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TelstraClear Ltd

Comments on Telecom's Submission in Respect of UBS

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1. Introduction

1.1 Amos Aked Swift (NZ)

AAS is a specialist and independent telecommunications and business consultancy. We have wide experience in networks, technologies and system operations; and suppliers. AAS currently employs six professional staff, with highly specialised and complementary skills. Across the team we have a comprehensive understanding of the whole telecommunications industry.

1.2 Project Brief

TelstraClear Ltd (TCL) has asked AAS to provide technical and contextual commentary on 'Telecom New Zealand's submission in respect of the TelstraClear UBS and backhaul application'.

2. General Commentary

Telecom New Zealand has taken a very negative stance in their submission. Throughout, they have taken the worst possible special cases and generalised them to describe the total situation. In a number of statements in their submission, Telecom has made unreasonable assumptions regarding TCL's request, and in other places Telecom has 'nitpicked' over issues that AAS would consider would normally be the subject of negotiation between two willing parties once the primary technical issues had been resolved, which sets the basic framework for the services to be provided.

Conversely, rules which are set on the basis of the most common situation need to still accommodate the exceptional scenarios which genuinely exist in the Telecom network. If there are justifiable limits in the Telecom rural network or in some types of small DSLAMs which would mean that the TCL requested serviced parameters cannot be met in those situations, the service parameters should be qualified by a requirement of "where technically feasible", accompanied by reasonable means of objectively verifying that.

3. Detailed Commentary

The following is detailed commentary on the primary technical issues we have identified in the Telecom's submission.

3.1 The Body of Telecom's Submission

The bulk of the body of Telecom's submission is not concerned with the technical aspects of their argument, and is therefore outside the scope of this commentary. The exceptions to this are as follows:

3.1.1 Paragraph 76 – Limits to Access Principles

Much of the content of paragraph 76 is self-evident. However, AAS disagrees with two of the statements made in this paragraph.

1. In 76(b) Telecom states that (the 32 kbps minimum speed)…"needs to be measured over a time interval (for example 1 hour, 15 minutes or 1 minute). The

choice of time interval depends on the characteristics of the service desired by the customer and may have a significant cost implication." It appears to AAS that the "significant cost implication" relates to a small number of situations where Telecom has mini-DSLAMs installed. Telecom uses a DSLAM made by Conklin in situations where demand for its Jetstream service is low – at small exchanges and off active cabinets (customer transmission system cabinets fed by optical fibre transmission systems). These DSLAMs are known as mini-DSLAMs. AAS understands that they have a maximum link capacity (from the network side of the mini-DSLAM) of 8 Mbps, with a maximum capacity of 60 ADSL ports. In situations where a relatively large number of ADSL ports are transferring data in the upstream direction, a Conklin DSLAM may not meet the 32 kbps minimum if the measurement is taken over a short period of time. This is an exception to the general situation, and is a technical limitation imposed by Telecom's use of these DSLAMs, where the use of larger DSLAMs would not be economic. If higher take up of xDSL services is being driven by Telecom retail and/or wholesale customers, it might well be economically feasible for Telecom to replace the capacity limited DSLAMs, thus alleviating the problem. However, where this is not feasible, AAS would expect that TCL would accept this as a technical feasibility limit in such circumstances and AAS believes that reasonable measures could be developed to ensure that the limited capacity was made available on a non-discriminatory basis between Telecom retail and wholesale customers.

It is also possible that Telecom is raising the issue of 32 kbps not due to the mini-DSLAMs, but due to it not being specified as an "average". In other words, the Commission specified it as an absolute minimum of 32 kbps. In our view, if this were to be averaged, the period over which it should be averaged would need to be relatively short, or else there would be little point in quoting it as a minimum. We find it difficulty in understanding Telecom's assertion that "if (the time interval) was less than one minute this would create a real time service…". In our view there is no connection between the length of time the average is calculated over and whether or not the service is 'real time'.

2. In paragraph 76 (c) Telecom states that that "Limit (c) states that 'the service is not required to support any function that relies on real time network capability'. While it is not necessary to define the precise scope of that limit, limit (c) is clearly intended to exclude a service which is required to support video conferencing, VoIP clients, and other real time and multi media services…". The latter portion of this quote cites the Local Loop Unbundling Report, Annex 5 as its source. What Appendix 5 to the Local Loop Unbundling Report actually says is:

   "Typically, the functionality explicitly excludes the following:

   • video conferencing;

   • VoIP clients and services; and

   • other real time multimedia services, including TV, Video on Demand etc."

   Our understanding of the meaning of 'typically' is that it is synonymous with 'illustratively' or 'indicatively'. In our view, a reading of this passage which would be more consistent with the 128 kbps upchannel restriction in that the Commission simply expected these services not to work, or not to work at a reasonable quality of service level. As we noted in our first report, an absolute exclusion, as Telecom argues for, is technically unrealistic because VoIP, for example, can be provided even on dial up Internet, albeit at poor service levels.

The issue is therefore not whether these services can be provided, but the quality of service at which they can be provided. As the Commission's intention was to protect investment incentives for NGN, it is reasonable to use anticipated NGN service quality levels as a proxy in assessing whether TelstraClear's service request is consistent with the Commission's intended scope for the bitstream service. As we discussed in our first report, the service parameters requested by TelstraClear either would not support some of the services referred to in the LLU Report quote above, such as TV, or would only support them at a level of service quality substantially below that which would be expected if those services were provided over the NGN.

3.1.2 Paragraph 80 – Scope of the Service Sought

In this paragraph, Telecom states that "the scope of the service sought remains unclear and undefined…". AAS agrees with this, at least in part. Once the basic parameters of the services which Telecom is required to supply are set, it will be necessary to more closely specify the technical implementation details, for example, measurement points for UBS performance. There is nothing unusual in that, especially when implementing a new wholesale service. We do not agree with Telecom's assertion that TCL has been so imprecise in its specification that Telecom cannot ascertain what services TCL is requesting.

We have made some suggestions below on some of the technical details which will need to be firmed up to implement the services requested by TCL.

3.1.3 Paragraph 164 – Cost of Service Specifications

In this paragraph, Telecom states that "the provision of these minimum service specifications is very likely to result in significant cost increases which flow through to the retail price. For example, if Telecom was required to monitor the minimum service specifications requested by TelstraClear on a per user basis this would require a specialist modem costing upwards of $2,000 (as opposed to the standard end-user modem which costs about $100)". This is a strange example for Telecom to cite, since the cost of the end-user modem is not a part of the cost of UBS provided by Telecom. Bearing this cost is between the access seeker (in this case TCL) and the end user. If the measurement of some service parameters is end-user modem dependent (and this is a possibility), then Telecom should raise this as a service parameter measurement issue. Telecom has not cited any example that has an impact on the cost of providing the UBS within the access or core networks.

AAS understands that TelstraClear will propose that dedicated test circuits be installed to monitor service parameters. These will allow measurement under non-congested conditions, and avoid the use of specialised modems on end-user services. We believe this would be a practical approach rather than measuring performance on an individual end user basis. A large number of test lines would not be required. Even on those test lines, special modems may not be required to perform the testing as there are solutions that use software connected to a standard modem to measure performance.

3.1.4 Paragraph 165 – The Number of Additional Solutions

In this paragraph, Telecom raises the issue of precedence, saying "each additional tailored solution that Telecom is required to provide will increase the overall complexity of the designated Bitstream service". This is undoubtedly true, but only in a limited sense. Telecom obviously already supports a range of different retail services from its DSLAMs, presumably with little or no operational penalty. At the DSLAM level and in the capacity to the first ATM switch, implementation of a new wholesale service with a different speed to retail services is little different to the implementation of a new retail service with different speeds to the existing retail services. If Telecom asserts that there are differences, it should be required to describe those differences so that the Commission is in a better position to evaluate their relative difficulty and cost and, as importantly, whether the solution being implemented by Telecom is the technical solution which an efficient wholesale provider would implement.

For example, Telecom says "each new solution will require Telecom to configure a new virtual path for each of Telecom's 1,500 DSLAMs". How difficult is that to do? Would Telecom be doing this anyway? What is the likely cost? Telecom hasn't presented any facts relating to this.

AAS considers that a conservative approach would be to separate wholesale traffic as a whole into a VPN, or possibly create a separate VPN for each wholesale customer. This would allow traffic segregation, preventing wholesale traffic from impacting on retail traffic (and vice versa). Separating each wholesale customer's traffic or the traffic for each wholesale variant into a separate VPN service seems to us to be an over-engineered approach.

AAS understands that some of the overseas bitstream products use virtual paths between the DSLAM and the first ATM switch, as in the UK. However, that has benefits for the access seeker because they are able to configure the capacity of the virtual path and thereby to control the contention ratios etc. This gives them a much higher degree of control over service quality than Telecom's proposed UBS product.

In any event, Telecom's requirement for a new virtual path to each DSLAM is a function of the IP architecture Telecom has chosen to deploy, rather than being an innate feature of IP networks.

3.2 Appendix A to Telecom's Submission – Analysis of Non-Price Terms

Most of Telecom's technical arguments are contained in this Appendix, and therefore the bulk of our commentary relates to this. Our comments are as follows (reference numbers refer to paragraph numbers in this Appendix):

3.2.1 Paragraph 4, Unconstrained Downstream

AAS understands that TCL accepts the 128 kilobits per second (kbps) specified limitation on the upstream speed of the Unbundled Bitstream Service (UBS). This is evidenced in Paragraph 16 of TCL's 'Application for Determination for Designated Access Services', which lists a series of options that TCL would like to be made available to it. In this paragraph, all of the options have an upstream speed of 128 kbps.

As far as AAS is aware (we do not have access to detailed specifications of the equipment that Telecom is using) it is technically possible for Telecom to supply a 128 kbps upstream service combined with a non-rateshaped downstream service.

3.2.2 Paragraph 6 – Unconstrained Service

In our view, Telecom's decision to withdraw its unconstrained service is more likely to be based on retail product related issues rather than technical or network resource related reasons.

It is difficult to see what additional network resources Telecom suggests would cost so much as to "make the price of the service unattractive to residential and SME customers". The network resources used to provide UBS are as follows:

1. Local access copper pair
2. The DSLAM backplane
3. The capacity between the DSLAM and the first ATM switch
4. The Backhaul Service

Note that national and international transmission capacity are not part of the UBS.

Our comments on each of these aspects is as follows:

1. **Local access copper pair**: This is not affected by unconstrained service, since it is not a shared resource.
2. **The DSLAM backplane**: This is unlikely to be an issue at large DSLAMs. See below for comments on mini-DSLAMs.
3. **The capacity between the DSLAM and the ATM switch**: This is affected by unconstrained services, but in general, this can be readily upgraded at a relatively low incremental cost. See below for comments on mini-DSLAMs.
4. **The Backhaul and International Service**: These elements are the most sensitive to unconstrained services, but they are provided or paid for by the Access Seeker.

The possible exception to these comments is the mini-DSLAM (see section 3.1.1 above). The use of these mini-DSLAMs in peripheral parts of Telecom's network may well cause difficulties for Telecom in meeting TCL's specifications. This (and many of the other exceptions raised by Telecom) can be simply accommodated by prefixing the requirements with the words "where technically feasible". This would avoid having a service specified by the 'lowest common denominator', and allow the greatest range of services to be offered to the largest number of end users.

In areas where service is provided by Conklin DSLAMs, we understand that TCL would accept that the requested service could not be provided to TCL's customers (as it couldn't to Telecom customers). In our view, imposition of the limitations applicable to these mini-DSLAMs across the whole of Telecom's DSLAM population is not justified, and could be dealt with as an exception, rather than becoming the rule.

3.2.3 Para 7 – Rateshaping

It is not clear to AAS why Telecom has included this comment, since TCL is asking that rateshaping is not applied to the downstream component of the UBS. The distinction between the use of rateshaping for 'throughput rate configuration' and for 'a form of traffic management' is not helpful to the discussion.

In our view, TCL is clearly requesting a UBS that has no rate limitation in the downstream direction, since TCL would prefer to impose this limitation itself. The rateshaping that is applied by the DSLAM as a part of its statistical multiplexing functionality is an inherent part of any UBS provided over current ADSL technology. Applying no rate shaping (i.e. allowing the maximum speed of which the DSLAM is capable) is simply one of the speed or rate shaping options which is available, and is little different to applying a rate shaping at, for example, 256 kbps.

3.2.4 Para 9 – Incorrectly Framed Request

This paragraph refers to paragraph 16.2(b)(ii) of TelstraClear's Application for Determination. AAS does not find TelstraClear's request in this paragraph unclear when considered in context with the following paragraph, 16.2(c), where TCL also requests that any new speed combinations introduced by Telecom into the retail market should also make these available for the wholesale bitstream service where they do not violate the "limitation of access principles".

3.2.5 Para 11 – 8 Mbps Not Achievable

AAS agrees with Telecom in this instance. In our view, the service requested by TCL would be better described as an "unconstrained speed" service.

3.2.6 Para 11 – Maximum Speed Only Available to 20% of Users

The maximum speed available is dependent on the length, the type and the condition of the cable pair being used. AAS agrees with Telecom's assessment that the maximum theoretical speed is likely to be available to approximately 20% of end users.

That there is a technical trade-off between down channel capacity and reach is not in dispute. The question for the Commission is whether the trade-off in respect of TCL end users should be made by Telecom as the network provider or TCL as the retail provider (see paragraph 3.2.2 of this report for suggested treatment of exceptions).

3.2.7 Para 11 – 8 Mbps/128 kbps Service Unstable

AAS is not aware of any technical reason for such a configuration to be generally unstable, however it is likely that such a high degree of asymmetry will degrade the performance of TCP over the service. If the upstream link is heavily loaded, it can delay the transmission of TCP control packets, thus affecting the apparent downstream performance. AAS understands that many gaming applications use the connectionless

protocol UDP rather than TCP. UDP does not rely on the receipt of 'ACK' and other validation packets, so the asymmetry is unlikely to be a problem in this case.

Note also that the maximum theoretical downstream speed is not available to all users (see section 3.2.6 above).

3.2.8 Para 12 – Operational and Technical Practicality

The nature of the "technical and operational practicability issues" is not clear to AAS. Telecom already offers a range of ADSL based services (see Paragraph 118, Table 1 of Telecom's submission). This table, in fact, understates the number of variations offered by Telecom, since there are also variants with different data caps.

In paragraph 12(a) Telecom says: "the implementation of a configuration of upstream speeds, downstream speeds and quality characteristics is a complex and costly undertaking, which requires a significant amount of planning and testing, with the result that the ensuing wholesale product can only be provided at a price which may ultimately be unattractive to residential and SME end-users". AAS is of the view that Telecom is over-stating the case. Many of these parameters are set on an individual basis when an individual DSLAM port is configured for each end user. All parameters must be set when the DSLAM port is first configured, so different speed combinations are simply different settings in a standard configuration list. The nature of this activity is exactly the same whether the end-user being set up is retail or wholesale. Other circuit parameters are determined by the network architecture and dimensioning, in particular the dimensioning of the link between the DSLAM and the first ATM switch. This is briefly discussed in paragraph 3.2.2 of this report.

In paragraph 12(b), Telecom says "each additional tailored solution will require Telecom to configure a new virtual path for each of Telecom's approximately 1,500 DSLAMs". This issue is discussed earlier in paragraph 3.1.4 of this report.

3.2.9 Para 40 – Jitter and Delay Variation

AAS agrees with Telecom. We assume that TCL has used the terms synonymously.

3.2.10 Para 42 – Specification of Parameters

AAS agrees that these parameters will need to be specified in order to implement the services. TCL will have their own specifications, however we suggest the following may be suitable:

- Measurement points – these should be negotiated between the parties
- Measurement time interval – AAS suggests one minute
- Size of packet – AAS suggests that, since TCL wishes to target gaming as an application an appropriate packet size is 64 bytes.
- Measurement condition – non-congested link.

3.2.11 Para 44 – Use of ITU Definitions

In general terms, and when they are appropriate, AAS is strongly in favour of the use of ITU definitions. The ITU is an international standards body which has been largely responsible (under its previous name, CCITT) for the uniformity of the international telephony network. We believe that TCL's service parameters are consistent with ITU definitions, though explicit incorporation of ITU definitions would assist the parties in firming up the implementation details of the service parameters requested by TelstraClear.

3.2.12 Para 45 - Specification of Parameters

This paragraph is largely a repeat of Telecom's paragraph 42, and our comments in paragraph 3.2.10 pertain.

Telecom has introduced the new parameter 'Application of interleaving' in this paragraph, stating that it has not been specified. Annex 1 to TCL's Application for Determination (Paragraph 1.1) states that interleaving is 'optional' in measuring service performance. Our understanding is that TCL intends that the 50ms limit should be an absolute limit. Telecom's own data in its initial submission clearly suggest that it could meet the 50ms standard for a 64 byte packet with the interleaving off, but it obviously will be easier for Telecom to meet that standard if interleaving is off. We agree with this proposition.

3.2.13 Para 51 – Contention Ratio

The term 'contention ratio' is not well defined, and can be taken to have more than one precise meaning.

The simplest meaning, and that easiest to define and measure, is the simple ratio of the sum of the available bandwidths going into the DSLAM to the bandwidth going out (generally in the downstream direction). Thus, a DSLAM with ten 2 Mbps ADSL bitstreams on one side (to end users) and a link of 2 Mbps on the other (to the ATM switch) would be defined as having a contention ratio of 10:1. It is our understanding that this is the definition assumed by TCL.

Other definitions of contention ratio (such as that alluded to by Telecom) depend on actual usage, and may be measured at particular intervals, or during some definition of a 'busy hour'. Many of these definitions have been developed for specific uses, and have a specific context within which they are useful. Such definitions are complex, however, since the busy hour may change over time and may well be different for different DSLAMs. In our view, this additional complexity makes these definitions more contentious, and therefore to be avoided if possible in the UBS discussion.

3.2.14 Para 52 - Specification of Parameters

Our understanding of TCL's definition of Contention Ratio (as in our paragraph 3.2.13 above) implies that the reference point for measuring this is the simple ratio across the DSLAM, as described above.

3.2.15 Para 53 – Interrelationship of Parameters

In our view, performance levels should be measured on a non-congested link (i.e. data is presented in both directions slower than the maximum allowed link speed). There is then no impact from the rateshaping that would be needed to police the speed available to the end user. The trade-offs which Telecom describes are then irrelevant.

3.2.16 Para 54 – Specify Upstream and Downstream Separately

It is our understanding that TCL has stated its requirements on a one-way basis, and that these parameters are intended to apply for each direction.

3.2.17 Paras 56 & 57 – Impossibility of Provision

AAS has suggested that a packet size of 64 bytes be used for measurements. This, combined with making measurements on a non-congested link, deals with Telecom's difficulties.

3.2.18 Paras 59 to 65 – Latency

Telecom's own figures demonstrate that, with a 64 byte packet, the requested latency can be achieved relatively easily, even with interleaving on. The upstream latency, with interleaving on, would be expected to be:

28 ms (interleaving) + 3.2 ms (time to traverse Telecom's network) + 5 ms (nominal) = 36.1 ms

Turning interleaving off would result in an expected latency of 8.2 ms.

3.2.19 Paras 66 to 70 – Delay Variation

Specification of a single packet size, and measurement under non-congested conditions also deal with Telecom's difficulties in this regard.

3.2.20 Para 71 – Packet Loss and Contention Ratio

Measurement under non-congested conditions also removes this objection.

3.2.21 Para 73 – Latency and Delay Variation

Also covered by packet size specification and measurement on non-congested link.

3.2.22 Para 74 – Service Levels Not Otherwise Provided

In paragraph 74, Telecom states "If Telecom was required to meet the minimum service specifications requested by TelstraClear it would have to provision significantly more network resources to the wholesale bitstream service. The resulting retail price for the service may be beyond the reach of most residential and SME end-users". As we discussed in section 3.2.2 of this report, it is not clear to AAS where this additional cost would be incurred.

3.2.23 Para 77 – Interleaving

It is clear from the above discussion (particularly section 3.2.18), that AAS believes that Telecom can meet TCL's requested specifications with interleaving on.

AAS does not understand, however, why turning interleaving off for TCL would "significantly increase the operational complexity of the wholesale bitstream service". AAS understands that, at least on some DSLAMs, the interleaving delay and the presence or absence of interleaving can be set on a per customer basis. Telecom does not explain the origin of the additional complexity.

3.2.24 Para 98 – End-User Caps and Backhaul

It is our understanding that the access seeker either supplies the backhaul capacity or pays Telecom for the capacity. The capacity of the links from the DSLAMs to the ATM switch is defined by the requested contention ratio. It is therefore not clear to AAS where "Telecom's network links may well be flooded…"

It is noted that the use of data caps is a very blunt instrument with which to control the consumption of network resource. Telecom itself appears to have abandoned their use to provide price signals to its own retail customer base, since it no longer imposes excess data charges once the data cap has been reached (it throttles the service to a slower speed instead) on most of its Jetstream services.

End of Report