 March 2009 on:

a) The Government's proposal to partner with the private sector to upgrade parts of the existing network to fibre to provide minimum broadband speeds of 12 megabits per second to 98 per cent of Australians on an open access basis; and

b) The implications of the proposed National Broadband Network (NBN) for consumers in terms of:
   i. Service availability, choice and costs,
   ii. Competition in telecommunications and broadband services, and
   iii. Likely consequences for national productivity, investment, economic growth, cost of living and social capital.

2 Summary

The purpose of this Submission is 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. [Note 1]

The next wave of technology development will 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.

This demonstrates that cable broadband technology and network architecture continues to evolve and prosper against a competitive back drop where GPON/GePON (fibre) and VDSL2 vendors are urging traditional carriers to continue to invest in their alternative broadband 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, AUSTAR, Neighbourhood Cable, Optus and Telstra, have a natural, proven evolution path for their broadband infrastructure. They 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.

Note 1: RFoG: Radio Frequency over Glass is an acronym for the fibre-to-the-premises suite of products and services that will emerge from the working group 5 of the SCTE's Interface Practices and In-home Cabling sub-committee. This working group formally began in March 2008. It supports the use of existing set-top boxes and DOCSIS (Data over Cable Service Interface Specification) equipment like cable modems. The RFoG standard is pursuing the Institute of Electrical and Electronics Engineers (IEEE) perspective rather than the International Telecommunications Union – Telecommunications Standardisation Sector (ITU-T) GPON approach.

3 Foreword

The Australian setting

C-COR Broadband is a medium sized, privately owned Australian business with a deep insight into DOCSIS / HFC networks (cable broadband networks). Being independent of a large global parent company's imperatives allows us relative freedom to express a professional opinion.

In overseas markets, the cable broadband networks are often used to drive sustainable, competitive broadband infrastructure – in Australia we have 4 cable broadband network operators being Austar in Darwin; Optus, passing 2.2m homes; TransAct with Mildura, Ballarat and Geelong networks; and Telstra, 2.6m homes passed in the bigger cities.

These networks serve about 7 million Australians today.

In my view the ACCC seems to take pride in the myth that ULLS and LSS have delivered better broadband outcomes for Australians. It is a one dimensional view of infrastructure based competition, completely ignoring the existence of cable broadband as a real challenger.

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'? 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.

And, 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. Current data traffic modelling based on residential user behaviours and availability of increasingly sophisticated end user products is suggesting that 25 Mbps uplink bandwidth will be needed by 2012 (3 years away) to meet increasing customer needs. By reducing the copper distance back to around 300 metres from the fibre node to each residential and business customer, VDSL2 can deliver this to 2012, whereas by upgrading to DOCSIS 3, cable networks can deliver this uplink bandwidth beyond 2012, as can Fibre-to-the-Premise.

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 suggest 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, and the TAFE system has the capability and capacity to ensure any vocational training gaps identified by the contractors are filled. (C-COR Broadband has a collaborative relationship with GippsTAFE for the ongoing development and delivery of vocational training for communications contractors). Unfortunately, modernisation is a notion that is vigorously at odds with the interests of the key telecommunications' vendors behind the NBN investment spree.

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 other technologies for those more disadvantaged than our fellow Australians within access to the existing cable broadband networks.

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 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.

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? In Australia 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 underinvested in their HFC networks?

In other leading broadband markets, like North America and Korea, customers have choices of network connections and actively choose between cable, fibre, and copper media for transport of broadband: in Australia the vast majority have no choice of 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.

Community consultation – 1990s Revisited

Back in the 90s, as I remember, the race to build the Optus and the Telstra cable networks, caused friction and angst within local communities. They took offence at the white oxide coated aluminium boxes being mounted on their poles. Some complained about the black coaxial cable being strung from pole to pole. In response to this outcry, the casings were changed to a plain aluminium colour that would lose visual impact in the Australian sun and grey colour coaxial cable was deployed rather than black. Telstra moved to put their cable broadband network underground.

When the networks were rolled out in their streets without consultation, people took offence and much ill will was created because they did not see any benefit other than a direct personal cost to them in the form of lost street ambience.

The Fibre-to-the-Node networks (e.g. VDSL2 technology) require large, double-fridge-like street cabinets installed on foot paths/ nature strips to serve every 300 or so homes. They require local power. Say, 10 million homes across Australia will require 30,000 new large air-conditioned street cabinets. In the case of the Optus proposal the cabinets will be made overseas by Huawei (Telstra presumably will use street cabinets from Alcatel-Lucent). Could they be put underground? Could they be made in Australia?

Does the Government plan to consult the Local Government sector to secure their support for the mandatory installation of the NBN street cabinets in their communities? When will this consultation begin?

4 Global perspective

The Technology Competition

In the USA cable Multiple System Operators (MSOs) have enjoyed a technical competitive advantage over traditional carriers for the last few years with a network infrastructure that delivers the triple play – video, data, and voice services – over one common network architecture. To maintain its leadership position in the marketplace and to leverage their extensive capital investment, the cable industry, through the development efforts of DOCSIS 3.0®, will be able to increase the data bandwidth capabilities for residential and business services, without network-wide infrastructure upgrades.

Recently the major U.S. Telecom providers, AT&T and Verizon, announced substantial investments in their network infrastructure in an effort to add video and high-bit rate data services to their voice services to compete with cable broadband 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 / VDSL2, and video via satellite dish on the roof. Of course mobility is best delivered by the wireless networks. Anecdotal evidence suggests that AT&T 'U-verse' VDSL2 roll-out is not getting a good market acceptance. The simple reason being the iPTV, video services, don't match the experience enjoyed on the cable networks.

In a major industry development on January 12, Microsoft Corp. announced that Guangzhou Digital Media Group formally launched Zhujiang Digital, a connected TV service powered by the Microsoft Mediaroom Internet Protocol television (IPTV) platform. "This is the first Microsoft Mediaroom-enabled TV service to launch in China and the first time Mediaroom has been delivered over a cable network anywhere in the world". This is significant because Microsoft has been a very public and close eco-partner to VDSL vendors like Alcatel-Lucent.

Three of the world's 10 largest ISPs are cable operators according to Liberty Global. And these networks are growing.

The development of DOCSIS 3.0 has significant implications for Australian telecommunications.

The Challenge

The objective of this Submission is to successfully 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.

In Australia 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.

We want to challenge this myth. And in the process debunk other myths:

1. Wireless broadband, cable, VDSL2, and GPON are all shared media infrastructures. All these media share the broadband bandwidth to the available users connected, or active, at that time;
2. Each media has its implicit differences in how much bandwidth and how well they support different applications like interactive video. The laws of physics apply to each of these technologies. Point-to-point infrastructures are a shared media within the confines of the direct links, only;
3. I take exception to economists espousing the benefits and speeds of VDSL2 technologies without acknowledging that there are other alternatives;
4. Cable broadband networks are not proprietary technology. The networks use IP transport protocol, for the delivery of superfast internet, from the customers' modems to the optical core of the World Wide Web. [Residential gateways (often called routers) are frequently used in homes to connect to a broadband service, such as IP over cable or DSL. A home router may allow connectivity to a business via a secure Virtual Private Network].
5. Australian cable broadband networks are 'closed' only because the existing owners choose this. They could quickly deliver wholesale bandwidth to independent virtual operators just like wireless and DSL networks;
6. The original cable broadband networks were built after the copper-based networks were funded and established, in our case by the Australian Government. Cable networks are typically the preserve of the second entrant, or challenger, into a geographic market. In the much touted AT&T and Verizon geographic markets, the cable operators are investing heavily and available public data shows that they are winning their fair market share: customers are switching to the cable operators because they offer attractive services, be that better video experience or superfast internet or a better value proposition.

5 Opportunity

The 'next great business opportunity' is in selling Internet, voice and video services to small and medium-sized businesses – traditional copper-based operators are already targeting businesses with fewer than 20 employees that could for instance yield $1 billion a year in additional business for cable networks. The traditional telecommunications carriers will have a hard call to make; deciding whether to allow their traditional ADSL2plus / VDSL2-based services to be churned to a clearly better value-added service for their business customers, or to accept the 'new reality'.

Market Drivers

It is generally accepted that the existing broadband industry is being driven by customers who want two things: more consistent bandwidth experience and video-centric applications like iPTV, interactive video and video telephony.

The next wave of television sets will be capable of delivering 3D experiences, bringing significant challenges for bandwidth performance on iPTV transport. Delivering MVV (Multiview Video) video to end users will pose serious networking challenges, involving protocols, quality of service, channel-delay management, and error concealment and recovery.

The technological pre-requisites for delivering High Definition TV, superfast internet to customers cannot be met by copper's native capabilities used by the traditional carrier's – these demands are beyond the media's physical limits. Video customers – be that for HDTV or video telephony – are demanding an unimpaired video experience equal to cable.

Industry dynamics

Cable networks create infrastructure based competition. They can be the source of wholesale services where differentiation is based on throughput speed, contention (quality of service), and pricing by independent retailers or resellers.

The prevailing view of GPON / GePON and the ADSL2plus / VDSL2 vendors is that cable broadband has had its day. They are still investing substantial marketing resources to communicate the merits of their technology and their view of the future.

Conversely the emerging view of the cable broadband operators and vendors, such as ARRIS Inc., is that RFoG technology will deliver speeds approaching 300 Mbps per customer in the near-term, a solution that offers a lower cost and longer term future.

6 Utilizing DOCSIS 3.0 for Superfast High QoS Services

The 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.

The new DOCSIS 3.0 specification has also added over twenty channels or approximately 1 Gbps of additional RF bandwidth that may be used for new services. In addition, the changes in the spectrum allocation for the reverse path, allow nearly double the amount of spectrum allocated, to more than several hundred Mbps.

The Cable industry is working to fill critical business service gaps that can leverage DOCSIS-based systems. These new business services utilising DOCSIS-based systems include Layer 2 VPN (also known as Ethernet Services or Carrier Ethernet) as well as Time Division Multiplexing (TDM) Services. The Cable industry is promoting these two services types, L2 VPN and TDM, through work organized by CableLabs® utilising a specification known as Business Services over DOCSIS (BSOD). The main industry drivers for Carrier Ethernet and TDM emulation services include the Metro Ethernet Forum (MEF), Internet Engineering Task Force (IETF), IEEE and the ITU-T.

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.

In practical terms, the operators will offer these performance levels for ‘power-user’ customers. Everyday users will be delighted with a more consistent performance experience.

Figure 1 illustrates the value of DOCSIS 3.0, where fibre solution bandwidth is pushed out, perhaps over 100 Mbps. This additional bandwidth or data throughput enables cable operators to provide superfast high QoS services leveraging DOCSIS and HFC, as well as DOCSIS over the emerging all fibre outside plant architecture known as RFoG, described later.

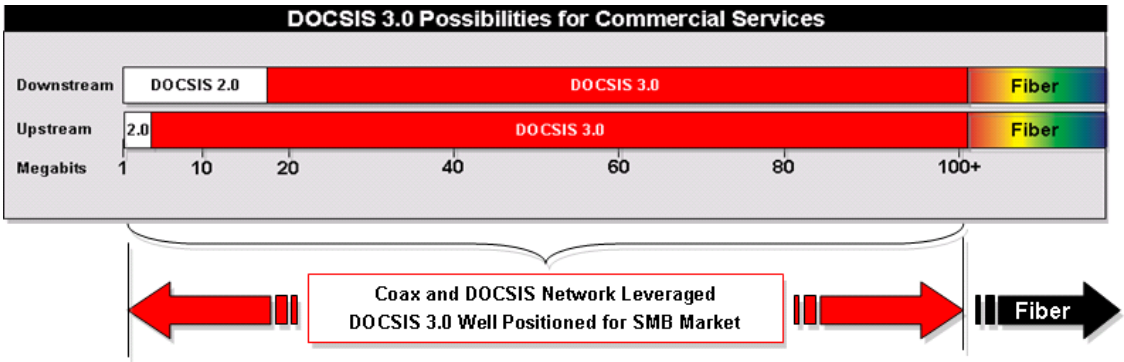

Figure 1: DOCSIS 3.0 Services

Network Access Layer Equipment

DOCSIS 3.0 coupled with traditional HFC and emerging RFoG technologies offers a great end-to-end superfast services architecture for cable broadband operators because the network access layer equipment may also be shared across both types of outside plant technology, delivering improved service delivery without network wide infrastructure upgrades.

Alternatively should a cable operator want to move to the GePON or GPON architecture they face considerable up-front costs as the QAM Modulators need to be replaced with IP encoders and multiplex equipment and they need to have CWDM Optical Multiplexers, De-multiplexers and splitters. At the customer end the DOCSIS modems need to be replaced with an IP decoder STB.

In addition, due to network timing constraints, the 32 or 64 customers must all be in close proximity to each other (the DOCSIS standard allows for a much wider spread over the HFC network). As a sweetener to cable operators some PON vendors have offered to include an RF overlay to increase this spread, however the down side of this is the optical receiver in the ONT is not very sensitive, reducing the optical split from 64 to 32.

All in all cable operators wanting to upgrade their HFC network will need to carefully consider the service disruption and costs associated with the major changes that are required to achieve 100Mbps services via an all optical network, particularly when there is another, more effective solution available using DOCSIS 3.0 and emerging RFoG technologies.

7 DOCSIS 3.0 over Contemporary HFC

Cable Operators have an extensive HFC network infrastructure and DOCSIS 3.0, delivered over HFC, may provide a serving area to support the majority of small-medium business and minimize costly fibre builds. The use of DOCSIS 3.0 has a few challenges; these include the allocation of RF bandwidth or spectrum for DOCSIS 3.0 services. In Australia, the cable broadband networks have a range of HFC architectures including varying systems capacity levels (750, 860 MHz systems and 1 GHz) and the allocation of spectrum within those systems may differ as well. The move from analogue to digital will free-up bandwidth within the HFC network that can de used to deliver innovative services to SMBs.

Spectrum Utilization in the HFC Network

MSOs are evaluating alternatives to support the ever-growing demand for bandwidth or spectrum. With a flexible and scalable HFC architecture finding the RF spectrum may be accomplished in many ways, including Bandwidth Reclamation & Increased Bandwidth Efficiencies, HFC Segmentation, Bandwidth Expansion, Node Splits and HFC Spectrum Overlay (Figure 2). None of these options need to be done system-wide; they may be targeted capacity upgrades implemented (for lower than average capital outlay) at the node locations that need the additional bandwidth (perhaps a node serving the DOCSIS 3.0 business customer).

Using targeted node upgrades to leverage some of the channels in the 860 MHz to 1 GHz spectrum range may offer significant new capacity for DOCSIS 3.0 services. This allows the spectrum below 860 MHz to be used for video services and legacy DOCSIS 2.0 channels. If systems have not been upgraded to 1 GHz, these could initially be targeted node upgrades in the areas that need the additional bandwidth. Figure 2 outlines the breath of techniques for unlocking HFC Network capabilities.

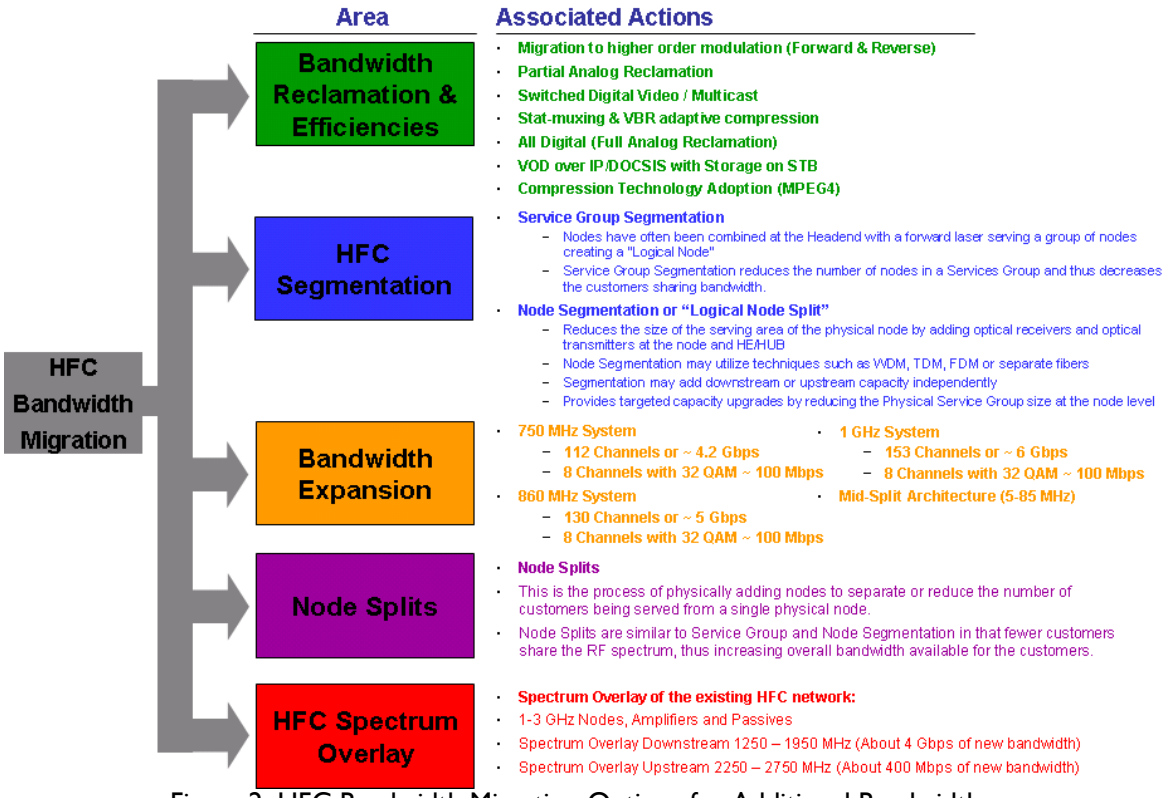

Figure 2: HFC Bandwidth Migration Options for Additional Bandwidth

The RF engineers within the cable broadband industry understand the massive under-utilised bandwidth capability within these networks. Traditional Australian carriers with a bias towards ADSL2plus / VDSL2 network elements on a copper-based infrastructure do not yet appreciate cable's latent competitive advantage.

Cox Communications (USA) is currently down around 550 homes passed per node. Chief Technical Officer Chris Bowick, was recently quoted as saying: "... the cost of upgrading to 1 GHz was an order of magnitude less expensive than the upgrade from 550 to 750 MHz in years past", suggesting the number was approaching $40 per home passed to move to 1 GHz.

A modern HFC network infrastructure can provide as many as 120 discrete channels to deliver time sensitive and best effort services. All transmission of digital television over HFC networks is via QAM (or VSB modulation).

A key variation in network design is whether the DOCSIS QAM is delivered through a CMTS (Provider Edge Router) or a video on demand QAM. Whilst North American networks follow ITU-T J.83 Annex B and tend to be 6 MHz channels with 64 or 256 QAM, in Australia Annex A

(DVB-C) with 8 MHz channel spacing using 7 MHz bandwidth for video and 6 MHz for data is the practice.

Most operators transport digital video over QAM modulators that are not part of the CMTS: they are delivered with next generation, cost optimised EdgeQAM platform. The DOCSIS transmission provides the superfast bandwidth and low latency for time sensitive applications like VoIP whilst the video over QAM transmission provides the high performance required for SD and HD video with surround sound audio.

Figure 3 shows an example of RF bandwidth utilisation. In this example, 120 channels can deliver 600 HDTV programmes or a massive 19.2 Gbps of data in the forward direction (network to customers).

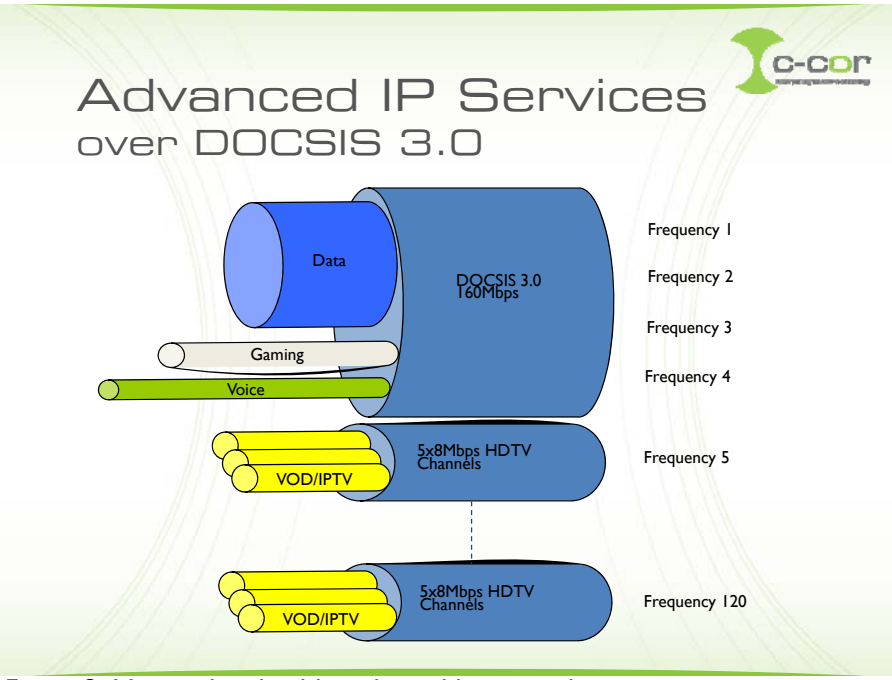

Figure 3: Massive bandwidth within cable networks

The HFC architecture is remarkably nimble; there are a host of ways a cable operator can create additional bandwidth. However, if DOCSIS 3.0 over HFC is not desirable or possible, there is another outside plant option to explore that leverages DOCSIS 3.0 over an all fibre-to-the-premises approach, called RF over Glass (RFOG) as discussed in the following section.

8 DOCSIS 3.0 through RF over Glass (RFoG)

An emerging technology called RFoG (RF over Glass) may offer a second alternative to traditional HFC solutions. Essentially, RF over Glass is similar to HFC architecture with the coaxial portion of the network residing only in the inside wiring at the customer premises, but extending fibre throughout the outside plant network to the customer premises location. RFoG supports all of the existing Cable services, including all video and DOCSIS services.

The RFoG solution uses existing BSS/OSS and Headend elements (network elements and provisioning systems for video, data, and voice) in the cable broadband operator's network. The traditional cable installation practices are leveraged as well as CPE equipment and services such as Analogue, Digital, and DOCSIS Services. An RFoG service group size will likely be in the range of 32 Households Passed (HHP); however, processing and combining at the Headend will remain an option as with traditional HFC. This allows Cable Modem Termination System (CMTS) equipment to be shared over a larger pool of service groups for even greater economies of scale. By deploying an all-passive optical network, like RFoG or PON systems, service providers can achieve lower operational costs than fibre to the node approaches with no actives or copper wiring in the Outside Plant (OSP) network.

All of the existing services and technologies delivered over HFC can equally be delivered over RFoG: the benefits include smaller service groups for greater bandwidth, an all-passive optical network to the home, and a migration strategy for even higher bit rate technology over EPON or GPON while still using RFoG.

In Figures 4 and 5, a contemporary HFC architecture and the RFoG architecture are illustrated.

Essentially, the coaxial cable and actives portion of the outside plant of the HFC network is replaced with an optical splitter. The RFoG systems have a WDM mux at the Headend allowing the optical wavelengths to be combined on a single fibre down to the customer. The RFoG customer premises equipment is essentially a media converter, receiving and transmitting the optical signals and interfacing with the coaxial network at the customer premises. All the customer equipment can be upgrade to the higher performing network without cabling changes.

For economic reasons it is neither necessary or unlikely that RFoG would be a replacement technology for existing HFC deployments, but it may be an alternative for new residential builds, and operators may consider RFoG builds in existing HFC deployments and new build areas.

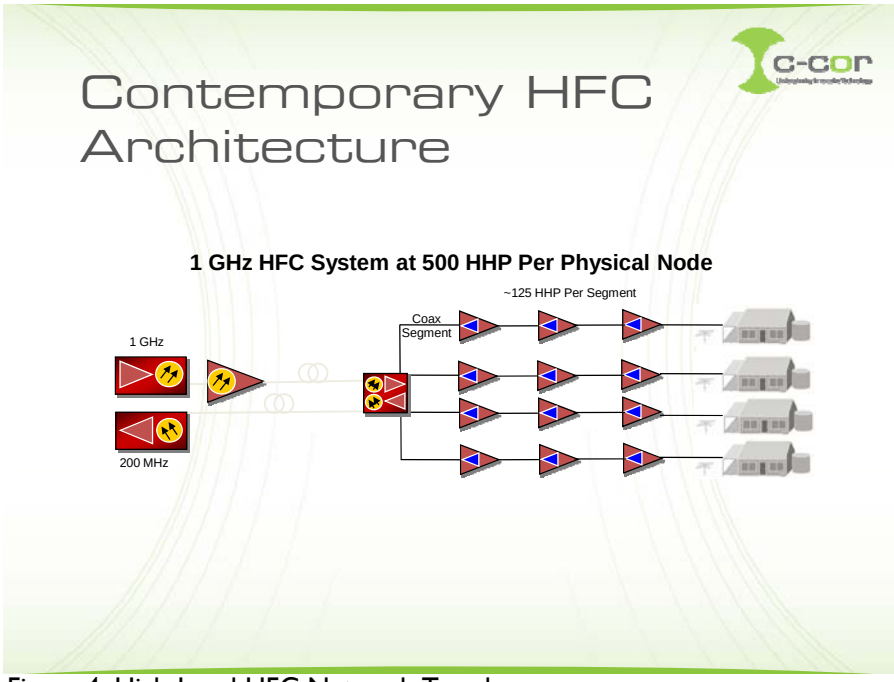

Figure 4: High-Level HFC Network Topology

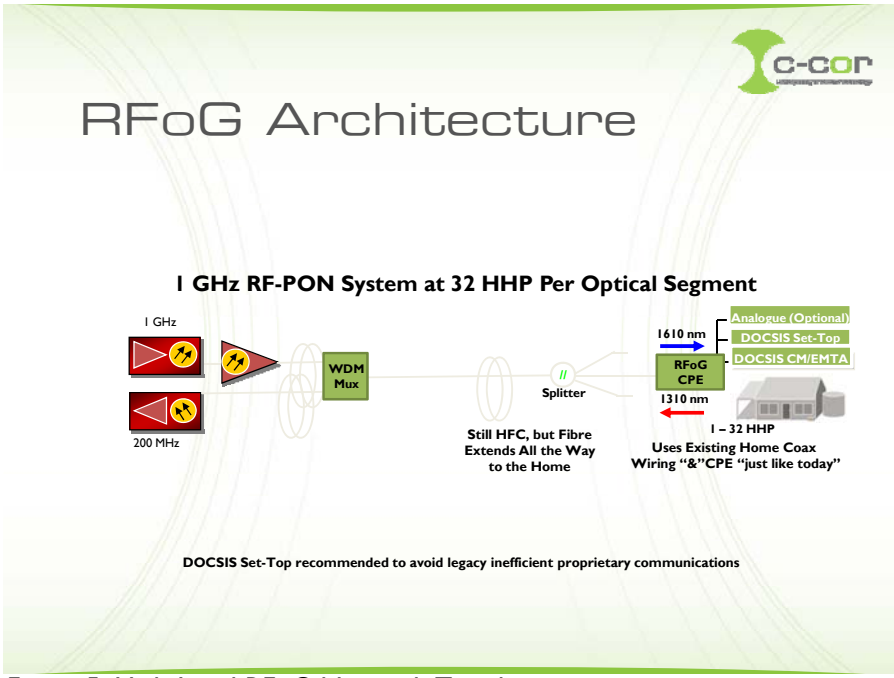

Figure 5: High-Level RFoG Network Topology

With this architecture, a cable broadband operator could deliver symmetrical data rates approaching 100 Mbps. This fibre to the business solution is meant to leverage the DOCSIS network elements at the customer premises and Headend – the Embedded Multi-Terminal Adapter (eMTA) / Cable Modem (CM) and CMTS respectively. The RFoG solution leverages all back office systems for triple play and the existing Voice over IP (VoIP) solutions at the Headend, as well as the customer premises.

Wavelength (nm)	Wavelength Range (nm)	Direction	Standards	Function / Technology
1550	1550 - 1570	Downstream	SCTE / ITU / IEEE	RF Video
1610	1600-1620	Upstream	SCTE – RFoG	Return path proposed

The SCTE's Working Group 5 specification is maturing: it reveals a high degree of alignment with IEEE standards. The current position of the RFoG optical architecture in the outside plant could use the 1550 nm wavelength on the forward path and 1610 nm on the return path.

Figure 6 is an example of an RFoG and DOCSIS system and shows the leverage of fibre-to-the-business (FTTB) using RFoG technology and traditional DOCSIS systems at the headend and CPE.

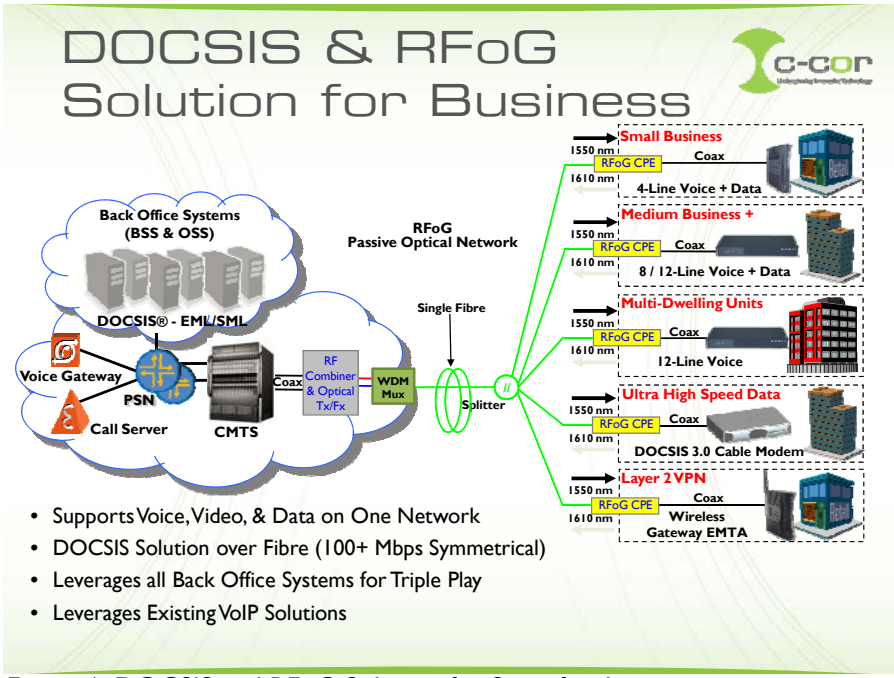

Figure 6: DOCSIS and RFoG Solution for Superfast Internet

9 Conclusions

Australian Cable Operators have extensive HFC network infrastructure in place and, combined with the arrival of DOCSIS 3.0, will be sufficient to support the majority of their residential and SMB service needs (some 7 million Australians), minimizing costly fibre builds or unwanted duplication of broadband assets. However, if fibre solutions are preferred for Business Customers to resolve any operational concerns about active OSP (outside service plant) networks or to support future bandwidth growth, new technologies like RFoG (RF over Glass) offer a great alternative to shared media GPON optical solutions. High-end DOCSIS CMTS (Provider Edge Router) equipment already has integrated, highly reliable redundancy schemes that may not be found on Ethernet Switching or PON network elements, and this provides assurance to the operators that the access layer is engineered at 99.999% availability.

The Australian cable broadband operators have made considerable investments in back office systems for DOCSIS voice and data services that would be leveraged for DOCSIS 3.0 Technologies. As a result, DOCSIS 3.0, coupled with traditional HFC technologies and/or emerging RFoG technologies will provide an excellent end-to-end solution architecture for bandwidth intensive business services. The resulting system will be capable of supporting data services with bandwidths of 100 Mbps or more per customer while leveraging existing data and voice networks and systems simply and with low risk.

Cable broadband is typically used by market challengers to enter markets. Overseas these operators are investing in superfast technologies and differentiating their services based on service innovation, performance, and reseller diversity. Again, the leading cable operators are driving the vendor industry to develop the next generation of products, based on open industry standards, so they can cost effectively expand their geographic footprint to penetrate the markets of the incumbent traditional telecommunications operators.

In Australia, we have the 2 biggest operators using all forms of technology platforms: fibre to corporate customers, ADSL2plus to small & medium business and residential, wireless for mobility customers. We have a model of competition but no intermodal competition.

Will the Government see merit in restructuring the competition landscape to force intermodal competition, namely superfast broadband from wireless and wired networks? Through the NBN process, will the Government demand a trade sale of one or all cable broadband networks to a third force – an overseas operator – to create a new industry participant of reasonable scale.

DOCUMENT ENDS