



**TELSTRA CORPORATION LIMITED**

**Response to the ACCC discussion paper reviewing the  
declaration for the domestic transmission capacity service**

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**Attachment 1 Response to specific questions raised in the Discussion Paper**

**Attachment 2 Sample of ten competitive offerings of Ethernet services**

## Executive Summary

Telstra has serious concerns with the Commission's proposed variation to the service description for the declared domestic transmission capacity service (DTCS) as identified in the Commission's Discussion Paper on this topic dated November 2009. Telstra does not believe that any additional regulation of transmission services is warranted, or can be justified.

The Commission's proposed variation:

- includes services using 'Ethernet interface protocols'; and
- removes the limitation of DTCS bandwidths to certain 'designated rates'.

The Commission is proposing these changes only nine months after it decided to continue the regulation of the DTCS for a further five years as it currently stands, without any call from industry for a change to the service definition, and without any evidence of market failure or the need to regulate in this manner.

While the Commission has described these variations as constituting a minor clarification, the proposed variations would give the DTCS service description extremely broad application. The Commission would potentially regulate a wide range of new services in a diverse range of unrelated product markets. The proposed amendments could also require DTCS to be supplied at bandwidths inconsistent with international standards.

The proposed variation has significant adverse ramifications for the future supply of the DTCS as well as all types of Ethernet services in Australia, and therefore should not be made.

The key points in this submission are outlined below. **Attachment 1** to this submission contains Telstra's response to the specific questions raised in the Commission's Discussion Paper of November 2009.

**1. Regulation of Ethernet is not in the long-term interests of end-users; to the contrary, it is neither necessary nor appropriate, rather it is premature and potentially harmful**

The Commission's proposal to vary the DTCS service description has no evidentiary support to enable the Commission to reach a view that it is in the long-term interest of end-users. In fact the evidence suggests that it is neither necessary nor appropriate.

Ethernet can be created by access seekers at low cost from existing declared DTCS transmission. DTCS can already be used by access seekers to self-supply Ethernet-based services. There is no material difference between the cost for access seekers to convert SDH transmission services to Ethernet over SDH services, and the cost for Telstra to itself supply Ethernet over SDH at wholesale. Accordingly, there is no efficiency gain from extending regulation to cover this service.

There is no undeclared network bottleneck. There is no market failure. There is ample evidence of effective competition, some examples of which are outlined in this submission.

There would be material adverse consequences if the Commission's proposed variation was implemented. The removal of designated speeds mean an access seeker could potentially seek DTCS and Ethernet at a range of non-standard bandwidths, inconsistent with those contemplated by international standards. There seems little justification for the Commission proposing such a potentially significant adverse regulatory burden.

The premature regulation of Ethernet will adversely influence technology choice and impede its adoption. The Commission's proposal is harmful and risks distorting and deterring new investment while impeding the long-term development of effective infrastructure competition, particularly backhaul services.

### **The proposed variation is not in the long term interests of end users**

Given these issues, it cannot be legitimately concluded at this time that the proposed variation is in the 'long term interests of end-users' as required by section 152AL of the *Trade Practices Act 1974 (Cth)*.

This is particularly true given:

- (a) the current absence of any market analysis or any analysis identifying the impact of declaration of Ethernet on competition;
- (b) the lack of any analysis of the impact of the proposed declaration of Ethernet on the efficient use of, or investment in, infrastructure;
- (c) the very limited period provided by the Commission for industry consultation (with such consultation occurring over the Christmas / New Year period while much of the industry has been absent on holiday); and
- (d) the Commission's statement that it does not intend to publish a draft report or engage in any further industry consultation.

## **2. The proposed variation is far too broad in scope and application**

Ethernet interface protocols are deployed across a wide range of platforms and used for a multitude of services. The proposed variation could regulate:

- both Layer 2 and Layer 3 services, resulting in double-regulation of wholesale Ethernet services supplied over the same infrastructure;
- Ethernet services supplied over local access infrastructure (including ULLS and FTTP networks), thereby regulating wholesale DSL, Business Grade Ethernet, and Ethernet private network services; and

- Telstra’s future Ethernet services as well as those currently being developed by NBN Co would also be regulated under the proposed variation.

**3. If Ethernet is regulated, the international experience currently favours only limited regulation**

To the extent that regulation of Ethernet services has occurred in other jurisdictions, it has been carefully crafted and narrowly targeted. In some cases this has involved defining wholesale transmission product markets by technology, geography, network hierarchy and/or capacity.

Any regulation has been directed only at those Ethernet markets where there is clear evidence of market failure. Regulatory forbearance has occurred in those markets where Ethernet is still in the early stages of deployment to encourage innovation and investment in the technology.

Any regulation of Ethernet has only occurred after detailed consideration with regard to the effects on competition and investment of that regulation on the relevant markets – analysis which the Commission in this case has not undertaken.

**4. If any regulation is applied, it should be limited in scope and narrowly targeted**

If, despite the absence of any evidentiary support for such a decision, the Commission is nonetheless minded to regulate Ethernet, then the DTCS service description should be carefully targeted only at the ‘Ethernet over SDH’ presentation of existing regulated interexchange SDH services outside metropolitan areas.

However, in such circumstances, and prior to making any decision to regulate, a full assessment of the state of current and expected future competition in the relevant markets in which Ethernet is supplied would be required. As mentioned above, Telstra believes that this will demonstrate no market failure and that Ethernet is not a bottleneck, and that accordingly there is no requirement to regulate. Industry consultation on any revised service description that might be proposed should then also be conducted.

If the Commission does propose to continue with an amendment to the service description, then Telstra suggests that with the proposed removal of the process for granting further exemptions under the proposed new regulatory regime, the Commission should also take the opportunity to ‘automate’ the exemptions in the service description. The Commission should automatically reduce the scope of regulation as competitive infrastructure is rolled out by NBN Co and other operators.

## **A Regulation of Ethernet is neither necessary nor appropriate, rather it is premature and potentially harmful**

- 1 The Commission's proposed variation to the DTCS service description is neither necessary nor appropriate.
- 2 The Commission only recently reviewed the service description in March 2009, and decided to re-declare the service for a further five years with no amendment to the description. There was no industry call for regulation of Ethernet services.
- 3 There is no geographic impediment to competition in Ethernet markets. There is no undeclared network bottleneck. There is no market failure. There is ample evidence of effective competition.
- 4 DTCS can already be used by access seekers to self-supply Ethernet-based services. There is no material difference between the cost for access seekers to convert SDH transmission services to Ethernet over SDH services, and the cost for Telstra to itself supply Ethernet over SDH at wholesale. Accordingly, there is no efficiency gain from extending regulation to cover this service.
- 5 By covering such a broad range of services, the proposed variation would have a number of material adverse consequences. It would lead to double regulation in some cases, inconsistent regulation and regulation of some services that are competitively supplied.
- 6 The proposed variation is not in the long-term interests of end users

### **A.1 There was no industry desire to regulate Ethernet in 2009**

- 7 As far as Telstra is aware, no industry desire for regulation of Ethernet was expressed in the inquiry about the declaration of DTCS completed in March 2009.
- 8 In the recent inquiry into the DTCS declaration, the potential extension to Ethernet-based services was not raised by any party in submissions, nor by the Commission as an issue for comment in the inquiry process. That market inquiry investigated the state of competition for SDH transmission services in various geographic and bandwidth markets.
- 9 Any variation to the DTCS service description to include Ethernet is unnecessary. However if the Commission believes the market has evolved unexpectedly since March 2009, the Commission should initiate further market inquiries to identify the bottleneck service and to assess the state of competition in the relevant markets.

### **A.2 Ethernet services can be easily supplied using the underlying DTCS**

- 10 The extension of regulation identified as proposed by the Commission is also inappropriate, since there is no unregulated bottleneck. The DTCS in its current form already enables access seekers to acquire basic inputs so that they can offer competing wholesale or retail services.
- 11 To supply 'Ethernet over SDH' access seekers can convert an underlying SDH service that has been acquired from Telstra or another provider. The SDH

services are already declared under the current DTCS service description. The conversion costs are low and conversion can easily occur. There is no material cost difference between access seeker conversion of an SDH service and Telstra conversion. Indeed, as demonstrated below, carrier grade Ethernet can sometimes be created more cheaply by access seekers from the underlying DTCS than Telstra can supply the service itself to access seekers.

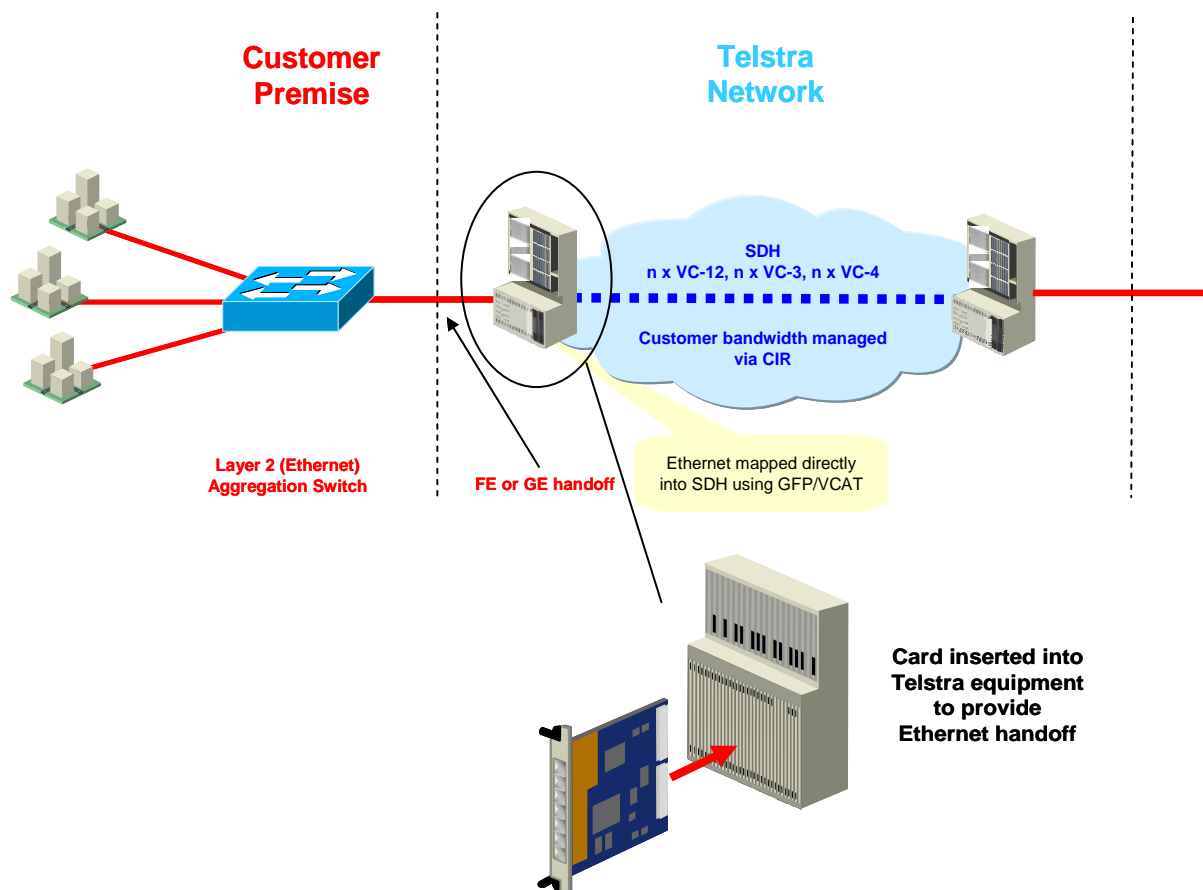
- 12 Accordingly, there is no need to add Ethernet interface protocols to the existing service description. The pricing for carrier grade Ethernet services is already adequately constrained by the ability of access seekers to create their own carrier grade Ethernet services using SDH transmission as an underlying input.
- 13 For the purposes of this submission, Telstra compares the costs involved in the following two scenarios:
  - (a) Telstra converts one of its own SDH transmission links in order to supply 'Ethernet over SDH' to an access seeker; and
  - (b) the access seeker acquires an SDH transmission link from Telstra and applies its own equipment to create an 'Ethernet over SDH'.

Although there are many network architecture options available to access seekers the example is typical of the method and cost that Telstra or an access seeker would incur to provision an Ethernet over SDH service in the Telstra network.

**(a) Telstra conversion of an SDH transmission service to create 'Ethernet over SDH'**

- 14 In order to supply Ethernet over SDH, Telstra will need to deploy equipment to convert the SDH to Ethernet technologies:
  - (a) In practical terms, an Ethernet interface card is inserted into a pre-existing Telstra Next Generation Add Drop Multiplexer (**NG-ADM**) in order to adapt the NG-ADM to provide Ethernet hand-off. A NG-ADM is located at each end of a DTCS link.
  - (b) The SDH(TDM) circuits within the DTCS link act as Virtual Containers (VCs) for the Ethernet service. The Ethernet interface cards map the Ethernet frames into the SDH domain within the VCs using Frame-Mapped Generic Framing Procedure (GFP-F).
  - (c) This solution provides Committed Information Rates (CIR) and can also involve the grouping of many VCs using virtual concatenation.
- 15 An illustration of the upgrading of an SDH link via an NG-ADM is illustrated in **Figure 1** below:

**Figure 1: Adaptation of DTCS by Telstra to provide Ethernet-based transmission**



- 16 Telstra Wholesale currently supplies an 'Ethernet over SDH' service known as "Telstra Wholesale Carrier Grade Ethernet" or "TW-CGE". An overview of the TW-CGE product, which is provisioned using the procedure described above, is set out at the following Internet link:

- <http://telstrawholesale.com/products/data/wholesale-carrier-grade-ethernet.htm>

Telstra does not offer any quality of service as part of the CGE service.

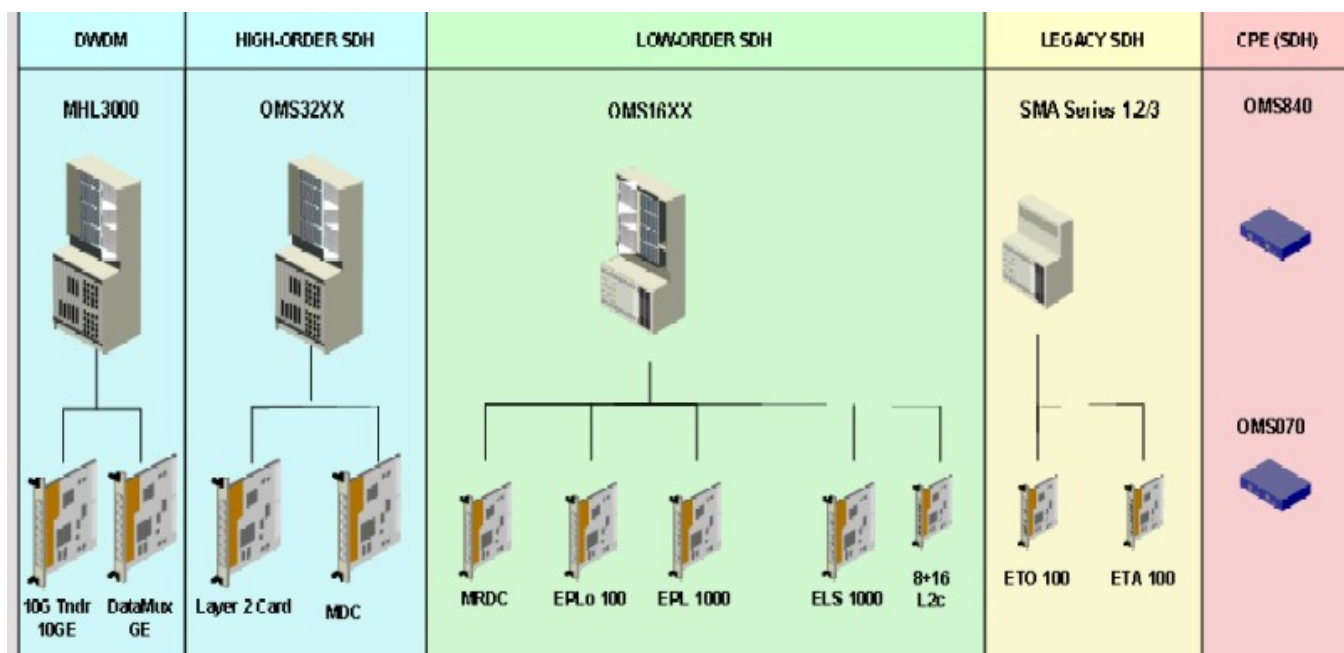
- 17 Telstra's network does have inherent limitations as to the circumstances in which CGE can be supplied:
- (a) **Economic limitations:** SDH links have discrete bandwidth increments. Telstra requires a sufficient block of capacity ordered by an access seeker before it is economic to insert an Ethernet interface card. In effect, the insertion of an Ethernet interface card involves an opportunity cost to Telstra in that the relevant VC cannot then be used to supply standard SDH transmission.
  - (b) **Technological limitations:** The capability to insert an Ethernet interface card only exists where the relevant ADM has been upgraded to Next Generation SDH (NG-SDH) so is capable of mapping Ethernet onto SDH. While Telstra has upgraded a number of ADM within its core network, not all ADM have been upgraded in this manner. Telstra does not offer 'Ethernet over SDH' in all the geographic locations where SDH transmission is available.



An illustration of the Ethernet interface card options for the various underlying transmission technologies is set out in **Figure 2** below.

**Figure 3** below identifies the conversion of DTCS from SDH to CGE via insertion of an Ethernet data car. The conversion assumes that the relevant Telstra ADM is NG SDH enables.

**Figure 2: Card options to create carrier grade Ethernet**

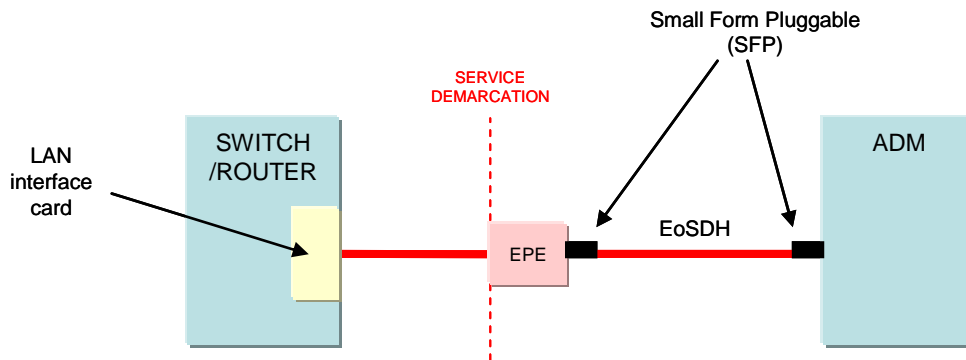


**(b) Access seeker conversion of an SDH service to create carrier grade Ethernet**

- 18 In order to convert an SDH service to an Ethernet service, an *access seeker* will follow this procedure:
  - (a) The access seeker will acquire a standard SDH transmission service from Telstra of a bandwidth suited to their intended Ethernet service or services.
  - (b) The access seeker will connect their own NTU conversion equipment at each end of the SDH transmission service.
- 19 The access seeker is not constrained by whether or not Telstra's equipment has been upgraded given that the access seeker is installing its own NTU for conversion purposes beyond Telstra's equipment at each end of the SDH transmission link. Therefore, the access seeker can self supply Ethernet at all geographic locations where Telstra sells SDH transmission, which is nationally ubiquitous. Ethernet conversion by the access seeker provides a wider footprint than Telstra's own Ethernet over SDH
- 20 There are a large range of approaches available to an access seeker to convert Telstra's SDH transmission to supply Ethernet over SDH. Each access seeker therefore has significant flexibility to identify the optimal approach that will best suit their budget, customer requirements and network configurations.
- 21 A typical situation is shown below involving an access seeker receiving the SDH service at the end-customer's premise. The access seeker must simply supply a termination unit at the end-user premise to convert the optical signal to an electronic signal and switch it to the correct customer telecommunication lines.

- 22 A cost comparison of 'Telstra conversion' against 'access seeker conversion' is summarised in **Figures 3 and 4** below for a 150Mbit/s Ethernet service supplied using an SDH service in the form of an STM1 (155Mbit/s). This is typical bandwidth for access requests from access seekers. For convenience, only one end of the link is illustrated, but the same costing would apply to both ends.
- 23 In most cases, the conversion cost should be similar for Telstra and access seekers. However, **Figures 3 and 4** also demonstrate that in some circumstances it may actually be cheaper for an access seeker to acquire SDH from Telstra and convert it to 'Ethernet over SDH' than for the access seeker to acquire a pre-converted 'Ethernet over SDH' service from Telstra.

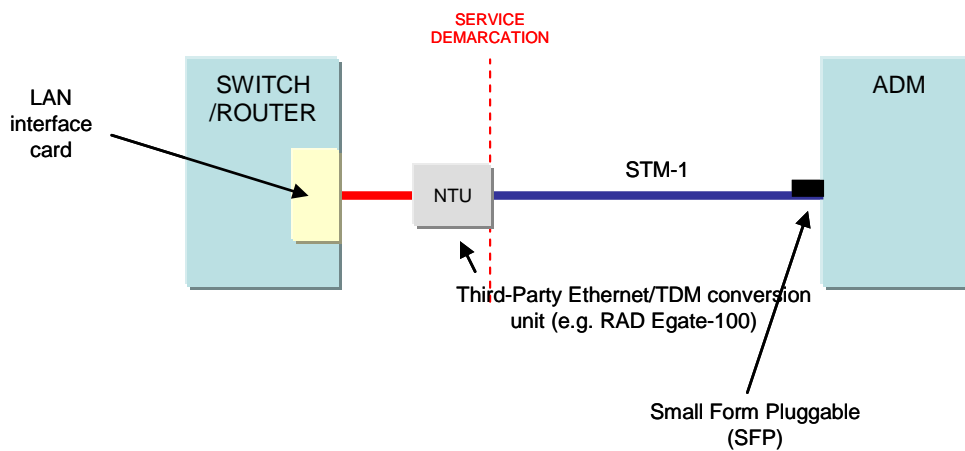
**Figure 3: Cost of conversion by Telstra (per end)**



[c-i-c begins]

[c-i-c ends]

**Figure 4: Cost of conversion by an access seeker (per end)**



[c-i-c begins]

[c-i-c ends]

### **A.3 Competition for Ethernet services exists in all geographic areas**

- 24 The availability of different Ethernet services can be characterised notionally into three footprints or zones which differ geographically depending on whether it is the SDH carrier or the access seeker supplying the Ethernet service.
- 25 In all three zones competition for Ethernet services exists. The exemptions from regulation granted for SDH and PDH transmission under-represent the true scale of competition. This is evident from the range of Ethernet services already supplied in the markets.
- 26 Section B described the technical features and characteristics of some of the different Ethernet services.

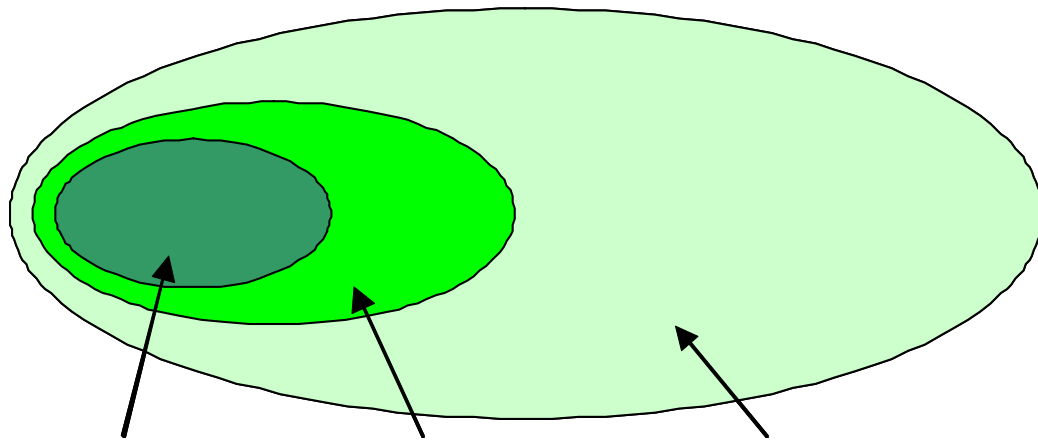
#### **(a) *Ethernet services that are sold and Ethernet services that are converted from SDH transmission by access seekers are available in different zones***

- 27 The analysis in this submission demonstrates that there are three distinct geographic 'zones', corresponding with the ability of Telstra and wholesale customers to supply Ethernet services using various transport technologies.
  - (a) The first zone covers Telstra's entire SDH network. This zone is the area within which access seekers can acquire Telstra SDH services and convert them to supply 'Ethernet over SDH'. In this manner, access seekers can supply Ethernet over SDH anywhere in Australia.
  - (b) The second zone is a subset of the first zone and hence only covers part of Telstra's SDH network. This zone represents those exchanges that contain ADM that have been upgraded to NG-SDH. In this second zone, Telstra is capable of supplying 'Ethernet over SDH' as a wholesale service by inserting an Ethernet interface card into the ADM. Given that access seekers can convert SDH services themselves, the pricing of Telstra's wholesale 'Ethernet over SDH' service is already effectively constrained.
  - (c) The third zone only covers the limited metropolitan areas where Ethernet over fibre is capable of being supplied. The supply of Ethernet over fibre is currently only practical and economic for metropolitan areas and it has distance limitations. The supply of Ethernet over fibre normally coincides with those routes where there already exists infrastructure-based competition.
- 28 Given that the supply of 'Ethernet over fibre' is located in competitive areas, there is no need to regulate 'Ethernet over fibre':
  - (a) Although many of the exchange service areas that Ethernet over fibre is available are already exempt from the current DTCS service description, there are many more areas that should be exempt due to the high levels of competition.
  - (b) Access seekers also retain the option of creating their own Ethernet services from transport services such as SDH.
  - (c) Accordingly, the price of 'Ethernet over fibre' is heavily constrained.

29 In any event, the 'Ethernet over fibre' service is evolving in Australia and remains in the earlier stages of its product life cycle. It is inappropriate to consider the regulation of Ethernet over fibre (if at all), until such time as the relevant markets have matured.

30 The notional supply of Ethernet services can be depicted as a Venn diagram, as illustrated in **Figure 5** below.

31 **Figure 5: Venn diagram showing the wholesale supply of Ethernet**



The potential supply of Ethernet over fibre by Telstra at wholesale is geographically limited by distance.

The potential supply of 'Ethernet over SDH' by Telstra at wholesale is geographically limited by the extent to which ADM have been upgraded to NG-SDH.

Telstra supplies standard SDH transmission as part of the DTCS which can, in turn, be used by access seekers to supply their own competitive 'Ethernet over SDH' product. Likewise the declared ULLS service can be used to provide 'Ethernet over Copper'.

**b) Existing exemptions don't reflect the true scale of competition**

32 The extent of competitive build has previously been noted by the Commission in its decision to grant to Telstra an exemption from the DTCS on certain transmission routes.<sup>1</sup> In that decision, the Commission found that nine capital-regional routes and a range of inter-exchange routes met its criteria, which required at least three alternative providers. The exchange service areas (ESAs) that the Commission identified as being served by competitive inter-exchange transmission under the Commission's criteria are listed in **Table 1** below.

**Table 1: ESAs deemed competitive by the Commission**

| State | ESAs deemed to be competitive   |
|-------|---|
| NSW   | ASHFIELD, BALGOWLAH, BANKSTOWN, BLACKTOWN, BURWOOD, CAMPSIE, CARRAMAR, CASTLE HILL, CHATSWOOD, COOGEE, CREMORNE, EAST, EASTWOOD, EDGECLIFF, EPPING, GLEBE, GRANVILLE, HARBORD, HOMEBUSH, HORNSBY, HURSTVILLE, KENSINGTON, KINGSGROVE, KOGARAH, LAKEMBA, LANE COVE, LIDCOMBE, LIVERPOOL, MASCOT, MOSMAN, NEWTOWN, NORTH PARRAMATTA, NORTH RYDE, NORTH SYDNEY, PARRAMATTA, PENDLE HILL, PENNANT HILLS, PETERSHAM, RANDWICK, REDFERN, REVESBY, ROCKDALE, RYDALMERE, RYDE, SEVEN HILLS, SILVERWATER, ST LEONARDS, UNDERCLIFFE, WAVERLEY |
| VIC   | ASCOT, BRUNSWICK, CAULFIELD, COBURG, ELSTERNWICK, FOOTSCRAY, HEIDELBERG, MALVERN, MORELAND, NORTH MELBOURNE, PORT MELBOURNE, PRESTON, RICHMOND, SOUTH MELBOURNE, ST KILDA, TOORAK   |
| QLD   | PADDINGTON, SOUTH BRISBANE, TOOWONG, VALLEY, WOOLLOONGABBA  |
| WA    | SOUTH PERTH, SUBIACO  |

Source: ACCC, *Telstra's Domestic Transmission Capacity Service Exemption Applications: Final Decision*, November 2008

33 The market information obtained by the Commission from the annual industry submissions in response to the Infrastructure RKR issued on 22 December 2007 (RKR) should show the locations where carriers have laid competing fibre and other networks. The RKR requires 22 specified carriers to report on the locations of their core network and access infrastructure. Other fibre owners, including energy and railway companies with material fibre infrastructure, are not captured by the RKR.

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<sup>1</sup> ACCC, *Telstra's Domestic Transmission Capacity Service Exemption Applications: Final Decision*, November 2008

- 34 Telstra suggests that the Commission could use the data collected in response to the RKR as a starting point to inform its inquiry about the state of competition in markets in which Ethernet is supplied.
- 35 Competition within transmission markets in metropolitan areas and in a number of regional locations is extensive and far wider than the locations in which exemptions are granted.
- 36 Telstra believes that before any extension of the transmission service description is considered, the Commission must first consider the level of competition in the market: that consideration will demonstrate that the level of competition for transmission that already exists, and will continue to exist for the next 5 years, is well beyond that covered by the current exemption applications granted by the Commission.
- 37 However for Ethernet services, application of the SDH exemptions is not sufficient. Ethernet should not be regulated as there is no bottleneck. This is because carriers with their own fibre can self-supply their own requirements for Ethernet over SDH and Ethernet over fibre and sell in the wholesale markets. Carriers and carriage service providers without their own fibre can buy the regulated SDH transmission service provided by Telstra to create their own Ethernet services. There is no bottleneck

**(c) Competitors already offer Ethernet services on routes potentially affected by declaration**

- 38 Given the flexible nature and proliferation of Ethernet standards, a wide range of Ethernet services are available in the Australian market.
- 39 Many other carriers such as Optus, AAPT, Pipe Networks and Nextgen offer multiple forms of Ethernet, leveraging underlying physical infrastructure or services such as SDH to provide Ethernet that is suitable for different circumstances (e.g., long-haul via 'Ethernet over SDH')
- 40 Supply of EoC also appears to be a viable alternative for competitors. Viability is largely driven by the availability of copper pairs and relatively low cost of rental. There is an increasingly large quantity of copper pairs available for this purpose as many traditional services are migrated from copper to fibre. This, coupled with the low cost of the muxing hardware means that EoC becomes very economic especially for (but not limited to) low speed, short distance services.
- 41 Many of these competitive Ethernet-based services do not discriminate between the retail and wholesale market into which they are sold. These services also purposefully cover a broad range of qualities from lower speed, asymmetric, contended services through to higher speed, symmetric, class of service enabled services. In this manner, there is significant product differentiation.
- 42 Telstra has attached, as **Attachment 2** to this submission, an overview of the some of the current competitive offerings of Ethernet available in the market. Some of these services may be Ethernet over fibre, but most are likely to constitute 'Ethernet over SDH' given its superior distance capability. All of the services constitute "Ethernet" so compete with each other and would likely be declared under proposed changes to the DTCS definition.
- 43 The attachment contains only a sample of ten Ethernet offerings competing with Telstra, noting that there are likely to exist many more Ethernet offerings that are not included in **Attachment 2**:

- Optus;
- AAPT;
- Pipe Networks;
- Nextgen Networks;
- Uecomm;
- TPG/Soul;
- PowerTel;
- Amcom;
- TransAct;
- Agile/Internode

#### **A.4 Material Adverse Consequences of the Commission’s proposed DTCS variation**

44 The Commission’s proposed DTCS variation would have material adverse consequences on investment and innovation for the industry if it were to proceed. The adverse consequences are caused by:

- (a) Double regulation;
- (b) Inconsistent regulation;
- (c) Over-regulation in competitive areas
- (d) Impractical regulatory requirements; and
- (e) Over-regulation of emerging markets

##### **(a) Double regulation**

45 Expanding the DTCS service description to cover downstream wholesale and retail services, as well as the basic SDH transmission input, amounts to ‘double regulation’. If the service description were varied as proposed, regulation would apply to the same underlying infrastructure at multiple levels of carriage technologies.

46 For example, ‘Ethernet over SDH’ will be subject to regulation, as will the underlying SDH-based transmission service and ‘Layer 3’ routed services, which commonly adopt Ethernet interfaces all supplied over the same fibre infrastructure, potentially by different carriers and carriage service providers.

47 In this manner, regulation would extend to include not only SDH transmission, but also to Ethernet services conveyed via SDH transmission (i.e., ‘Ethernet over SDH’). Such double regulation is unnecessary in circumstances where access seekers can easily create ‘Ethernet over SDH’ at low cost by acquiring and converting the underlying SDH service.



48 Consistent with fundamental concepts of competition policy, any ‘enduring bottleneck’ need only be regulated once to address any market failure. Overlapping regulation would harm both future investment and the development of long-term sustainable competition by distorting build/buy signals while creating scope for significant regulatory arbitrage.

**(b) Inconsistent regulation**

49 The proposed variation to the DTCS service description creates serious inconsistencies. Other transport protocols, such as ATM, are not regulated in the core network as part of the DTCS service. However, they will be regulated if used to supply Ethernet. Regulation of an underlying transport protocol only in circumstances where it is used to carry an Ethernet service would distort market behaviour.

50 Overlapping and inconsistent regulations increase the risk of regulatory error (an inherent risk with any complex regulation of rapidly emerging technologies) and diminish the likelihood of efficient commercial outcomes being negotiated by access seekers. Such overlapping regulation is at odds with modern competition policy.

**(c) Over-regulation of competitive services**

51 The proposed variation allows for the exemptions granted for inter-exchange SDH and PDH transmission to also apply to services with Ethernet interface protocols. These exemptions are insufficient to prevent the regulation of services that are competitively supplied.

52 Ethernet over fibre is available in metropolitan areas, where there is extensive infrastructure-based competition. There is no need to regulate this Ethernet service at all because it is fully competitive.

53 Importantly, the locations that are the subject of the 2008 transmission exemptions do not comprise the full set of competitive locations in which there are at least Telstra plus two other fibre owners:

- (a) Telstra only nominated that subset of competitive exchange service areas (ESAs) and capital to regional routes in respect of which Telstra had sufficient factual data to evidence the existence of infrastructure-based competition to the level required by the Commission.
- (b) Of this subset of competitive ESAs and routes in respect of which Telstra could sufficiently evidence competition, the Commission only exempted a limited number of locations.
- (c) Since then, competitors have built more fibre and there are a much larger number of competitive exchange service areas that would meet the Commission’s criteria.

**(d) Impractical regulation of non-standard transmission rates**

- 54 Another important implication of the Commission's proposed variation is that it would extend regulation well beyond the current designated rates. Under the varied service description, access seekers could request transmission services at a range of speeds outside the current discrete bandwidth increments in a manner inconsistent with international standards.
- 55 For 'Ethernet over SDH' or 'Ethernet over fibre', it would be possible for an access seeker to obtain services at other than the standard Ethernet bandwidths. The standard Ethernet bandwidths are 10Mbit/s Ethernet, 100Mbit/s (i.e., Fast Ethernet) and 1Gbit/s (i.e., Gigabit Ethernet). These bandwidths are sufficiently well documented internationally and in Australia that they should be used in the service description.
- 56 This extension of regulation to non-standard bandwidths is neither necessary, nor is it practical in the circumstances. There are both technical and economic limitations on the supply of services outside the standard bandwidths, and requiring Telstra to overcome these limitations would impose a significant regulatory burden.

**(e) Over-regulation of an emerging technology in an immature market**

- 57 Ethernet over fibre is also an emerging technology that should not be subject to regulation until its use has matured.
- 58 A more detailed analysis of emerging technology is set out in Section B of this submission.

**A.5 The proposed variation is not in the long-term interests of end users**

- 59 The legislative regime requires any service declaration or variation to be in the long-term interests of end-users (LTIE). In determining whether declaration is in the LTIE, the Commission must have regard to the following objectives:<sup>2</sup>
- (a) the objective of promoting competition in markets for listed services;
  - (b) the objective of achieving any-to-any connectivity in relation to carriage services that involve communication between end-users;
  - (c) the objective of encouraging the economically efficient use of, and the economically efficient investment in:
    - (i) the infrastructure by which listed services are supplied; and
    - (ii) any other infrastructure by which listed services are, or are likely to become, capable of being supplied.
- 60 Objectives (a) and (c) are closely linked and complementary to each other. As the Australian Competition Tribunal noted in *Re Seven Network*, a form of regulation that encourages efficient investment will in turn promote competition and vice versa.<sup>3</sup> Providing access seekers and access providers with

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<sup>2</sup> TPA, s152AB

<sup>3</sup> *Re Seven Network Limited (No 4)* [2004] ACompT 11 at [134]

clear incentives to make efficient investment decisions will ultimately promote efficient competition over the long term. Conversely, a competitive market will create incentives for efficient investment by all players.

- 61 Objective (b) is not directly relevant to the present inquiry and will not be addressed in this submission. Variation of the DTCS declaration is unlikely to affect any-to-any connectivity, given that there is no evidence of Ethernet being unavailable in the market or any refusal of providers to supply it.

**(a) Promotion of competition**

- 62 The ACCC has stated in the past that in considering where declaration would promote competition and the LTIE, it will look for 'enduring bottlenecks'.<sup>4</sup> These are network elements or facilities that are uneconomic to duplicate and without which access seekers cannot economically provide an end-to-end service.
- 63 Where an enduring bottleneck exists, declaration of access to the relevant facility will promote competition by allowing access seekers to provide a competing end-to-end service. However where there is no enduring bottleneck, regulation will not promote competition or the LTIE since it will discourage facilities-based competition where it is feasible.
- 64 In the present case, there is no evidence of an unregulated enduring bottleneck. Access seekers are buying the DTCS in its current form and using it to supply competing services. Competition is already effective in downstream markets, based on the existing DTCS.
- 65 Expansion of the DTCS would not promote competition in downstream markets since it would not relieve any bottleneck. Rather, expansion of the service description could potentially harm competition, by increasing access seekers' reliance on regulated access products and reducing investment in alternative infrastructure. This will ultimately diminish facilities-based competition, which would not be in the LTIE.

**(b) Efficient use of and investment in infrastructure**

- 66 Telstra submits that the proposed variation of the DTCS will not encourage efficient investment. Rather, introducing regulation at multiple layers will distort investment decisions and increase the likelihood of inefficient outcomes.
- 67 As discussed in Section B of this submission, the proposed variation could lead to regulation of a range of services at multiple layers of the supply chain. These include both 'basic' transmission services and value added services such as Business Grade DSL.
- 68 Regulation at these various layers is unnecessary, since the higher layer services can be (and are) replicated by access seekers using lower layer inputs. Regulating at higher layers simply offers access seekers a choice between creating their own service based on the regulated lower layer inputs or simply buying the end product on a regulated basis.

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<sup>4</sup> ACCC, *Fixed Services Review Declaration Inquiry for the ULLS, LSS, PSTN OA, PSTN TA, LCS and WLR: Final Decision*, July 2009

- 69 This 'double regulation' of substitute products can lead to inefficient investment decisions, since the risk of error in relative pricing is greatly increased. Regulation must try to mimic the outcomes of a competitive market not just for pricing of one product, but also for relative pricing.
- 70 Where pricing of several substitute products is determined by regulation, the relativities in regulated pricing will determine each product's relative attractiveness. If relativities between regulated prices do not mimic a competitive market, then this will lead to inefficient investment decisions. Actual investment will not reflect that which would occur in a competitive market.
- 71 Where investment decisions are distorted by multiple layers of regulation, it follows that competition will be damaged over the long term. If regulation tilts access seeker decisions towards regulated access products, there will be under-investment in key infrastructure. This will reduce the potential for product differentiation by access seekers and ultimately diminish competition.
- 72 For these reasons, the proposed regulation of the Ethernet service does not meet the LTIE criteria, and therefore should not proceed.

## B The proposed variation is far too broad in scope and application

|    |   |
|----|---|
| 73 | The concept of 'Ethernet interface protocols' in the Commission's proposed variation is very broad and could apply to a wide range of services. Ethernet interface protocols are deployed across a wide range of platforms and used for a multitude of services.  |
| 74 | The range of Ethernet services regulated by the proposed variation would be all encompassing: <ul style="list-style-type: none"><li>• both Layer 2 and Layer 3 services, resulting in double-regulation of wholesale Ethernet services supplied over the same infrastructure;</li><li>• Ethernet services supplied over local access infrastructure (including ULLS and FTTP networks), thereby regulating wholesale DSL, Business Grade Ethernet, and Ethernet private network services; and</li></ul> |
| 75 | Telstra's future Ethernet services as well as those currently being developed by NBN Co would also be regulated under the proposed variation  |

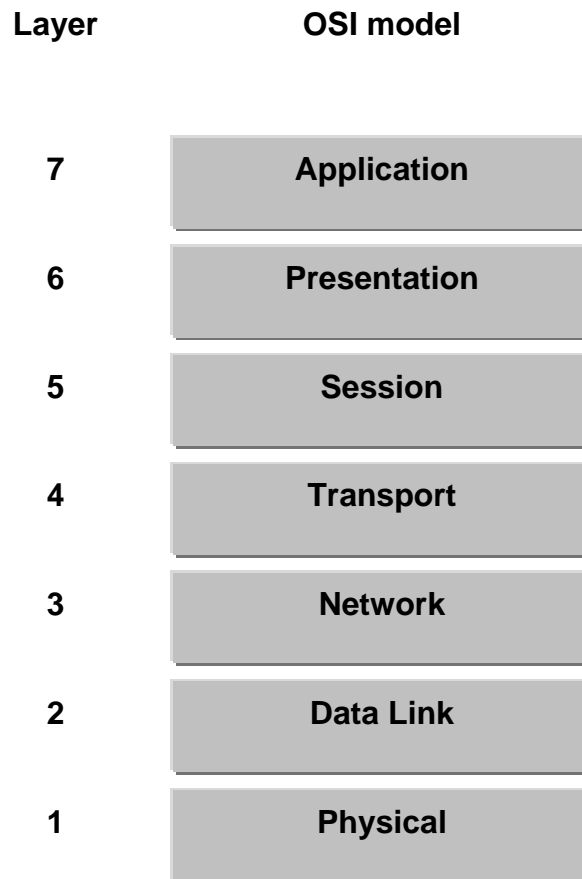
### B.1 The concept of 'Ethernet interface protocols' is very broad

- 4 "Ethernet" is a very broad family of standards which spans both the network hierarchy and the end-to-end service type. Ethernet was originally developed in the mid 1970's as a local area networking (LAN) standard, but has subsequently expanded to the wide area networking (WAN) environment. Ethernet now encompasses all parts of telecommunications networks and devices.
- 5 Ethernet standards describe a range of functions across both the Layer 1 (physical) and Layer 2 (data Link) layers of the Open Systems Interconnect (OSI) model. Ethernet functions include:
  - physical interfacing – providing a standardised Ethernet interface on another service, such as ATM or SDH;
  - aggregation – the ability to combine multiple physical Ethernet interfaces into a logical bundle to more efficiently aggregate multiple services;
  - switching – allowing multiple sites to communicate through a cloud of shared bandwidth; and
  - class of service – the ability to prioritise traffic according to a range of attributes to avoid the over-dimensioning of capacity.
- 76 The seven layers of the OSI model are identified in **Figure 6** below.<sup>5</sup>

**Figure 6: The seven layers of the Open System Interconnection (OSI) model**

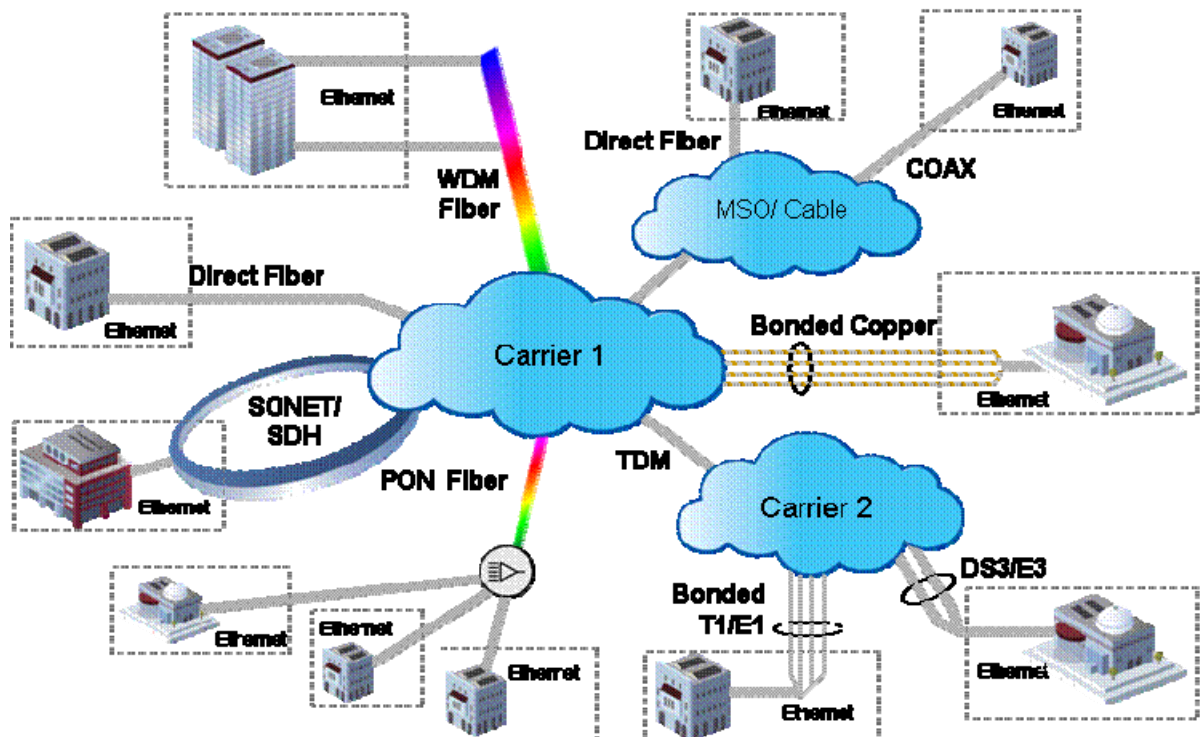
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<sup>5</sup> See [http://www.webopedia.com/quick\\_ref/OSI\\_layers.asp](http://www.webopedia.com/quick_ref/OSI_layers.asp) for further information.



- 77 Ethernet is incredibly versatile and can be delivered over all underlying telecommunication infrastructures and platforms and at each part of the network:
- (a) Ethernet is now the most common ‘interface protocol’ with a wide range of services and devices interconnecting via a standard Ethernet interface (e.g. Bigpond ADSL and cable services; IP-VPN; consumer devices such as computers and televisions).
  - (b) Ethernet can be carried directly over fibre (commonly referred to as “Ethernet over fibre” or “Native Ethernet”) or copper (commonly referred to as “Ethernet over Copper”) as well as over multiple other transport technologies such as SDH and ATM.
- 78 In effect, Ethernet is agnostic to the underlying carriage infrastructure or transport technology – refer to **Figure 7** below.

**Figure 7: Versatility of Ethernet**

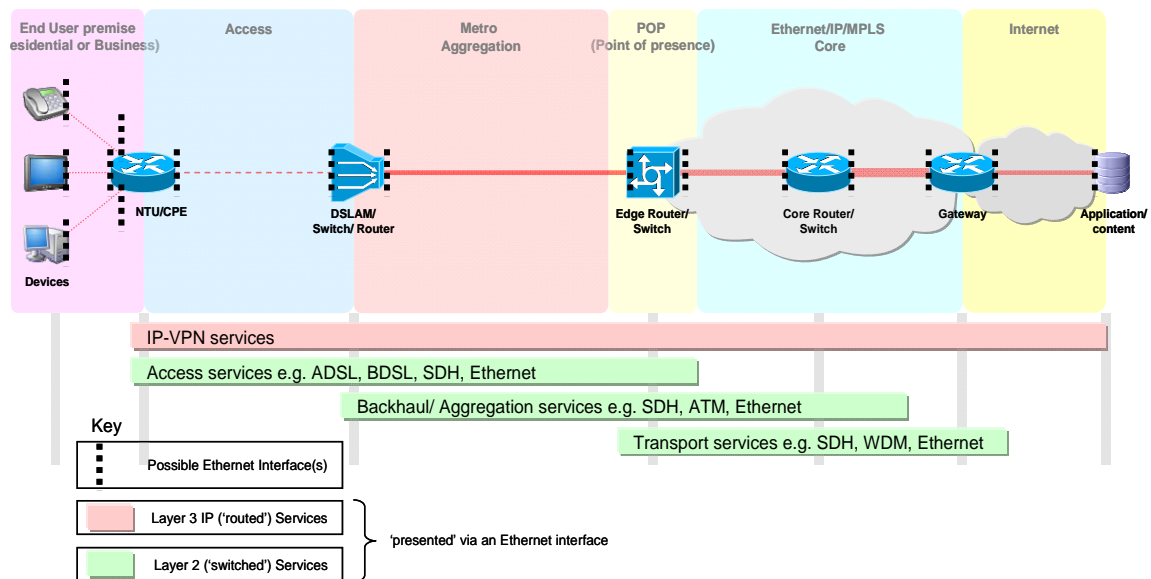


Source: MEF; An overview of the work of the MEF, January 2009

- 79 Ethernet interface protocols can be applied at all interface points in a network or service including:
- (i) customer premises equipment (CPE), such as modems and set top units (xDSL and cable);
  - (ii) network edge (local access) transport, including tail services supplied in the access network;
  - (iii) various forms of core transport, including next generation SDH transmission and optical gigabit Ethernet transmission; and
  - (iv) end-to-end retail and resale services, such as Business Grade Ethernet (BGE), IP-VPN, and residential broadband products such as BigPond ADSL and broadband over cable (HFC).

80 Indeed, Ethernet interface protocols are now used in a multitude of services and are, in effect, becoming ubiquitous, as illustrated in **Figure 8** below.

**Figure 8: The ubiquitous usage of Ethernet interface protocols**



- 81 Even if regulation were appropriate at this time for Ethernet services (which Telstra disputes for the reasons identified in this submission), the concept of an 'Ethernet interface protocol', as used by the Commission in its varied DTCS service description, could be interpreted broadly to encompass most of the Ethernet family:
- (a) The concept includes all forms of Ethernet-based core transmission as well as Ethernet-based access tails in the access network.
  - (b) Additionally, it could cover end-to-end services (and, in effect, mandate the wholesale resale of unbundled 'Layer 3' retail services). As currently drafted, the proposed variation could potentially capture both Layer 2 and Layer 3 services.
- 82 To illustrate Telstra's concerns about the breadth of the Commission's proposed variation, Telstra identifies below services currently available in the industry that could be caught by the varied service description.
- 83 Telstra's analysis is not exhaustive and a range of further services may also be caught – refer to **Table 3** below.

## B.2 A wide range of current Ethernet services would become regulated

- 84 There are two principal types of Ethernet interface protocol services, namely 'Ethernet over fibre' and Ethernet over an intermediary transport protocol, typically SDH, DWDM, or xDSL.
- (a) **Ethernet over fibre**
- 85 'Ethernet over fibre' is a business grade service provided directly over a meshed fibre network and supplied on a contended basis. However, it has distance limitations. Accordingly, it is only practical and economical to supply Ethernet over fibre in metropolitan areas served by multiple fibre paths.
- 86 Since the metropolitan locations are characterised by higher value customers and lower costs than rural locations, Ethernet over fibre is subject to significant infrastructure-based competition, making any regulation of it unnecessary. This submission identifies the depth and breadth of such competition.



**(b) Ethernet over SDH**

- 87 'Ethernet over SDH' is a carrier grade service and is supplied using the DTCS (in its current form) as an underlying input. By conveying Ethernet using an underlying SDH service, a carrier is able to experience the high quality transportation characteristics of the underlying SDH service (e.g., dedicated performance and reliability over long distances).
- 88 'Ethernet over SDH' is the most common long-haul Ethernet service given that SDH is the most popular long-haul transport technology. Accordingly, Ethernet over SDH is more commonly used in the core network.
- 89 Ethernet over SDH simply requires either:
- (a) Telstra to insert an Ethernet interface card into a Telstra Add Drop Multiplexer (ADM) at each end of the SDH link, provided that the ADM has been upgraded to Next Generation SDH (NG-SDH) so is capable of mapping Ethernet onto SDH; or
  - (b) the access seeker to place its own Network Terminating Unit at each end of the SDH link, irrespective of whether the SDH link has been upgraded to NG-SDH.
- 90 In most cases Telstra and access seekers face similar costs in converting SDH transmission to Ethernet. There are a range of network equipment options available for access seekers so costs can vary. However, the example in Figure 3 and Figure 4 above costs a typical scenario, and it shows it can be more economic for an access seeker to acquire SDH transmission from Telstra and convert it to 'Ethernet over SDH', rather than directly acquiring 'Ethernet over SDH' from Telstra.
- 91 Furthermore, Telstra can only offer an Ethernet over SDH service between locations where the ADMs have been upgraded to NG-SDH. In contrast, an access seeker faces no such constraint and can potentially convert SDH services acquired from Telstra in any location.

**(c) Ethernet over Copper**

- 92 An increasingly popular form of competitive supply in the access network is Ethernet over Copper (EoC). This involves a competitor taking the ULLS and installing equipment in the exchange and at the customer premises to enable supply of an Ethernet service. Multiple copper pairs are bonded together to improve the bandwidth and distance capabilities (see **Table 2** below).<sup>6</sup>

**Table 2: Speed and distance capabilities of bonded copper pairs**

| Copper pairs | Distance capability | Speed capability |
|--------------|---------------------|------------------|
| Single pair  | 2.3km               | 5.7 Mbps         |
| 2 pairs      | 2.3km               | 10 Mbps          |

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<sup>6</sup> 'Hatteras Repeaters Extend Ethernet over Copper', *Xchange*, June 2009 (<http://www.xchangemag.com/hotnews/hatteras-repeaters-extend-eoc.html>)

|         |       |         |
|---------|-------|---------|
| 8 pairs | 2.3km | 45 Mbps |
|---------|-------|---------|

Source: 'Hatteras Repeaters Extend Ethernet over Copper', *Xchange*, June 2009

(d) **Services regulated by the proposed variation**

93 The services which are currently supplied by the industry that may be regulated by the proposed new DTCS service description are set out in the **Table 3** below. The list is indicative and is not exhaustive.

**Table 3 Services potentially regulated by the proposed variation**

| Technology  | Product name examples  |
|---|--|
| Ethernet over fibre (direct fibre)                            | Business Grade Ethernet <sup>7</sup> ; E-Man <sup>8</sup>                                    |
| Ethernet over SDH   | Carrier Grade Ethernet <sup>9</sup> ; E-Line <sup>10</sup> ; Ethernet over SDH <sup>11</sup> |
| Ethernet over PDH   | Carrier Grade Ethernet <sup>12</sup> ; E-Line <sup>13</sup>                                  |
| Ethernet over ATM   | EATM <sup>14</sup>   |
| Ethernet over MPLS  | Switched Ethernet <sup>15</sup>  |
| Ethernet over VPLS/MPLS                                       | National VPLS <sup>16</sup>  |
| Ethernet over DOCIS 3.x (HFC/Coax)                            | Cable broadband <sup>17 18</sup>   |
| Ethernet over PON (GPON)                                      | Bitstream services <sup>19</sup>   |
| Ethernet over xDSL e.g. ADSL, SHDSL, eSHDSL (ULL, Bonded ULL) | ADSL, BDSL <sup>20</sup> ,   |

7 Telstra Wholesale <http://telstrawholesale.com/products/data/wholesale-business-grade-ethernet.htm>

8 Telstra <http://www.telstraenterprise.com/productsservices/network/ethernetaccess/Pages/Ethernet%20MAN.aspx>

9 Telstra Wholesale <http://telstrawholesale.com/products/data/wholesale-carrier-grade-ethernet.htm>

10 Telstra [http://www.telstraenterprise.com/productsservices/network/ethernetaccess/Pages/EthernetLine\(ELine\).aspx](http://www.telstraenterprise.com/productsservices/network/ethernetaccess/Pages/EthernetLine(ELine).aspx)

11 Nextgen <http://www.nextgennetworks.com.au/ethernet.htm>

12 Telstra Wholesale <http://telstrawholesale.com/products/data/wholesale-carrier-grade-ethernet.htm>

13 Telstra [http://www.telstraenterprise.com/productsservices/network/ethernetaccess/Pages/EthernetLine\(ELine\).aspx](http://www.telstraenterprise.com/productsservices/network/ethernetaccess/Pages/EthernetLine(ELine).aspx)

14 Telstra <http://www.telstraenterprise.com/productsservices/network/ethernetaccess/Pages/EthernetATM.aspx>

15 Nextgen <http://www.nextgennetworks.com.au/ethernet.htm>

16 Nextgen <http://www.nextgennetworks.com.au/vpls.htm>

17 Bigpond Cable Broadband <http://www.bigpond.com/internet/plans/cable/>

18 Optus [http://www.optus.com.au/home/index.html?action=nav\\_personal\\_broadband](http://www.optus.com.au/home/index.html?action=nav_personal_broadband)

19 NBN Co proposed

[http://www.nbnco.com.au/content/upload/files/NBN001\\_concept\\_paper\\_final.pdf](http://www.nbnco.com.au/content/upload/files/NBN001_concept_paper_final.pdf)

20 Telstra Wholesale <http://telstrawholesale.com/products/data/wholesale-business-dsl.htm>

| Technology   | Product name examples                                 |
|--|---|
| IP-based Virtual Private Network (IP-VPN) services | Business IP, Connect IP, IP WAN, IP MAN <sup>21</sup> |

- 94 Importantly, the varied service description could apply to basic residential broadband services provided over the unconditioned local loop, such as ADSL. In this manner, wholesale customers of Telstra that are acquiring ULLS and then selling ADSL may become subject to regulation, potentially requiring the wholesaling of their retail ADSL services on price and non-price terms potentially determined by the ACCC.

### B.3 Regulation of future Ethernet services

- 95 Besides the existing services described in section A.2 above, Ethernet interface protocols are increasingly being used for a range of emerging access services over a range of different technologies. The proposed DTCS service description may therefore cover other Ethernet-based access services as they are deployed by the industry (including by NBN Co and Telstra's wholesale and retail competitors).

- 96 To the extent that the new DTCS service description does regulate these emerging services, it may delay the deployment of next generation Ethernet-based access services, hampering innovation and efficiency.

- 97 An example of an emerging access service is an Ethernet 'bitstream' service, as proposed by NBN Co. In NBN Co's current public consultation paper, NBN Co describes its proposed wholesale offering in the following terms:<sup>22</sup>

*"It is NBN Co's view that the Layer 2 products for mass-market fibre services should be based on Ethernet delivery, utilising GPON [fibre] as the physical access technology."*

- 98 NBN Co has proposed two 'Ethernet bitstream' products:

- a Local Ethernet Bitstream (**LEB**) product which will provide an Ethernet-based bitstream access service between the network termination point at the end-user premises and a local point of interconnection (**Pol**) located at the fibre access node; and
- an Aggregated Ethernet Bitstream (**AEB**) product providing Ethernet-based bitstream access service between the customer and a district Pol located at an aggregation node. The AEB, in effect, aggregates multiple Ethernet-based bitstream access services (LEB's) to a point at which "competitive backhaul options exist".

- 99 As a service for the carriage of communications at a rate of at least 2 Mbit/s using Ethernet interface protocols, both of these basic NBN Co wholesale services would seem to be caught by the varied DTCS service description, as proposed by the Commission.

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<sup>21</sup> Telstra <http://www.telstraenterprise.com/productsservices/network/ipvpn/Pages/IPVPN.aspx>  
<sup>22</sup> 'NBN Co Consultation Paper: Proposed wholesale fibre bitstream products', December 2009, p12

100 Any regulation of such emerging NBN services seems premature in circumstances where the future industry structure is still the subject of ongoing analysis and negotiation.

## C If Ethernet is regulated, the international experience currently favours only limited regulation

- 101 Where Ethernet-based transmission has been regulated overseas, regulation has been more targeted at enduring supply bottlenecks. In some cases this has involved defining transmission wholesale product markets by technology, geography, network hierarchy and/or capacity.
- 102 Any regulation has been directed only at those Ethernet markets where this is clear evidence of market failure. Regulatory forbearance has occurred in those markets where Ethernet is still in the early stages of deployment.
- 103 Any regulation of Ethernet has only occurred after detailed consideration with regard to the full implications of that regulation on relevant markets

### C.1 United Kingdom

- 104 In the United Kingdom, Ofcom treats Ethernet-based transmission services differently to traditional SDH and PDH services when regulating BT's supply of wholesale transmission services. By way of summary:
- (a) Consistent with the European Commission Recommendation on relevant communications markets, Ofcom distinguishes between wholesale *trunk* segments of leased lines and wholesale *terminating* segments of leased lines. Leased lines are defined in terms of dedicated symmetric transmission capacity.
  - (b) The trunk segment is defined as being above certain network aggregation points (above the local exchange), of which there are 46 across BT's network.
  - (c) The terminating segments are below these aggregation points, extending down to the network termination point at the customer premises.
- 105 In identifying the appropriate scope of regulation, OFCOM is required to follow the European Framework. Under this Framework, market reviews involve:
- (a) first defining the markets under consideration (first at the retail level, and then at the wholesale level);
  - (b) then an analysis to consider whether any communications providers (CPs) have significant market power (**SMP**) in any relevant markets; and
  - (c) finally the imposition of appropriate regulatory obligations on those CPs found to have SMP.
- 106 In identifying the relevant markets, Ofcom follows an analysis based on identifying the product substitutability of carriage services (including a HMT/SNIPP test). In its analysis of leased line services in its recent Business Connectivity Market Review (**BCMR**), Ofcom relevantly tested first for competitive constraints between services that fall under the 'leased lines' description and then for competitive constraints arising from a wider set of business connectivity services.

- 107 In this manner, regulation has been directed by Ofcom only at those particular markets (as specifically defined) where there is perceived to be a market failure deserving of regulatory attention.
- 108 Based on its analysis, Ofcom reached the following conclusions relevant to the regulation of Ethernet-based transmission services in wholesale markets:
- (a) Traditional Interface (TI) transmission (i.e., SHD/PDH) exist in a different wholesale market to Alternative Interface (AI) transmission (i.e., Ethernet-based services). TI and AI services are considered to exist in separate markets because of a lack of direct substitutability between them and due to different end user equipment requirements.
  - (b) The AISBO market (i.e. wholesale Ethernet transmission) is further segmented into two markets by bandwidth:
    - (i) low bandwidth AI Services, at speeds up to and including 1Gbps; and
    - (ii) high bandwidth AI Services, at speeds over 1Gbps.
  - (c) Ethernet services exist in a separate market to virtual private networks (VPNs) and asymmetric broadband services, such as ADSL.
  - (d) While a market exists for wholesale Ethernet terminating services (i.e., symmetric wholesale transmission services supplied in the access network), a distinct market had not yet arisen for wholesale Ethernet trunk services (i.e., wholesale inter-exchange transmission services). Such a market for Ethernet trunk services is unlikely to emerge until Carrier-Class Ethernet standards and technology matures.
- 109 Following its analysis, OFCOM ultimately concluded that only low bandwidth Ethernet services should be subject to regulation and such regulation should only apply to terminating services (i.e., services supplied in the access network between the core aggregation node and the customer premises).
- 110 In application to Australia, while the Commission has only issued its Discussion Paper to date, it does not appear to Telstra that the Commission has undertaken any meaningful analysis of the different wholesale markets. Yet the Commission has recognised (in Section 6.2 of its Discussion Paper) that *“the process of market definition also involves determining the market boundaries of transmission or any downstream markets, which can be described in product, geographic and functional terms”*.
- 111 Consistent with the UK approach and the Commission’s own description of the methodology it should be employing, Telstra submits that the Commission should undertake a proper analysis of the relevant wholesale product markets, including an analysis based on product substitutability. The Commission should properly identify the wholesale transmission market(s) it is intending to regulate and target its service description only at those markets. The proposed variation to the existing service description risks catching a wide range of new wholesale and retail markets.
- 112 Given the need for this market analysis, Telstra further submits that the Commission should issue a draft report for public comment before it issues any final report.

## C.2 European Union (excluding UK)

- 113 As in the UK, regulators in other EU countries have considered the potential need for regulation of both ‘traditional’ transmission services and Ethernet-based transmission. This is partly attributable to the most recent European Commission Recommendation on relevant communications markets (**EC Recommendation**), which appears to promote a technology-neutral approach to defining transmission markets.<sup>23</sup>
- 114 Among the relevant markets listed in the EC Recommendation is the market for ‘*wholesale terminating segments of leased lines, irrespective of the technology used to provide leased or dedicated capacity*’. National Regulatory Authorities (**NRAs**) are required to properly define and assess this market (and others listed in the EC Recommendation), consider whether any operator has SMP and implement remedies if required.
- 115 In line with the EC Recommendation and relevant Directives, NRAs have carefully defined and assessed the relevant markets. In some cases this has meant regulating certain Ethernet-based services, but where such regulation has been imposed it has been carefully targeted at ‘enduring bottleneck’ services where a market participant has substantial market power. Regulation of Ethernet-based transmission services in Europe has certainly not been applied in the sweeping catch-all manner that would be the consequence of the service definition proposed by the Commission.
- 116 Importantly, most NRAs in the EU have already de-regulated the wholesale trunk segment of leased lines. Some countries have already withdrawn regulation in respect of wholesale terminating segments.
- 117 In the EC’s latest regulation on product and services markets susceptible to *ex ante* regulation (December 2007):
- wholesale trunk segments of leased lines (i.e. inter-exchange transmission) has been removed from the list of services to be subject to *ex ante* regulation, although NRAs retain a residual right to regulate where a market review reveals continuing SMP; and
  - wholesale tail segments of leased lines (i.e., customer access tails) remain on the list, “*irrespective of the technology used to provide leased or dedicated capacity*”.

## C.3 Canada

- 118 Consistent with the European and UK experience, the Canadian Radio-television and Telecommunications Commission (**CRTC**) defines and regulates Ethernet-based transmission services separately to traditional SDH and PDH transmission.

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<sup>23</sup> European Commission, ‘*Explanatory note accompanying the Commission Recommendation on Relevant Product and Service Markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (Second edition)*’ (C(2007) 5406), Brussels, November 2007.

- 119 Traditional transmission services fall under the broad category of Competitor Digital Network (**CDN**) services. The key transmission services include the inter-exchange and central office optical connecting link CDN services. While some of these services are considered 'essential' and classified as 'Category I' services subject to *ex ante* regulation, other more competitive services are classified as 'Category II'.
- 120 More recently, the CRTC has considered whether Ethernet-based transmission services should be subject to regulatory intervention. The CRTC identified three key categories of Ethernet-based services:
- (a) Ethernet access services which provide transmission between an incumbent carrier's central office (exchange building) and an end-customer's premises at speeds of 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s;
  - (b) Ethernet transport services, which provide connectivity between the exchange and points of interconnection; and
  - (c) Ethernet central office connecting services, which offer connectivity between a competitor's exchange equipment and the incumbent's transmission equipment.
- 121 Only the central office connecting service has been classified as an essential 'Category I' service (i.e., Ethernet in the CAN, as is intended to be supplied by NBN Co). With respect to the other two Ethernet-based transmission services, the CRTC considered that alternatives to the incumbent are sufficiently widespread to justify less regulation.<sup>24</sup>

#### **C.4 Relevance of international experience**

- 122 In summary, the international experience demonstrates that any regulation of Ethernet transmission services has been the subject of careful and detailed analysis. The relevant product markets have been carefully identified. Regulation has been focussed only on those markets (defined by product, level and geography) where there has been clear evidence of market failure.
- 123 More generally, the international experience is also broadly supportive of more targeted regulation with differentiation based on:
- (a) trunk segment vs terminating segment;
  - (b) bandwidth;
  - (c) geographic; and
  - (d) Ethernet vs SDH/PDH.
- 124 The Commission's proposed approach in Australia therefore seems to be at odds with the international experience.

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<sup>24</sup>

CRTC Telecom Order 2007-20, paragraph 88



## **D If any regulation is applied, it should be limited in scope and narrowly targeted**

- |     |   |
|-----|---|
| 125 | If despite the absence of any evidentiary support for such a decision, the Commission is nonetheless minded to regulate Ethernet, then the DTCS service description should be carefully targeted only at the 'Ethernet over SDH' presentation of existing regulated interexchange SDH services outside metropolitan areas.  |
| 126 | A full assessment of the state of current and expected future competition in the relevant Ethernet markets would need to be undertaken before deciding whether new regulation is required.  |
| 127 | In Telstra's view, a proper analysis of the market would show that there is no necessity to declare Ethernet services at all.   |
| 128 | If, for some reason, the Commission concludes otherwise, then the Ethernet service description should be: <ul style="list-style-type: none"><li>- targeted (at most) only at the 'Ethernet over SDH' presentation of existing regulated interexchange SDH services outside metropolitan areas. Alternatively, regulation of Ethernet should be limited to uncontended and circuit switched services;</li><li>- confined to designated rates that are standardised interface protocol rates;</li><li>- applied to interexchange services only. Tail Ethernet services should be excluded from the service description; and</li><li>- updated to automate exemptions as competitive infrastructure is rolled out by NBN Co and other operators.</li></ul> |

### **D.1 Any variation to the service description should be limited in scope**

- 129 As noted above, Telstra does not believe there is any basis upon which the Commission could conclude that regulation of Ethernet is necessary, appropriate, or in the LTIE. Without prejudice to this position, Telstra has set out in this section of the submission a draft outline of what a more narrowly focussed variation to the DTCS service description could look like.
- (a) The proposal set out in this section is only a summary of Telstra's preliminary view as to what such a variation may look like, should the Commission disagree with Telstra's views and decide in any event to proceed with a variation of the service description. It has been prepared in a very tight time line and would require further consideration, should the Commission contemplate implementing it.
  - (b) Should the Commission consider such a variation to be appropriate it would first be necessary for the Commission to conduct a market inquiry to identify whether there is in fact a need for regulation. In addition to this, it should consult on these proposals and allow industry sufficient time to respond.

- 130 The starting point for the Commission’s analysis should be to identify whether any enduring bottleneck exists pertaining to Ethernet services, that should be the subject of regulation.
- 131 While Telstra later identifies that no such bottleneck exists, the most appropriate scope of regulation if such a bottleneck did exist would be the regulation of interexchange ‘Ethernet over SDH’ in those non-metropolitan areas that are not yet subject to effective competition.
- 132 Any such regulation would also need to recognise that not all exchanges have been upgraded to support NG-SDH. The exchanges that have not been upgraded would in almost all cases be located in non-metropolitan areas. Accordingly, Telstra would not necessarily have the capability to supply wholesale ‘Ethernet over SDH’ in certain non-metropolitan areas in any event. In contrast, access seekers would have the capability to supply in such areas given that they can and do convert Telstra SDH transmission (whether or not it was upgraded to NG-SDH). This again supports Telstra’s argument that declaration of the Ethernet service more generally is unnecessary.
- 133 The remainder of this section sets out some suggested drafting modifications to the proposed service description that would limit the scope of the service definition.
- 134 Telstra has proposed several options for the Commission’s consideration. Telstra has also sought to keep any variations to the service description as simple as possible. Industry would need to be consulted again for any new variation considered by the Commission.

## **D.2 Variation limited to ‘Ethernet over SDH’ services**

- 135 The Commission has proposed in its discussion paper that the DTCS service description should be varied principally by including the concept of an ‘Ethernet interface protocol’ into the concept of a designated rate.
- 136 As Telstra has identified in this submission, the effect of this variation would be to regulate virtually every carriage technology supplied in Australia, but only in circumstances where it was used to supply Ethernet. The net consequence would be that carriers would become reluctant to supply Ethernet over any carriage technology, particularly a technology that was not already declared – such as xDSL. The Commission’s proposal would potentially impede the rollout of next generation Ethernet technologies in Australia.
- 137 Given this effect, Telstra proposes that the Commission should recognise that Ethernet is supplied over many ‘Layer 1’ and ‘Layer 2’ transport technologies. The Commission should limit the scope of any variation to the transmission services covered by the existing DTCS declaration so that it recognises the ability of Ethernet to be supplied over the existing DTCS services, namely SDH. In this manner, any variation to the existing DTCS service description should be expressly confined to ‘Ethernet over SDH’.
- 138 For example:

“a designated rate is a transmission rate of:

- (a) 2.048 Megabits per second, 4.096 Megabits per second, 6.144 Megabits per second, 8.192 Megabits per second, 34 to 35 Megabits per second, 140/155 Megabits per second (or higher orders) using SDH or PDH presentation; or

(b) a transmission rate of 10, 100 or 1000 Megabits per second using 'Ethernet over SDH' delivery where neither transmission point is a customer transmission point."

- 139 Such a variation would also recognise that there is an inherent tension between the desire for technological neutrality and the realities of product market definition. Technological neutrality should be considered within the context of a service definition that regulates an enduring bottleneck existing in the context of a particular product market. Service declarations should not simultaneously apply to multiple product markets, thereby regulating products that are inherently not substitutable given they exist in different markets.
- 140 That is not to say that Telstra considers SDH transmission and 'Ethernet over SDH' transmission to exist in the same market. In the UK, for example as described in Section C, SDH is considered to exist in a different product market to 'Ethernet over SDH'.

### **D.3 Alternatively limit the variation to uncontended and circuit switched services**

- 141 If the Commission does not accept Telstra's arguments that variation of the service definition is unnecessary, and it similarly does not accept Telstra's proposal to limit any service description to 'Ethernet over SDH' services, then Telstra proposes in the alternative that the service description is limited to 'uncontended' and 'circuit switched' services.
- 142 For example:

"The domestic transmission capacity service is a service for the carriage of certain communications from one transmission point to another transmission point via network interfaces at a designated rate on a permanent, uncontended, circuit switched basis by means of guided and/or unguided electromagnetic energy..."

- 143 The words 'uncontended' would ensure that the service declaration only applied to the wholesale carrier grade services supplied in Telstra's network (namely Ethernet over SDH) and not to the business grade services (namely Ethernet over fibre). Specifically:
- (a) The words 'uncontended' refer to a contention ratio of 1:1, hence no contention. In this manner, the transmission link would comprise of dedicated capacity at a constant bandwidth supplied to a single exclusive customer. This outcome is consistent with the concept of dedicated bandwidth supplied to a single customer that is inherent within the DTCS service description.
- (b) If the transmission were contended, then the supplier could require the customers to share the relevant bandwidth. Prioritisation issues, quality of service issues, and potential packet loss may result. Such a service is more suitable for a business given that the desired quality of service is normally lower.
- 144 The words 'circuit switched' are intended to ensure that the services covered by the DTCS service description remain as a 'Layer 2' service (without routing) and do not include 'Layer 3' services (with routing). Specifically:

- (a) A circuit switched service inherently excludes any packet switching and routing, hence excludes any IP core services.
- (b) If packet switched services were included, then the Commission would effectively regulate any 'Layer 3' services supplied via Ethernet interface protocols (e.g., IP-VPN services), as well as the intended 'Layer 2' Ethernet transmission services.

#### D.4 Confine the designated rates to standardised interface protocol rates

145 The Commission in its Discussion Paper proposes the following definition of designated rate:

*“a designated rate is a transmission rate of 2.048 Megabits per second or higher using Ethernet, PDH or SDH interface protocols.”*

146 Telstra is concerned that this variation implies that it would be possible for an access seeker to obtain PDH or SDH services at other than the standard PDH and SDH bandwidths.

147 The Commission’s variation also implies that it would be possible for an access seeker to obtain Ethernet services at other than the standard Ethernet bandwidths. The standard Ethernet bandwidths are 10Mbit/s Ethernet, 100Mbit/s(Fast Ethernet) and 1Gbit/s (i.e.Gigabit Ethernet). Again, these bandwidths are sufficiently well documented that they should be used in the service description.

148 10Mbit/s Ethernet, 100Mbit/s (i.e., Fast Ethernet) and 1Gbit/s (i.e.Gigabit Ethernet) are the speeds that the Ethernet interfaces are sold at. Although Telstra sells Ethernet at various rate limited line speeds within these bandwidth capacity categories the key distinction is the interface presentation.

149 This is also consistent with international regulation of Ethernet such as in Canada where the line speeds sold are at the discretion of the parties. To regulate line speeds as well as interface protocols introduces operational and technical complexities, and in turn costs.

150 Furthermore, the UK experience suggests that very high bandwidth transmission Ethernet services (typically >1Gbit/s) should not necessarily be subject to regulation.

151 Accordingly, Telstra suggests wording such as the following will address these designated rate issues:

“a designated rate is a transmission rate of:

- (a) 2.048 Megabits per second, 4.096 Megabits per second, 6.144 Megabits per second, 8.192 Megabits per second, 34 to 35 Megabits per second, 140/155 Megabits per second (or higher orders) using SDH or PDH presentation; or
- (b) a transmission rate of 10, 100 or 1000 Megabits per second using ‘Ethernet over SDH’ delivery where neither transmission point is a customer transmission point.”

152 By including the words “where neither transmission point is a customer transmission point” in the definitions above, Telstra is reflecting the clear case

that tail Ethernet services (between the exchange and the end customer premises) should not be subject to regulation, ie that any service description should apply to inter-exchange services only. This is because of the ready availability of substitute tail services by way of SDH transmission, ULL and bonded ULL (used to deliver ShDSL services) that are all regulated services.

- 153 To address this issue, Telstra proposes to exclude Ethernet over SDH services where one transmission point is a customer transmission point.

#### **D.5 Automation of exemptions to the service description**

- 154 As the Commission will be aware, the proposed amendments to Part XIC (at least in their current form) will remove the ability of access providers to seek ordinary exemptions from the scope of the declared service descriptions.
- 155 A key consequence of such removal is that it will not be possible for access providers to seek regulatory roll-back in the form of exemption applications from the Commission, on an ongoing basis, as competitive infrastructure is deployed.
- 156 To address this issue, Telstra submits that the Commission should adopt a new methodology for service descriptions that is more attuned to the new regulatory regime. Under this approach, the service description should include an in-built mechanism that adjusts the level of regulation to match the level of competition (i.e., the 'automation' of the service description).
- 157 An example of an approach to automation of the service description is that the service declaration does not apply to any routes with more than [X] competitors.
- 158 Telstra proposes that, if the Commission is inclined to implement a variation to the service description, then it should take the opportunity to incorporate the following 'automations' into the proposed service description to achieve such automation:
- (a) The DTCS service declaration should not apply to any transmission routes where NBN Co has overbuilt existing transmission of any carrier.
  - (b) The DTCS service declaration should not apply to any transmission routes where excess capacity exists and there is more than one infrastructure-based competitor.
- 159 The DTCS service declaration should not apply where there are more than two infrastructure-based competitors on a route, even if one of them does not have any excess capacity.
- 160 Again, while Telstra has suggested some possibilities for the Commission to consider if it were minded to proceed with a variation to the DTCS service description, Telstra emphasises that it sees no basis upon which to do so, as such a variation would not be consistent with the LTIE, as Ethernet is not a bottleneck service, but it is competitively supplied by many providers using various inputs, including the existing DTCS. If the Commission were inclined to proceed with the variation, then in Telstra's view, it is essential that it conduct a full market inquiry, and engage in further consultation with the industry to ensure the full impact of any proposed change is understood.

## **Attachment 1 Response to specific questions raised in the Discussion Paper**

**A. Are Ethernet interface protocols included in the current DTCS service description? Should Ethernet interface protocols be implied in the current DTCS service description?**

1 No, for both questions.

**C. Should the DTCS service description be varied to specifically refer to PDH, SDH and Ethernet interface protocols? Is it appropriate to refer to the interface protocols developed by the International Telecommunications Union, Telecommunications Standardisation Sector (ITU-T) and the Institute of Electrical and Electronic Engineers (IEEE)? Is the proposed variation in an acceptable form?**

2 No, for all three questions.

3 Telstra opposes the extension of regulation to cover Ethernet interfaces. Regulation of Ethernet is premature, particularly in circumstances where standards remain in a state of evolution and new services are in their infancy.

4 However, if Ethernet is to be regulated, the proposed variation should be in the form identified in Section D of this submission.

**F. What effect, if any, would the proposed variation of the DTCS service description have on the market definition for transmission services ?**

5 As identified in Section B of this submission, the proposed variation extends the market definition for transmission services well beyond what is normally considered a 'transmission service'. The new service description could include all manner of Ethernet services at multiple network layers in multiple network segments.

6 The Commission's proposed variation is inconsistent with the process of market definition normally followed by the Commission. That approach involves defining the proper product markets by testing for product substitutability. The Commission itself states that it is required to follow that procedure in Section 6.2 of its Discussion Paper.

7 The UK analysis identified in Section C of this submission, for example, identified that asymmetric services, such as DSL, should be considered in separate markets to Ethernet. The UK followed the approach of properly defining the relevant markets. However, the Commission's service description bundles all such services together within the proposed new scope of a DTCS service.

8 There is also an inherent tension between the desire for technological neutrality and the realities of product market definition. Technological neutrality should be considered within the context of a service definition that regulates an enduring bottleneck existing in the context of a particular product market. Service declarations should not simultaneously apply to multiple product markets, thereby regulating products that are inherently not substitutable given they exist in different markets.

- G. What effect, if any, would the proposed variation have on the geographic dimensions of the relevant markets?**
- 9 The geographic scope of regulation will be greatly increased due to the broader functional scope of the service description and the different geographic areas supplied by that broader functional scope.
- 10 Specifically, the broader scope of the proposed variation will mean that regulation will apply to the access network to a far greater extent than may have been intended. In effect, for example, the proposed variation constitutes a declaration of NBN Co's proposed new bitstream Ethernet services to be supplied in the customer access network. The variation also potentially declares wholesale DSL, broadband cable Internet, IP-VPN, and VPLS services in the access network.
- 11 Importantly, Telstra has identified in its submissions that the Commission should 'automate' its service descriptions in preparation for the new legislative variations. For example, the Commission should define the service description to automatically exclude any routes on which there exist multiple competitors with excess capacity.
- H. What effect, if any, would the proposed variation have on any-to-any connectivity in relation to carriage services that involve communication between end-users?**
- 12 Consistent with the Commission's previous conclusions in its 2009 DTCS declaration review, the proposed variation would not have any impact on the achievement of any-to-any connectivity between end users.
- I. What effect, if any, would the proposed variation have on the technology used to provide transmission services? To what extent, if any, would the proposed variation discourage or encourage efficient use, and efficient investment in, infrastructure?**
- 13 Telstra has identified, as a common theme throughout this submission, that:
- (a) the premature regulation of Ethernet will adversely influence technology choice and impede its adoption; and
- (b) the Commission's proposal is harmful and risks distorting and deterring new investment while impeding the long-term development of effective infrastructure competition.
- 14 The proposed variation suffers from significant regulatory overreach and regulates a range of services that are currently supplied in competitive markets. In such circumstances, it has the potential to deter and delay investment in, and the rollout of, new wholesale Ethernet services.
- 15 Suppliers of such services will be wary that they could be deprived of their ability to recover their actual costs under an 'efficient cost' pricing construct. Suppliers will also be wary of the effective move to wholesale price controls contemplated by the new legislative regime.
- K. What effect, if any, would the proposed variation have on the current market structure for transmission services? What effect, if any, would the proposed**

**variation have on competition in downstream markets or barriers to entry in transmission markets?**

- 16 The proposed variation may have an adverse impact on competition in downstream markets because the declaration would impede upstream infrastructure investment, thereby slowing the evolution of facilities-based competition in various wholesale markets (including those inadvertently covered by the broad scope of the variation).
- 17 Indeed, by constituting regulatory over-reach, the declaration itself risks becoming a barrier to entry into transmission markets by deterring potential infrastructure-based competitors. The costs of regulation exceed any benefits.
- 18 Again, these issues are detailed in the submission.



## Attachment 2 Sample of 10 competitive offerings of Ethernet services

The following list is limited to the 'top 10' competitive offerings of Ethernet services, other than Telstra. Accordingly, this list is not exhaustive. This list has been prepared based on public information sourced from the Internet.

### 2.1 Optus

|  |  |
|--|--|
| <p><b>What is the product?</b></p>                   | <p><b>Optus offers 2 service options:</b></p> <p><b>Optus Ethernet</b></p> <p>The Optus Ethernet service is a Layer 2 data networking solution which supports real-time applications such as voice, video or data services. It provides a high speed link from 4Mbps to 1000Mbps. There are 3 interface options – 10Mbps, 100Mbps and 1000Mbps.</p> <p>There are 2 data network solutions offered on the Optus Ethernet service:</p> <ul style="list-style-type: none"> <li>• Transparent LAN Service – a point-to-point networking solution which allows traffic to be sent and received between any 2 points; and</li> <li>• Multipoint Service – a multi-point networking solution allowing a single port to communicate with many destinations.</li> </ul> <p>The Optus Ethernet Service also offers VLAN Tunnelling to give the flexibility of segregating traffic to ensure better service delivery. It has Spanning Tree Support which allows establishment of a disaster recovery plan to ensure complete redundancy for mission-critical traffic. It has Large Maximum Transmission Units which allows transmission of data across wide areas without having to reconfigure existing equipment.</p> <p><b>E-Link</b></p> <p>E-Link is Optus' new Ethernet over SDH leased line networking solution. It utilises a SDH network more efficiently, minimising carrier interfaces and the equipment footprint for customers. It has point-to-point and point-to-multipoint capability allowing aggregation into a single GE interface at the carrier exchange or hub location. A pre-selected dedicated bandwidth is guaranteed. End-users have a choice of access speeds ranging from 2Mbps to 1Gbps. It also has full duplex capability which ensures the selected allocation can be transmitted fully in both directions simultaneously. the SDH backbone network also uses high-throughput redundant core switches and several levels of redundancy enabling traffic to be easily switched if one method fails.</p> |
| <p><b>Does it use Telstra's infrastructure ?</b></p> | <p>Optus uses its own network infrastructure to provide its Ethernet services but also uses services of other network service providers, mainly Telstra Wholesale.</p>   |

| <b>Where is it supplied?</b>  | <p>The E-Link product has national coverage, servicing the CBD, metro, regional and inter-capital areas.</p> <p>Optus Ethernet may be provided inter-capital and in metropolitan areas – ie within and between Melbourne, Sydney, Brisbane, Canberra, Adelaide and Perth.</p>  |   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
|---|--|---|---|-----------------------------------|---------------------------------|----------------------|---------------------|----------------------|-------------|---------|---------|--------------|---------|---------|---------------|---------|---------|----------------|---------|---------|---|--|---------------------------------|----------------------------------|
| <b>What price?</b>  | <p>Optus Ethernet prices</p> <p>Under the Optus Services Agreement, establishment/relocation charges for Optus Ethernet services are as follows:</p> <table border="1" data-bbox="517 488 1989 592"> <tr> <td><b>Access Installation / Relocation Charge (per site)</b></td> <td><b>TLS Circuit Installation/Relocation charge (per TLS circuit)</b></td> </tr> <tr> <td>\$15,000 (\$16,500 GST inclusive)</td> <td>\$1,500 (\$1,650 GST inclusive)</td> </tr> </table> <p>Monthly service charges are:</p> <table border="1" data-bbox="517 683 1265 922"> <thead> <tr> <th><b>Access Charge</b></th> <th><b>GST excluded</b></th> <th><b>GST inclusive</b></th> </tr> </thead> <tbody> <tr> <td>Up to 2Mbps</td> <td>\$1,467</td> <td>\$1,614</td> </tr> <tr> <td>Up to 10Mbps</td> <td>\$1,818</td> <td>\$2,000</td> </tr> <tr> <td>Up to 100Mbps</td> <td>\$2,000</td> <td>\$2,200</td> </tr> <tr> <td>Up to 1000Mbps</td> <td>\$3,583</td> <td>\$3,942</td> </tr> </tbody> </table> <p>E-Link prices</p> <p>Under the Optus Services Agreement, establishment/relocation charges for E-Link services are as follows:</p> <table border="1" data-bbox="517 1107 1989 1241"> <tr> <td><b>Access Installation / Relocation Charge (per site) for bandwidths 2Mbps to 999Mbps</b></td> <td><b>Access Installation / Relocation charge (per site) for 1000Mbps</b></td> </tr> <tr> <td>\$4,500 (\$4,950 GST inclusive)</td> <td>\$9,100 (\$10,010 GST inclusive)</td> </tr> </table> | <b>Access Installation / Relocation Charge (per site)</b> | <b>TLS Circuit Installation/Relocation charge (per TLS circuit)</b> | \$15,000 (\$16,500 GST inclusive) | \$1,500 (\$1,650 GST inclusive) | <b>Access Charge</b> | <b>GST excluded</b> | <b>GST inclusive</b> | Up to 2Mbps | \$1,467 | \$1,614 | Up to 10Mbps | \$1,818 | \$2,000 | Up to 100Mbps | \$2,000 | \$2,200 | Up to 1000Mbps | \$3,583 | \$3,942 | <b>Access Installation / Relocation Charge (per site) for bandwidths 2Mbps to 999Mbps</b> | <b>Access Installation / Relocation charge (per site) for 1000Mbps</b> | \$4,500 (\$4,950 GST inclusive) | \$9,100 (\$10,010 GST inclusive) |
| <b>Access Installation / Relocation Charge (per site)</b>                                 | <b>TLS Circuit Installation/Relocation charge (per TLS circuit)</b>  |   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| \$15,000 (\$16,500 GST inclusive)   | \$1,500 (\$1,650 GST inclusive)  |   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| <b>Access Charge</b>  | <b>GST excluded</b>  | <b>GST inclusive</b>                                      |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| Up to 2Mbps   | \$1,467  | \$1,614   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| Up to 10Mbps  | \$1,818  | \$2,000   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| Up to 100Mbps   | \$2,000  | \$2,200   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| Up to 1000Mbps  | \$3,583  | \$3,942   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| <b>Access Installation / Relocation Charge (per site) for bandwidths 2Mbps to 999Mbps</b> | <b>Access Installation / Relocation charge (per site) for 1000Mbps</b>   |   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |
| \$4,500 (\$4,950 GST inclusive)   | \$9,100 (\$10,010 GST inclusive)   |   |   |                                   |                                 |                      |                     |                      |             |         |         |              |         |         |               |         |         |                |         |         |   |  |                                 |                                  |

Monthly service charges for the E-link service are per end and exclude the cost of a VLAN. The total monthly cost of the service would be twice the 'per end' charge plus the cost of a VLAN. Hence the cost of a 2Mbps service, including a \$472 VLAN would be \$2872 (2 x 1200 + 462).

Monthly service charges per end are:

| Bandwidth           | Monthly Charge per end (GST excluded) | Monthly Charge per end (GST inclusive) |
|---------------------|---------------------------------------|--|
| 2Mbps to 10Mbps     | \$1200                                | \$1320                                 |
| 11 Mbps to 100Mbps  | \$1500                                | \$1650                                 |
| 101Mbps to 500Mbps  | \$2500                                | \$2750                                 |
| 501mbps to 1000mbps | \$4000                                | \$4400                                 |

## 2.2 AAPT

### What is the product?


AAPT offers a product called "Wholesale Ethernet". It offers point-to-point, point-to-multipoint and multipoint configuration. The point-to-point and multipoint connections can be used for layer 2 Ethernet as well as an access mechanism to many layer 2 applications. AAPT's Ethernet operates nationally over AAPT's fibre-optic network at speeds from 2Mbps to 1Gbps or via AAPT's Mid-Band Ethernet at speeds from 2Mbps to 40Mbps. AAPT's coverage is complemented with leading third parties enabling it to offer comprehensive national coverage.

The following service attributes are highlighted:

| SERVICE ATTRIBUTE    | VALUE   |
|----------------------|---|
| Speed                | From 2Mbps to 1Gbps                             |
| Configurations       | Point-to-Point, Point-to-Multipoint, Multipoint |
| Interface Options    | 10/100BASE-TX, 1000BASE-LX/SX                   |
| VLAN Support         | 802.1q and 802.1QinQ                            |
| CoS Handling         | 802.1p and DSCP bits preserved                  |
| Ethernet Frame Types | Unicast, Multicast and Broadcast                |
| Pricing Zones        | Intrastate, Interstate (Near and Far)           |

In May 2009, AAPT launched its wholesale carrier-grade Ethernet product called Carrier e-Line. On 9 July 2009, it launched its wholesale business-grade Ethernet product (Business e-line) which replaced their current wholesale Ethernet products and offered wholesale customers enhanced business-grade Point-to-Point and Point-to-Multipoint Ethernet on AAPT's new network. Enhancements include:

- VLAN Transparency

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>the introduction of a Network Termination Unit that provides enhanced management and sophisticated reporting</li> </ul>  |
| <p><b>Does it use Telstra's infrastructure ?</b></p> | <p>AAPT services are generally provided via Telstra infrastructure but AAPT has its own carrier grade national MPLS backbone network over which AAPT Ethernet is delivered.</p>   |
| <p><b>Where is it supplied?</b></p>                  | <p>AAPT Ethernet is supplied nationally –</p>  <p>The map displays the AAPT Ethernet network across Australia, with major hubs in Perth, Adelaide, Melbourne, Sydney, and Brisbane. Numerous smaller regional nodes are also shown, connected by a dense network of lines. The map includes state and territory labels: Western Australia, Northern Territory, Queensland, South Australia, New South Wales, and Tasmania. Major cities like Perth, Adelaide, Melbourne, Sydney, Brisbane, Canberra, and Darwin are marked. Regional nodes include Broome, Alice Springs, Mt Isa, Mackay, Rockhampton, Bundaberg, Gladstone, Sunshine Coast, Gold Coast, Murrumbidgee, Lismore, Coffe Harbour, Newcastle, Gosford, Wollongong, and Launceston. The map also features several magnifying glass icons and an information icon.</p> <p>Further network information is found at <a href="http://www.aapt.com.au/our-network">http://www.aapt.com.au/our-network</a>.</p> |
| <p><b>What price?</b></p>                            | <p>There are 3 pricing bands by which AAPT Ethernet is priced – Intrastate, Interstate (near) and Interstate (far). Price on application</p>  |

## 2.3 Pipe Networks

|   |   |
|---|---|
| <b>What is the product?</b>                   | Pipe Networks offers a product called PipeEthernet which was the first in Australia to have Metro Ethernet Forum (MEF) certification. It offers speeds from 10Mbps to 10Gbps. It can be delivered via point-to-point or point-to-multipoint architecture. The PipeEthernet portal provides access to coverage maps, pre-qualification tools, quoting, provisioning and upgrading. Furthermore, PipeEthernet gives a Committed Information Rate giving full speed on all circuits. This service does not offer All-to-One Bundling but will allow multiplexing at the aggregation end, which is essential to manage multiple customers per port. |
| <b>Does it use Telstra's infrastructure ?</b> | PipeEthernet's metropolitan networks operate on their own redundant 10Gbps Ethernet core with their own fibre network equipped with Foundry Networks Super-X switches and MLX NetIron series routers.   |
| <b>Where is it supplied?</b>                  | PipeEthernet is supplied to the Brisbane, Sydney, Melbourne, Adelaide and Perth metropolitan areas and is actively expanding both locally and nationally.   |
| <b>What price?</b>                            | PipeEthernet is available to buildings at a flat monthly fee within the coverage areas, which is different to the traditional building-based pricing methods. Price on application  |

## 2.4 Nextgen Networks

|   |   |
|---|---|
| <b>What is the product?</b>                   | Nextgen offers Point-to-Point Ethernet services either delivered over SDH (Ethernet over SDH) or over the MPLS network (Switched Ethernet). Nextgen Ethernet is available at bandwidths ranging from 2Mbps to 10Gbps. The Switched Ethernet also has the ability to support multiple services on a single physical interface. It is also designed to work with a range of third party access providers. |
| <b>Does it use Telstra's infrastructure ?</b> | Nextgen owns and operates their own fibre network, their own SDH network and their own MPLS network.  |
| <b>Where is it supplied?</b>                  | Nextgen Ethernet is supplied nationally -   |

|                           |  |
|---------------------------|--|
|                           | <div data-bbox="512 264 1323 609"> <h3>Nextgen's Network Infrastructure</h3> <ul style="list-style-type: none"> <li>• 8,500km of optical cable - Brisbane to Perth<br/>- Australia's 3rd largest fibre network</li> <li>• Capital City Fibre Infrastructure<br/>- Metro fibre rings<br/>- Transmission terminals<br/>- Carrier grade co-location centres</li> <li>• Regional Fibre Breakouts</li> <li>• National SDH Transmission Network</li> <li>• National MPLS Switched Data Network</li> <li>• National Internet Routing Network</li> <li>• Wholesale Interconnects to all main Carriers for site connections</li> <li>• Points of Interconnect in most Australian data centres</li> </ul> </div> <div data-bbox="512 609 1323 994"> <p>The map illustrates the network infrastructure across Australia, with red lines representing fibre optic routes connecting major cities including Perth, Adelaide, Melbourne, Sydney, and Brisbane. Other cities shown include Kalgoorlie, Port Augusta, Shepparton, Albury, Canberra, Melbourne, Geelong, Dubbo, Parkes, Newcastle, Coffs Harbour, and Moree.</p> </div> |
| <p><b>What price?</b></p> | <p>Price on application</p>  |

## 2.5 Uecomm

|                                    |  |
|------------------------------------|--|
| <p><b>What is the product?</b></p> | <p>Uecomm offers a product called Ethernet VPN which is a layer 2 managed Ethernet service. Speeds on this network range from 1Mbps to 10Gbps. Access options for Ethernet VPN include over fibre, over E1, over DSL, over SHDSL and over ADSL. Ethernet VPN enables many-to-many connectivity. It is also MEF certified.</p> <p>In July 2008 Uecomm launched its new Ethernet VPLS Service which utilises MPLS to provide full redundancy in the core and seamless failover to an alternative site in the event a primary location fails.</p> |
|------------------------------------|--|

|   |   |
|---|---|
| <b>Does it use Telstra's infrastructure ?</b> | Uecomm owns and operates extensive metropolitan area networks in Melbourne, Sydney, Brisbane and the Gold Coast. Uecomm also leases fibre capacity to deliver network solutions in Adelaide, Canberra and Perth and has agreements in place to deliver data connectivity in other areas nationally and internationally. In particular, Uecomm and PowerTel have an agreement to link Uecomm's metropolitan network in Sydney, Brisbane and Melbourne via PowerTel's interstate network. The core fibre optic network however, is owned by Uecomm over which Uecomm's Ethernet services are delivered. |
| <b>Where is it supplied?</b>                  | The Ethernet VPN service covers metropolitan and CBD areas in Sydney, Melbourne and Brisbane and through to the Gold Coast. Other national and international access (to Adelaide, Canberra and Perth) is achieved through agreements with trusted third party network providers.  |
| <b>What price?</b>                            | Price on application  |

## 2.6 TPG/Soul


|   |  |
|---|--|
| <b>What is the product?</b>                   | TPG/Soul offers a product called Digital IP which is available over Ethernet or Fast Ethernet. Both use a MPLS network. Digital IP over Ethernet has connectivity speeds ranging from 256Kbps to 2Mbps and Digital IP over Fast Ethernet ranges from 4bps to 34Mbps.<br><br>TPG/Soul also offer a broadband Ethernet product called Ethernet over First Mile enabled by RAD Data Communications technology supplied by NSC Network Solutions and which is capable of delivering connectively speeds of up to 10Mbps. |
| <b>Does it use Telstra's infrastructure ?</b> | Digital IP over Ethernet and Digital IP over Fast Ethernet uses Soul's own MPLS network. Their Ethernet over First Mile also is provided over their MPLS network.  |
| <b>Where is it supplied?</b>                  | TPG/Soul offers its Ethernet service in CBD, Metro and regional areas. They cover 96% of metropolitan and regional areas. The network map is found at <a href="http://www.soulaustralia.com.au/pdf/SoulNetworkMap.pdf">http://www.soulaustralia.com.au/pdf/SoulNetworkMap.pdf</a> .  |
| <b>What price?</b>                            | Price on application   |

## 2.7 PowerTel

|   |  |
|---|--|
| <b>What is the product?</b>                   | PowerTel Ethernet is a layer 2 point-to-point and multipoint service which also provides access to many layer 3 applications. It has bandwidth options ranging from 512Kbps to 1Gbps. PowerTel Ethernet comes in Ethernet (10Mbps), Fast Ethernet (100Mbps) or Gigabit Ethernet (1000Mbps). PowerTel Ethernet offers single or aggregated access |
| <b>Does it use Telstra's infrastructure ?</b> | PowerTel Ethernet is available for connection by PowerTel's own fibre infrastructure or by extended access via third party suppliers. Its fibre network runs 2,400km linking Brisbane, Sydney, Canberra and Melbourne and extends to Adelaide and Perth through leased lines.  |

|                              |  |
|------------------------------|--|
| <b>Where is it supplied?</b> | PowerTel Ethernet services Brisbane, Melbourne, Sydney, Canberra, Adelaide and Perth. It offers both intra-city and inter-capital connections. |
| <b>What price?</b>           | Price on application   |

## 2.8 Amcom

|  |   |
|--|---|
| <b>What is the product?</b>                  | Amcom offers Point-to-Point Ethernet services which is a layer 2 connectivity solution running from 2 Mbps up to 1 Gbps.  |
| <b>Does it use Telstra's infrastructure?</b> | Amcom uses its own fibre optic network infrastructure in Perth, Adelaide and Darwin as well as using its own and third party infrastructure on the link from west to east Australia and down the east coast of Australia.   |
| <b>Where is it supplied?</b>                 | Amcom Ethernet is provided in the CBD and metropolitan areas of Perth, Adelaide and Darwin. They also recently secured long term access to a fibre network in CBD and metropolitan Melbourne, Sydney and Brisbane.<br><br> <p style="text-align: center;"><b>PERTH</b>                      <b>ADELAIDE</b>                      <b>DARWIN</b></p> |
| <b>What price?</b>                           | Price on application  |

## 2.9 TransACT

|   |  |
|---|--|
| <b>What is the nature of the product?</b> | TransACT provides the following wholesale Ethernet services: |
|---|--|



|   |   |
|---|---|
|   | <p><b>1 Metro fibre Ethernet services</b></p> <p>This services offers access to TransACT's diverse path and redundant gigabit Ethernet backbone. Metro fibre Ethernet services provide symmetrical speeds ranging from 5Mbps through to 10Gbps per second (10Gbps available as optical interface only). TransACT's Ethernet backbone has seven primary metro node sites. The user's site can be connected as a "primary node" with diverse path fibre access or as a "spoke", with single-path fibre access dependant on the user's requirements.</p> <p><b>2. Point-to-point fibre Ethernet</b></p> <p>This service offers discreet fibre Ethernet services supplied off dedicated single-mode fibre and separate from the Metro Ethernet ring. Access speeds range from 10Mbps to 10Gbps.</p> |
| <b>Does it use Telstra's infrastructure ?</b> | TransACT Ethernet services use their own fibre infrastructure.  |
| <b>Where is it supplied?</b>                  | TransACT Ethernet is supplied in ACT only.  |
| <b>What price?</b>                            | Price on application  |

## 2.10 Agile / Internode

|   |  |
|---|--|
| <b>What is the nature of the product?</b>     | <p>Agile Communications provides wholesale carrier data service outcomes which is delivered via retail service organisations. Internode is the sister company and key service partner of Agile Communications.</p> <p>Internode offers Ethernet services which have bandwidth capacity from 5Mbps to 1000Mbps and offer a fully symmetrical bandwidth solution.</p>  |
| <b>Does it use Telstra's infrastructure ?</b> | Agile wholesale services are offered through their own metropolitan and regional areas which are connected through the data backbone provided by Internode.  |
| <b>Where is it supplied?</b>                  | <p>Internode offer their Ethernet service throughout the CBD and metropolitan areas of the major capital cities of Australia. It is provided via the Internode Fibre Network and by wholesale arrangements with key suppliers, like Agile.</p> <p>A comprehensive network map is found at <a href="http://www.internode.on.net/pdf/network/internode-domestic-ip-network.pdf">http://www.internode.on.net/pdf/network/internode-domestic-ip-network.pdf</a>.</p> |
| <b>What price?</b>                            | Internode Ethernet solutions are priced on application.  |