

**Extel Communications** written submission to...

**Australian Government  
Department of Communications Information Technology and the Arts**

**Broadband Connect and Clever Networks  
Discussion Paper**

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## Extel and Broadband

Since 1991 Extel Communications has provided innovative, high quality access network products to telecommunications carriers around the world, including Telstra. Extel specialises in products that extend the reach of access networks for DSL, ISDN and standard telephony services. Today, Extel products connect over half a million subscribers in over a dozen countries around the world.

Extel’s “*expandsl*” technology facilitates economical provision of ADSL to customers who are located beyond the conventional distance limits of ADSL, or who are connected via pair gain and other devices that have previously been considered broadband blockers. *expandsl* utilizes innovative, water- and weather-proof Remote DSLAMS that can be placed in existing cable pits or on poles. Re-using existing infrastructure avoids significant upfront capital costs by reducing the need for new cabinets or exchanges in low density areas.

Extel’s *expandsl* technology, already in wide deployment, has the capability to provide broadband services at significantly lower operational cost than satellite, and with significantly better performance and upgrade characteristics than terrestrial wireless in almost any environment currently within range of service by copper telephone lines.

Through deployment of a combination of conventional and Remote DSLAMS, Extel estimates that 1.5Mb/s broadband services could be economically provided to up 99% of Australian premises.

By utilizing fibre-fed ADSL2+ Remote DSLAM’s in a Fibre To The Node (FTTN) architecture, *expandsl* will provide a cost effective upgrade path to much higher bandwidths, allowing the delivery of advanced services such as on-demand high definition television.

## Executive Summary

The success of Broadband Connect and Clever Networks programs depends on the extent to which the subsidies stimulate investment in sustainable growth of broadband networks beyond the current market-determined outcomes. The program subsidies need to be directed to the most sustainable and cost-effective technology solutions; so as to discourage substitution for investment that is already commercially-viable; and to encourage future private investment based on market growth in both demand and supply.

In this regard, Extel's key points of comment are:

1) **1.5Mb/s could be economically delivered to up to 99% of premises with available technology**

Terrestrial broadband technologies could economically provide 1.5Mb/s services to up to 99% of Australian premises. Only the most remote premises will justify the inherently higher costs associated with satellite.

2) **1.5Mb/s should be the minimum threshold for subsidy**

Demand for higher bitrates will continue to increase rapidly, particularly in metro areas. New applications that rely upon these higher bandwidths are developing rapidly, and a 256kb/s service is no longer acceptable as true broadband.. A 256kb/s minimum threshold can no longer be classed as a metro-equivalent broadband service for regional and rural Australia. The minimum system capacity threshold for downstream bitrate should now be 1.5Mb/s.

3) **Technology neutrality should be maintained by tying subsidies to capability**

Though asserting technology neutrality, the discussion paper contains some technology bias. True technology neutrality should be promoted by tying subsidies to technology-agnostic performance thresholds for the standard subsidy. Only when it can be demonstrated that a greater subsidy is required to meet this threshold, and/or this threshold cannot be met at any reasonable cost, should a higher subsidy and/or lower threshold be agreed. This will ensure that the subsidy mechanism will not distort the choice of most appropriate technology.

4) **Downstream bitrate is insufficient as the only performance measure**

Subsidised service threshold parameters should also take into account upstream bitrate, usage allowances, latency factors, backhaul oversubscription ratio, and service reliability.

Later sections comment on some important issues in the discussion paper, including:

- 5) Effective subsidy mechanisms
- 6) Satellite services
- 7) Additional information from providers
- 8) Price caps

## Service Characteristics

### **1) 1.5Mb/s can be economically delivered to up to 99% of premises**

Terrestrial broadband technologies could economically provide 1.5Mb/s services to up to 99% of Australian premises. The remaining premises are likely to be best served by satellite due to their extreme remoteness, however, there are inherently higher costs associated with satellite.

It follows that a “standard” subsidy will cover the vast majority of premises. A higher subsidy is only needed for the relatively few remaining premises that warrant it due to their extreme remoteness.

### **2) 1.5Mb/s should be the minimum threshold for subsidy**

The purpose of broadband service is to enable applications not practical at lower data speeds. Emerging applications which drive the need for higher bandwidths include:

- Teleworking and Remote Learning (e.g. collaboration tools such as MS-NetMeeting, document sharing, video conferencing, etc)
- Publishing and maintenance of websites (personal and commercial)
- E-mailing and instant messaging of large attachments (word processing files, images, video and audio clips and files).
- Music and video downloads (commercial movie and television downloads to commence in 2006)
- Digital image sharing (personal and professional)

While a threshold of 256kb/s was acceptable when HiBIS was designed, average bitrates have increased, and will continue to increase rapidly in, particularly in metro areas. For example, at the time of writing seven ISPs are offering 1.5Mb/s services in Melbourne for less than \$50 month, and six ISPs are offering greater than 1.5 Mb/s. Some ISPs have already ceased offering their 256kb/s services<sup>1</sup>.

A 256kb/s minimum threshold will no longer ensure an adequate broadband service for regional and rural Australia, and will definitely not ensure equivalence with metro – a stated aim of the scheme (Discussion paper, page 9). It is therefore not justified as a threshold to qualify for subsidized service. In order to qualify for subsidy, infrastructure should be capable of providing 1.5Mb/s to every subscriber, at predicted levels of demand. Note that customers could opt for a slower service if they desired, however the equipment should be capable of providing 1.5Mb/s when customers demand it. At point 4 we recommend that performance factors other than downstream bitrate should also be considered when setting the subsidy threshold.

We foresee that even a 1.5Mb/s threshold may require review after 2-3 years, as demand and supply for broadband applications continue to grow.

Access providers have a commercial incentive to offer the minimum acceptable bandwidth that can attract the maximum subsidy. Lower average consumer bandwidths reduce costs of backhaul, and backhaul charges will in many cases be the most significant element of running costs for an access

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<sup>1</sup> Source: [www.whirlpool.net.au](http://www.whirlpool.net.au) 29-Nov-05, and individual ISP websites

service provider. Since up to 99% of premises can be economically provided 1.5Mb/s services, to accept a lower threshold of network capability would be to encourage less than optimal utilization of subsidies.

### **3) Technology neutrality should be maintained by tying subsidies to capability**

The program should maintain technology neutrality by tying subsidies to capability.

Technology neutrality is a stated aim of the program (Discussion paper, p9). However, in apparent contradiction to this aim, page 15 proposes price caps that vary for different technologies.

“...ADSL services can be priced up to \$1500, non-ADSL services can be priced up to \$2000 except for two-way satellite services which can be priced up to \$2600...”

This proposal will have the unintended consequence of distorting technology choices by offering higher subsidies for less efficient technologies. Instead, the market should be relied upon to choose the most appropriate technology that will satisfy service performance characteristics that have been determined to reflect the policy goals.

This can be achieved by setting a standard subsidy that will be paid where the service meets a defined performance threshold. Only when it can be demonstrated that a greater subsidy is required to meet this threshold, and/or this threshold cannot be met at any reasonable cost, should a higher subsidy and/or lower threshold be considered.

### **4) Measures other than downstream bitrate are significant to performance.**

In addition to downstream bitrate, the following parameters significantly affect the overall user experience and the range of applications that may be deployed. To properly reflect the goals of metro equivalence and growth in both demand and supply, the eligibility for subsidy should take into account:

- **Backhaul oversubscription ratio.** Also called the “contention ratio”, this is a measure of how many customers share the available backhaul bandwidth. Because backhaul constitutes one of the highest costs to providers, it is tempting for providers to stretch the oversubscription ratio as much as possible.

We recommend independent technical advice so that backhaul oversubscription ratios for subsidised services are defined and administered to ensure that the nominal performance of the access network is not negated at the backhaul level.

- **Latency.** The time taken for packets to traverse the network – i.e. network “delay” - can seriously degrade real-time broadband applications such as Voice over IP, video conferencing and other interactive applications. High latency can also reduce the effective speed of file transfers due to idle time waiting for acknowledgements. Real-time gaming is badly affected by high latency, resulting in extreme user frustration.

- **Reliability.** Different technologies and environments produce different predictable quantities of unplanned downtime. Sources of downtime include equipment failure, extended power outages, severed cables (wireline), and interruption of service due to weather (terrestrial wireless and satellite).
- **Downstream bitrate.** Higher bitrates enable more download-oriented applications
- **Upstream bitrate.** This is becoming increasingly important to both business and residential broadband customers who need to exchange large documents and multimedia files, or work on virtual private networks.
- **Usage Allowance.** Both download and upload allowances are important, although acceptable thresholds are likely to be different for each.

## Business and Subsidy Issues

### 5) Effective Subsidy Mechanisms (Questions 1-3, 6, 9, 18-23)

The guidelines need to ensure that subsidies create leverage for commercial investment in areas of significant high cost, but are not wasted in substitution for reasonable commercial investment risk.

Eligible areas: So long as “lack of service” is the primary criterion for subsidy, there is obvious risk that providers will be tempted to hold back roll-outs and suppress demand, until such time as subsidy is approved for that area.

**We suggest that providers be invited to make a case for subsidy to provide broadband service in a given area, including areas where some limited or substandard service is already being provided.**

Competitive service: **There could be a case to invite providers to bid competitively to service particular areas identified as requiring subsidy** (perhaps in a subsequent phase of the program). As with decisions on the release of new broadcasting licenses, the number of providers able to obtain subsidy for a particular area could be determined on demographic and economic criteria. In that way, the benefits of subsidy and of competition might be combined.

Demand assessment: Demand estimates for any service area seeking subsidy should be based not only on voluntary demand registers (which provide an unreliable guide to real demand), but also by reference to actual take-up rates observed in areas with comparable demographics.

Access deficits: In the interests of sustainability of subsidised services, eligibility should be based on identifying projected deficits in return on investment over a reasonable period of operation. The relevant deficits might be attributable to:

- a) high individual access line costs, due to geographic factors; *and/or*
- b) high average access line cost, due to common cost factors such as low population density, low-income demographics, high upstream and backhaul costs, and need to replace or upgrade existing networks and facilities.

## **6) Satellite services(Questions 4 & 5)**

Satellite broadband suffers from inherent service quality issues, has very limited total capacity relative to terrestrial systems, and is inherently expensive. Higher cost services such as satellite should only be subsidized where no cheaper alternative is feasible - i.e. for the small number of premises which, due to their remoteness, cannot be more economically served by terrestrial technologies. Higher rates of subsidy will only be required to enable the very small percentage of remote premises for which the standard subsidy is demonstrably insufficient.

## **7) Additional information from providers (Question 11)**

We do not consider that commercial plans for future deployments in other service areas are appropriate information to be sought, as this is likely to be commercially sensitive information.

Consistent with support for technology neutrality, we see that **information relevant for subsidy assessment purposes is only that which determines the resulting service characteristics for the given service area, and the sustainable cost-effectiveness of the subsidised investment.**

The service can be characterized by key parameters at each terminal, based on stated loads on the system and stress factors such as temperature, cloud and radiofrequency interference. The key parameters are as described in section 4 above: downstream bitrate; upstream bitrate; usage allowance; backhaul oversubscription ratio; latency; and reliability.

We recommend that **providers be required to provide details of, and be evaluated against, the above parameters.** In a proposal for a subsidised service to an area, these parameters should not just be a theoretical “average” based on assumptions about the sharing of available bandwidth. They should be provided on the basis of both typical and minimum capability that could be provided to each and every customer in the nominated service area. They should be based on not only the actual broadband take-up, but the forecast broadband take-up.

We recommend that **in order to verify actual performance against claims, independent measurements be taken and/or verifiable evidence be provided by the provider on a regular basis.**

## **8) Price caps (Questions 23, 28, 29)**

In order to ensure that the subsidy flows through to the end user and to achieve the program objective of pricing equity, it may be appropriate that the subsidy contract establish a clear relationship between subsidy and customer pricing.

However, **we do not believe that the current three-level cap (ADSL, non-ADSL and two-way satellite) is appropriate, as it contains unnecessary technology bias. Technology choices could be distorted by the possibility to charge more for certain technologies whilst still attracting a subsidy.**

## **Attachment: Responses to DCITA's specific questions**

Note that answers cross-refer to sections numbered 1-8 in the submission.

### **Questions relating to Broadband Connect**

*Q1 How can the design and delivery of Broadband Connect be optimised to achieve long term sustainable quality broadband solutions for regional, rural and remote Australians?*

A: All sections (1-8) relate to this question

*Q2 What means can/should be used to encourage further capital investment in infrastructure that will support competitive networks and services under Broadband Connect and beyond?*

*Q3 How can Broadband Connect funding be structured to provide the best incentives for investment?*

A: A positive long-term investment climate will require an effective balance between incentives for local access networks and incentives for backhaul and wholesale service providers. (Sections 5-8).

*Q4 Is terrestrial or satellite the most appropriate means of delivering broadband in regional, rural and remote areas?*

*Q5 Can satellite be delivered as competitively as terrestrial services?*

A: Due to inherent technical and cost factors, satellite services should only be considered where all terrestrial options have been exhausted. Section 6 refers.

*Q6 Should participating providers be required to commit formally to service the areas they identify in registration applications?*

A: Capacity to respond to customer demand at a nominated rate of subsidy for a given area should be a condition of registration, but scope for commercial response to market conditions should be taken into account (Sections 5-8).

*Q7 Should annual renewal of funding agreements specify timeframes for commencement of services in areas of greatest need?*

*Q8 Should a system of prioritised funding for services connected in areas of greatest need (beyond what has been provided under the HiBIS two-tiered incentive structure) be introduced?*

A: No additional comment on Q7-8.

*Q9 What can be done further to overcome barriers to capital investment in sustainable technologies in less commercially viable regional areas?*

*Q10 How can the high cost of some technologies be reconciled with increasing customer expectations for higher speeds and usage allowances especially in more remote areas?*

A: Service options should be evaluated with reference to available upgrade paths and attendant costs, not only for short-term capacity to meet lowest service thresholds (Sections 1-5).

*Q11 Should it be mandatory for program participants under Broadband Connect to provide additional information as listed below as a condition of registration?*

- *intended future service areas (with approximate dates of commencement of supply);*
- *the viable geographic reach of broadband services from central transmission points for service delivery;*
- *technical barriers limiting the application of providers' technology in regional communities;*

- *the capacity of providers' technology to support varying types of broadband traffic and use;*
- *the range of service speeds providers' technology would be able to support;*
- *the capacity of providers' technology to provide services now and to accommodate new developments such as increased speed, usage and applications in the future;*
- *the particular relevance of the technology to other communication services (for example, capacity to be used also for supporting mobile telephony services);*
- *a summary of the broad nature of technology they employ; and*
- *anticipated timing and target areas for their technology deployment in regional Australia.*

A: Disclosure should be limited to technical capability and a viable business plan, but should not extend to marketing elements that may be commercially sensitive information and should be recognised as needing the flexibility to respond to market conditions (Section 7).

*Q12 On what basis would you argue that certain specific technologies will have the most impact on the delivery of regional broadband services in the next three to five years?*

A: Extended and progressively upgraded DSL over copper will remain the predominant access technology in regional markets where copper CAN exists, because no other technology can similarly leverage existing network assets to meet incremental demand.

*Q13 How would you compare the effectiveness of these technologies to others in the market place?*

Regardless of the technology employed, achievable data rates depend upon the distance between the customer and the point where the data enters the fibre network. Wireline and wireless technologies demonstrate similar achievable distances for any given data rate, although with a dedicated wire per customer, it is possible to dedicate this bitrate to each customer. As wireless is an inherently shared medium, the achievable bitrate at any given distance is shared between multiple users. Dedicated bandwidth is required to deliver advanced services such as real-time on-demand television quality video.

*Q14 To what extent will broadband technologies be able to augment capacity to meet rapidly expanding consumer expectations for higher bandwidth and more advanced applications?*

A: As outlined above, regardless of the wireline or wireless technology used in the access network, an increase in the achievable average bitrates requires more fibre to be deployed, so that average distances between the customer and the fibre are decreased. The per kilometre cost of deploying fibre is quite high compared to other costs such as network equipment, and therefore is usually the dominant cost. Hence regardless of the technology(s) employed (wireless or wireline), achievable average bitrates are closely related to the resources available to fund a build-out of fibre. Extel believes that the level of funding for Broadband Connect and Clever Networks would allow 1.5Mb/s to be achievable to up to 99% of premises, but substantially higher threshold bitrates may be unrealistic within the available funding.

*Q15 Can complementary technologies provide better solutions for delivery of services in regional Australia?*

A: In order for wireless technologies to achieve bitrates that are equivalent to wireline, similar amounts of investment will be required, because base-stations must be a similar distance from customers as wireline cabinets and exchanges. However, with wireless technologies, this equivalent bitrate is shared between subscribers, without the realistic possibility of dedicated bandwidths that wireline allows.

The strength of wireless lies in harnessing applications that take advantage of mobility. Its weakness is that it is an inherently shared medium, and consequently the bitrates that can be dedicated to each customer are substantially lower than wireline.

Wireless technologies could provide facilities-based competition against existing wireline deployments, but this should be considered in the context of its strengths and weaknesses – particularly its ability to provide a realistic evolution path to next generation services involving high dedicated bandwidths. However, as argued in section 3, Extel recommends that subsidy mechanisms should be technology agnostic, allowing the market to select the most effective technologies.

*Q16 What innovative approaches should Broadband Connect adopt in its program design to utilise these technologies most efficiently and effectively?*

A: Broadband Connect should observe strict technological neutrality so that each service proposal may be assessed on its service level merits, case by case (Sections 7-8)

*Q17 What capacity do existing technologies have to accommodate the introduction of new developments, such as increased speeds, usage and other applications?*

A: See answer to Q14.

*Q18 Should the current system of incentive payments to providers for the supply of broadband services be retained?*

*Q19 Would an up front method of payment be more effective?*

*Q20 How else could the method of payments to providers be adjusted to achieve more satisfactory outcomes for providers and people living in regional, rural and remote Australia?*

A: More attention should be given to targeting the subsidies where they are really needed; to matching subsidy to underlying cost structure; to considering rate of return issues for investors; and potentially introducing a bidding system in areas where competition may be viable (Section 5)

*Q21 Should funding be provided:*

- based on the number of customers connected?
- the number potential premises with potential access?
- a combination of both methods?

A: A combination could provide for subsidy that targeted both actual customers for their access deficit, plus support for backhaul and other wholesale costs that might be necessary to provide access to a group of potential customers (Section 5)

*Q22 If funding was based on the number of premises with potential access should it then only be provided for infrastructure?*

A: See above

*Q23 How can methods of payment under Broadband Connect be better structured to ensure that providers are not overcompensated for the supply of broadband services?*

A: Market forces are to be preferred to regulated pricing mechanisms, wherever market forces can be expressed through competition. Bidding mechanisms may provide some kind of proxy for competition where markets are weak. Any price cap mechanism should not introduce technology assumptions that might distort choice of technologies by service providers (Section 8).

*Q24 Should the current HiBIS threshold model for speed and usage be maintained at existing levels under Broadband Connect?*

A: No (Sections 1,2,4)

*Q25 Should the model be retained with increased minimum speed and/or usage requirements?*

A: Yes, but with other criteria also considered (Sections 1-5)

*Q26 Should two separate minimum speeds with two subsidy levels be introduced?*

A: Threshold service standards should not be compromised below 1.5Mb/s, but provision could be allowed for lower service capabilities where exceptional circumstances can be proved (Sections 1-3)

*Q27 Do threshold requirements need to be expanded to accommodate other issues such as latency?*

A: Yes (Section 4)

*Q28 Should the Broadband Connect Stage 1 price caps be retained under Stage 2?*

A: See answer to Q23.

*Q29 Should a greater range of price caps be introduced than the two currently available?*

A: See Section 5.

*Q30 Should the current funding cap level of 60 per cent continue under Broadband Connect?*

[ No comment on these questions ]

## **Questions relating to Clever Networks**

*Q1- Q18*

[ No comment on these questions ]

*Q18 Should there be specified minimum broadband specifications (eg. bandwidth, latency etc) for Clever Networks and, if so, what should they be and how should they be determined?*

A: Access service characteristics for Clever Networks projects should be not less than the customer access service characteristics for Broadband Connect services (Sections 1-4).

*Q19 What steps / mechanisms can or should be incorporated, if any, into Clever Networks to enable regional, rural and remote communities progressively to transition to high / higher bandwidth networks?*

A: Aggregation of institutional demand with private customer demand may encourage wholesale infrastructure investments such as backhaul capacity, exchange upgrades, and FTTN rollout, to mutual benefit of institutional and non-institutional customers.

*Q20 New technologies are showing considerable promise in providing broadband access to users well outside the current DSL limitations. What strategies should be adopted to encourage and support deployment of these new technologies, and to ensure newly emerged technologies are not precluded during the lifecycle of the program?*

A: Extel's *expandsl* products specifically address the issues of geographic extension and an incremental upgrade path. The core strategic imperative is to apply rigorous technological neutrality to evaluation of service options for any subsidised project, including the upgrade path and extension capabilities (About Extel, and Sections 1-4)

*Q21 What supporting information should be required in Clever Networks proposals in order for their sustainability beyond the life of the program to be evaluated effectively, and what factors should be considered in determining sustainability?*

A: Clever Networks proposals should be evaluated against criteria that test proposed technologies against current capabilities but also include ongoing operating costs, potential for incremental growth in scope and scale of service, and upgrade path to increased bandwidth (Sections 3-5).

*Q22-Q25*

[ No comment on these questions ]