



**The Internet Society of New Zealand Inc
(known as InternetNZ)**

**InternetNZ Submission in respect of
the Commission's Proposed Technical
Specification of the Bitstream Access
Service**

16 September 2005

Public Version

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1 Introduction

1.1 To avoid any doubt:

1.1.1 InternetNZ is concerned that its submissions on particular issues (such as admissibility) are reviewed by the Commission outside the context of those issues alone. InternetNZ confirms that its 29 July submission (supplemented by Mr Wigley’s 3 August letter) continues to form part of its submissions on substantive matters, for consideration in relation to the final determination. For example, the submissions relating to exclusion of evidence are relevant to wider matters, not just the weight to be given to the material, now that it has been admitted. InternetNZ requests that the various issues raised in the 29 July submissions are specifically covered in the final determination, on the basis outlined below.

1.1.2 InternetNZ has taken the opportunity to comment generally on the process with the intention of assisting with optimised outcomes for the future. Those observations are made in the 29 July submissions and these submissions.

1.2 InternetNZ is grateful for the welcome and acceptance of its involvement by the parties and by the Commission. InternetNZ is very positive about many aspects. However this first foray for InternetNZ has not all been plain sailing. On a number of occasions, InternetNZ has been left out of the loop. This problem has been drawn to the attention of Commission staff on a number of occasions. Still, however, InternetNZ has found out about important developments only by chance.

1.3 Most recently, neither the Commission, nor Telecom and TelstraClear, copied to InternetNZ the Commission’s 3 August letter (seeking further detail) and the various responses from Telecom and TelstraClear.

That is so even though InternetNZ had a direct interest in those matters and had telegraphed that in its submissions (most recently in the 29 July submissions and Mr Wigley's 3 August letter). While InternetNZ is grateful that the 3 August request for more information was relatively restrained, it is likely that objection would have been lodged by InternetNZ as to clarification of Dr Garth's material, in light of the history noted in InternetNZ's various submissions. Now it is too late to take that course.

- 1.4 The Society has the impression that the Commission and the major telcos have been working together and co-ordinating effectively for some years and that there may be a process issue around how new participants are involved. The Society considers that the Commission should review this at a process level, hopefully without the need to traverse again what has already happened. The solution can revolve around a "tick in the box" process at the Commission, and directions that the access seekers and providers copy material to the other parties such as InternetNZ.
- 1.5 In its submissions (verbally and in writing, and both at and following the conference and the workshop), InternetNZ has expressed its reservations about the quality of the information and evidence being provided, and the apparent acceptance of some material by the Commission. See for example paras 2.5 and 2.6 of its 29 July submissions.
- 1.6 Although the reasoning will not be clear until the final determination is issued, the combination of Commissioner Webb's 29 August letter (as to admissibility) and the draft specification (with its 3.5Mb/s default) foreshadow Commission reliance on material lodged by Telecom as to reach and negative impacts on the network. InternetNZ in its submissions has expressed considerable reservations about this material, as has TelstraClear. Appendix C in the Telecom 16 August letter and the 9 September detail provided by Dr Garth do not answer those reservations.
- 1.7 InternetNZ is deeply concerned that a final determination might be made, based on sparse material provided by Telecom (largely comprising assertions without underlying detail). That appears to be happening in relation to such an important issue for New Zealand and the fulfilment of s18 drivers (the long-term benefit of end-users of telecommunications services). InternetNZ is so concerned about an outcome that leads to an effective maximum PIR of 3.5Mb/s, based on sparse material, that it will clearly outline its submission that this conclusion is not legally available or appropriate.
- 1.8 InternetNZ notes that the 3.5Mb/s looks like the effective maximum speed in practical terms. The fears expressed by TelstraClear at para 4 of its 12 September letter appear justified. As TelstraClear say at para 4: *"Telecom will have the opportunity and incentive to make it so complex, time consuming and expensive in practice to successfully request higher speeds that 3.5Mbps will become the effective*

maximum.". As it transpires, that is the overall thrust of the Telecom 9 September letter. Telecom go even further and demonstrate why the 3.5Mb/s should in fact be the maximum, based in part (and at length) around complexities in determining what services should be provided beyond that speed (such as difficulties and costs associated with line route qualification checks).

- 1.9 It appears from para 9 of the draft technical specifications, and the overall approach of those specifications, that this is not the outcome sought by the Commission. But it looks very much like the *de facto* outcome, for the reasons so strongly illustrated by Telecom itself in its submissions. One only needs to refer to the ability of Telecom (as claimed by Telecom) to process only one line route qualification check per day to see where this is going.
- 1.10 The 3.5Mb/s default, as a *de facto* maximum, has Telecom's submissions being accepted outright, in relation to maximum speed. This is happening for reasons that are not at all apparent from the various submissions and other material.
- 1.11 In the unusual circumstances, in which neither the Commission, Telecom nor TelstraClear, involved InternetNZ in the August communications, InternetNZ will respond to the 12 September submissions at the same time as it deals with its initial submissions (that saves the need to cross-submit later, which InternetNZ would have sought to do).
- 1.12 The Commission is referred to the enclosed report from Knossos, and asked to deal with the specific issues raised in the report, in the manner outlined in these submissions.

2 The Commissioner's 29 August decision as to admissibility

- 2.1 It is necessary to express InternetNZ's concern about the 29 August decision, to underline why it considers it is in the invidious position of having to raise the prospect of judicial review or an appeal in respect of this determination.
- 2.2 InternetNZ considers that the 29 August decision does not address at all (or adequately) the submissions as to admissibility put forward by InternetNZ in its 29 July submissions (and Mr Wigley's 3 August letter).¹

¹ Take but one example, from page 3 of the 29 August letter. Slides 6, 7 and 8 are admitted as "*... they are now part of the record, given that the parties and other interested parties will be able to respond to the Commission's revised technical specification early next week ...*". This simply does not answer the submissions made by InternetNZ, particularly as InternetNZ so firmly stated, and this was accepted, that the material was to be lodged only on a basis that its admissibility could be reviewed retrospectively. See the oral submissions during the workshop when InternetNZ requested that the Commissioner come down to the conference room to give directions: one of the concerns expressed by InternetNZ was that the material would end up going in by default even though positions were reserved. And that is exactly what has happened, as appears

The specific InternetNZ submissions should have been covered by the Commission with reasons for deciding that the Telecom material could be admitted.

- 2.3 Against that background, InternetNZ firmly requests the Commission, in its final determination in relation to the substantive application, to identify the grounds put forward by InternetNZ (and TelstraClear) and to deal with them specifically, with reasons for why they are accepted or rejected. Some of the issues for resolution are highlighted directly in these submissions (but the other submissions elsewhere should be addressed as well).
- 2.4 To avoid any doubt, InternetNZ notes that it will not take any issue with the admission of the material referred to in the 29 August letter. That was an appropriate decision for the Commission to make, although not, in the view of InternetNZ, for the reasons given by the Commission. Instead of rejecting the material, the Commission is entitled instead to admit it and approach the matter from the perspective of evidential weight, instead of admissibility.² InternetNZ of course maintains that the material should be given nil or minimal weight.

3 The risk of judicial review or appeal

- 3.1 It appears that the draft specification is based on more than nil or minimal weight being given to the material lodged by Telecom as to reach, cross-talk and negative network impacts. It is hard to see how the Commission could come to a view which sets the default speed at 3.5Mb/s instead of 7.6Mb/s unless that is so. InternetNZ submits that any such conclusion is not available to the Commission on the evidence, information and submissions put forward by Telecom, whether that outcome is arrived at by:
 - 3.1.1 Accepting that Telecom has established its point; or
 - 3.1.2 Accepting that no party has satisfied the Commission that a higher speed is appropriate; or
 - 3.1.3 The Commission concluding, as stated in Para 9 of the draft specification, that there is no "certainty" (or something short of "certainty") as to the extent of degradation of service beyond PIR of 3.5Mb/s; or
 - 3.1.4 Some other approach.
- 3.2 It is noted, incidentally, that the reference to "certainty" at para 9 cannot reflect the appropriate approach. The level to which a point is to be established by parties and/or the Commission is not one of "certainty", which is an unachievable outcome on any determination such as this: it involves so many factors and trade-offs that are to be

from the extract quoted above, contrary to para 1.2 of InternetNZ's 29 July submissions and what was said at the workshop.

² That flows from the flexibility in sections 9(6) and 53 of the Act.

balanced that “certainty” (or anything close to it) is not achievable. This also reflects the realities of the underlying network, the management of which involves managed trade-offs. The reference to “certainty” reflects what appears to be a conservative approach, which would have severe negative impacts for end-users in net terms, when there is no demonstrated justification for a conservative approach.

- 3.3 InternetNZ has outlined those options and approaches (3.1.3-3.1.6) because it is not yet clear how the Commission will support the 3.5Mb/s conclusion (such as in terms of who carries the burden of proof, where s18 fits in this, who must establish what, etc). However, from whichever angle this is handled, InternetNZ submits that a default PIR below the 7.6Mb/s (or substantially below the 7.6Mb/s) cannot be legally justified as the Commission does not have the material to justify that conclusion. In particular, the Telecom material is so thin that a move from frequent international practice cannot be supported. We expand on international practice below noting now that InternetNZ has put forward material, that has not been rebutted, as to international use of the WCSM model (instead of Telecom’s unique and proposed “BRL” model), which handles unrestrained speeds.
- 3.4 While the Commission has some flexibility under section 53, it must nonetheless proceed on a principled basis as a matter of evidence, law, and process. This is of course subject to judicial review and potential appeal. An outcome which is not supported by any or sufficient evidence or information faces risk of judicial review or appeal³. Taking into account the Telecom material on reach and cross-talk impact is not, in InternetNZ’s submission, an approach that is available to the Commission (or, if that is not accepted, relying on it beyond minimal probative weight is not available).
- 3.5 Telecom has itself directly raised, or alluded to, judicial review risk for the Commission on various points it (Telecom) has noted. InternetNZ has dealt with those issues (and suggested solutions and/or reasons why judicial review is not available) in its 29 July submissions. InternetNZ has been conscious that these issues raised by Telecom may be of concern to the Commission. Therefore InternetNZ has set out carefully why the Commission can consider that it is not at risk of review or appeal as to the matters raised by Telecom.

4 InternetNZ’s standing

- 4.1 At page 2 of his 29 August decision, the Telecommunications Commissioner understandably reserves the position as to the rights of participants, other than those named as the access seeker and access provider in an application. InternetNZ has not yet reviewed

³ While appeals are limited to matters of law, that extends to include decisions which are not supported by the underlying evidence and facts. The Supreme Court has recently reviewed the approach to appeals on questions of law but nonetheless this ground of appeal remains: *Bryson v. Three Foot Six Ltd* [2005] NZSC 34.

what standing it has to appeal and/or apply for judicial review. That seems largely immaterial for present purposes, however. TelstraClear clearly has both rights (judicial review and appeal) and could choose to exercise them. That is of course a matter for TelstraClear. The issues raised by InternetNZ are therefore not restricted, based upon any question as to InternetNZ's standing.

5 The 3.5 Mb/s draft conclusion

- 5.1 In its submissions (including the 5 and 29 July submissions and these submissions) InternetNZ has identified the reasons why the Telecom "*evidence*" justifying a move away from the internationally recognised approach has not been made out.
- 5.2 In its 29 July submissions, InternetNZ expressed concern that "*the parties could rather easily make partisan assertions on some points without sufficient underlying data and analysis, or the ability for other parties adequately to test the assertions*".⁴ The indications that the Commission will act upon Telecom assertions around network performance and reach greatly heightens these concerns.
- 5.3 The Commission is referred to InternetNZ's earlier submissions for more detail (and to TelstraClear's submissions). However, by way of overview (and to help identify issues which should be directly addressed and answered by the Commission in its final determination):
 - 5.3.1 The 30 August draft specification at para 4 notes that TelstraClear propose that PIR should be defined in a way that implies acceptance of speed restraints. In fact the source document to which reference is made to support this point refers only to the maximum line speed and not less. TelstraClear have always sought full speed access.
 - 5.3.2 It is accepted that performance issues need to be managed, and the international approach is WCSM (see more detail below and in InternetNZ's 5 July submissions).
 - 5.3.3 Telecom is seeking to move away from the internationally recognised solution (that is, away from International Best Practice (SAP 2)). That move must be justified by the relevant network performance exception to SAP 2. See below for more detail on this point.
 - 5.3.4 Telecom has focussed on reach (the 49,000/69,000/73,000 issue). Even when it finally gave some detail underlying its mere statements as to numbers affected (Appendix C of the Telecom 1 August letter), that just overviewed the methodology and did not give any level of detail to enable (a) the parties to comment upon it and (b) the Commission to

⁴ Para 2.6 InternetNZ 29 July submissions.

consider whether the assertions made were sustainable. This puts the other parties and the Commission still in the position of being asked to accept Telecom's assertions with no way of assessing their strength. The lack of detail in Appendix C comes after many lost opportunities for Telecom to provide this detail earlier (see InternetNZ other written submissions on this point). The lack of detail on a point, as to which Telecom so obviously should have provided more information, inherently implies that such detail would not support the propositions. The need to provide the detail couldn't have been clearer from the circumstances, let alone specific statements by the Commission, InternetNZ and TelstraClear. This is no mere oversight. If the Commission has accepted such material in the past, it could not have been made clearer to Telecom that, this time around, real detail is needed.

- 5.3.5 As noted in InternetNZ's earlier submissions, Telecom made reach a fundamental part of its case, yet has failed to provide the evidence. While the Commission must balance the material before it (this is not just a matter of a party "proving its case"), a failure of a sophisticated party to put forward sufficient evidence on a key point (particularly in the face of strong contrary evidence) is especially material.
- 5.3.6 The Commission cannot rely upon that material in drawing its conclusion as it is mere assertion supported by limited explanation. The flexibility in s53 does not permit that to happen, particularly on such a pivotal issue when Telecom **knew** that it must provide the detail.
- 5.3.7 There are additional reasons why the Commission cannot rely on the material. Details about potentially affected uses and users within the 49,000/69,000/73,000 are not identified.
- 5.3.8 Especially important is that the Commission has no detailed analysis of the impact of a 3.5Mb/s default on the vast majority of actual and potential DSL customers (everyone but the 49,000/69,000/73,000). The Commission is confined to largely high level conclusions around the reduced speeds available to the majority, although the impact of reduced speeds is achieving some real notoriety, of which the Commission is generally aware, and the Commission is generally aware that a 3.5 Mb/s default is a substantially inferior service compared to one capped at a higher PIR (7.6Mb/s or less).
- 5.3.9 If the Commission does decide to take into account reach issues, it is required, under s18, to take into account the impact of the 3.5Mb/s upon the vast majority of actual and potential users. It is not enough for the Commission to take an

approach which reflects that set out at para 9 of the draft determination.

- 5.3.10 Even if the Commission considers that it is justified in weighing up the material before it as to network degradation, it must factor in the degradation of services to the vast majority of users, in view of s18. If there is any "certainty", it is that the vast majority of users (actual and potential) will get a significantly degraded service.
- 5.3.11 Dr Garth's material, even as clarified by the brief explanation in answer to the Commission's query (in the Telecom 9 September letter), has little or no weight for the reasons identified by TelstraClear and by Knossos as enclosed, and as outlined in earlier InternetNZ submissions. Telecom, in relying on Dr Garth and the reach evidence, are seeking to move away to a so-called BRL solution, in isolation from the position internationally (the WCSM model) that is designed to meet cross-talk problems. They face a heavy burden to justify that move, in the face of the international position, particularly as they seek to justify a 3.5Mb/s restraint when both the UK and Australia, for example, allow unlimited speeds via DSLAM's in an LLU environment (see InternetNZ's 5 July submissions).
- 5.3.12 Telecom notes in its 9 September submission that the speed compares favourably with speeds in other countries. However they cite only Telstra's lower speeds in Australia. This misses the point. For whatever reason, some providers cap the speed of their service. Telstra however permits (as does its counterpart in the UK) its competitors to provide unrestrained speed services via competitors' DSLAMs (eg: the Cable and Wireless ISP subsidiary in the UK and ihug's parent, inet in Australia). See www.bulldogbroadband.com for the UK position (and InternetNZ's 5 July submissions). The key point is that competitors are allowed to use unrestrained services across shared copper lines (ie: it's a shared infrastructure issue not a separate DSLAM issue). Of course, the service is not fully unrestrained, as the trade-offs around network degradation are being managed by the internationally standard WCSM approach. There is no reason why that can't happen here. It works internationally and InternetNZ cannot understand how the Commission can draw its draft conclusion, at para 9 of the draft technical specifications, in the face of that international position when Telecom hasn't demonstrated that its position is unique. Further, because Telecom controls all DSLAMs, it can much more readily manage the network performance issues than is possible in an LLU environment. Against this background, Telecom has not justified a drop from 7.6Mb/s, nor can the Commission justify that drop.
- 5.3.13 Taking the Australian example again (but the point applies in other networks too), LLU does enable other providers to offer

unrestrained services even though the incumbent offers restricted services. Here in New Zealand, the incumbent says it wants to restrict the speed of all its own services (which in fact it doesn't, as it happens) as well as those of ISPs to which it supplies. In New Zealand, access bitstream is the only unbundled access option for Telecom's competitors. Hence, much of the work done by LLU in other countries in promoting broadband competition falls to the bitstream service. There is even more reason in New Zealand to have higher speeds. Particularly significant however is that other countries allow unrestrained speeds over the last mile and the Commission must demonstrate why it needs to move away from that position. A departure from that position is not available to the Commission. Alternatively, it is not the appropriate outcome.

- 5.3.14 In short, if other countries allow unrestrained speeds over the last mile (eg: Australia and the UK) why can't New Zealand? This is a very considerable hurdle for Telecom and the Commission to overcome before something short of 7.6Mb/s can be justified (or before the Commission needs to start being concerned that speeds at that level will create unacceptable service degradation. It also provides a high level of reassurance to the Commission that 7.6Mb/s is manageable, without unmanageable network degradation. Telecom, the one party that can do so, and is highly incented to do so, has not established the need for change.
- 5.3.15 If the Commission does conclude that 3.5Mb/s (or some similarly low speed) is the default, reasons (beyond mere cross-reference to Dr Garth's figure in his slide) should be comprehensively given in the final determination for why that figure is chosen rather than some other figure.

6 7.6 Mb/s should be the default position

- 6.1 InternetNZ has read TelstraClear's 12 September submissions and agrees, for the reasons it gives, that the PIR should be set at 7.6 Mb/s rather than 3.5 Mb/s. It is apparent from Telecom's 9 September submissions that, in the absence of Telecom rolling out a higher speed service, 3.5 Mb/s will in reality become the maximum speed service. The difficulties and high costs associated with identifying lines suitable for higher speeds appear to make that the default position in practice.
- 6.2 Assume, contrary to InternetNZ's submissions, that the Commission considers that it must make specific provision for lower speeds (other than reduced speeds due to backhaul from Conklins and assuming of course that many connections will sync anyway at lower speeds). The best approach is to set the PIR at or near 7.6Mb/s and allow lower PIR where line route qualification checks indicate that is appropriate. In other words, set the default at a high position and facilitate a mechanism for reduction instead of at a low speed and have a

mechanism for increase. This eliminates Telecom's incentives (demonstrated, in InternetNZ's view, in the 9 September Telecom letter) to make line qualification checks practically impossible. This approach is the most appropriate outcome in achieving net section 18 benefits. It is the outcome that is most likely to drive a regime in which the access provider is incented to take the most appropriate approach.

- 6.3 Telecom of course is still selling full speed Jetstream services yet it maintains it needs to restrain those in the future for network management purposes. InternetNZ emphasises that Telecom continues to sell the unrestrained services, and Telecom simply makes unsupported statements that it will cap speeds for the future based on network performance requirements. It does not provide underlying analysis to justify a departure from what it has done for years. Is the change driven by real network issues or by this determination? After all this issue only surfaced during this regulatory process and new services were only introduced during this process. Again this is a matter which, InternetNZ submits, the Commission should specifically address in its final determination. It is unsatisfactory for a decision to be made which takes into account scant assertions without supporting information, on such a key issue, when Telecom is still selling unrestrained service. InternetNZ is concerned that New Zealand's access to "broadband" (if one could call speeds constrained at 128kb/s upstream, "broadband") is determined based on Commission reliance on such assertions by Telecom, when it could and should have provided much more detail (leading to the inference that the assertion is unsustainable).

7 Implementation of Service

- 7.1 The timeframes proposed by Telecom in its 9 September letter appear to be far more than is needed, and InternetNZ would be concerned if the debacle around last year's UBS roll-out is used to justify such an extended timeframe.

8 SIR

- 8.1 InternetNZ considers that TelstraClear has made a very damaging concession by accepting an across-the-board approach to SIR, for the reasons outlined in the 9 September ihug submission and by Knossos below. However, there is nothing that InternetNZ can do about this other than reserving the position for the future.
- 8.2 However, there are live points in the Knossos report that have not been conceded by TelstraClear. They are the points relating to (a) the average SIR calculation and (b) the application of SIR parameters to the network.

9 Telecom's pricing material

- 9.1 Telecom cannot now re-introduce pricing material, as it seeks to do by its 9 September letter.

10 Holding the technical workshop without the Commissioners

- 10.1 The technical issues of course are central to this determination. They cannot be pigeon-holed and dealt with separately. Telecom's approach in its submissions demonstrates this point. Telecom seeks to interweave the various commercial, economic, technical and legal issues into an intricate web. InternetNZ can appreciate that technical workshops, without the Commissioners being present, are useful at the level where there is implementation of detail, etc. However, that is not appropriate when issues core to the determination are being covered, as happened at the July workshop. The problems with the admission of evidence, noted at Footnote 1 above, illustrate this. However, much more important is that workshops, in the absence of Commissioners, on core matters has the appearance of the Commissioners devolving and delegating the technical aspects to Commission staff, when they are central to the determination. InternetNZ recognises that it is difficult for the Commissioners to be across all of the detail of a determination. However, on core technical issues, the Commissioners should be more directly involved than appears to be the case. This calls for Renaissance Man/Woman expertise! But that is the reality of determinations such as this.
- 10.2 Of course the Commissioners have the transcript available to them, and advice and reports from Commission staff. However, this is a poor substitute for actually being there and actually hearing what was being said. InternetNZ for example considers that a review of the transcript cannot possibly give a flavour of the impact of the oral exchange between TelstraClear and Telecom experts, particularly Drs Milner and Potter. That exchange left a compelling impression that the Telecom assertions on reach and network degradation are unsustainable and it is to be regretted that the Commissioners were not there to see this happen.
- 10.3 This issue is neatly illustrated by a leading Court of Appeal authority (*Rae v. International Insurance Brokers (Nelson Marlborough) Ltd* [1998] 3 NZLR 190), when dealing with a related issue: the need for an appellate court to defer to the trial judge's conclusions on the facts:

" The advantages possessed by the trial Judge in determining questions of fact are manifest. Of paramount importance, of course, is the fact the trial Judge hears and sees the witnesses first hand over a matter of days, or even weeks, of taking evidence. He or she can form an impression of the reliability of witnesses and, where necessary, their credibility – although in deference to the witness's feelings the Judge may not always express an adverse conclusion in that regard. As the evidence unfolds the trial Judge gains an impression from the

evidence which is not necessarily or usually apparent from the cold typeface of the transcript of that evidence on appeal. The Judge forms a perception of the facts in issue from which he or she adds or subtracts further facts as witnesses give their evidence, and so obtains as complete a picture as is possible of the events in issue. The Judge perceives first hand the probabilities inherent in the circumstances traversed in the evidence and can obtain a superior impression of those probabilities as a result." (per Thomas J)

- 10.4 In coming to its final determination, InternetNZ submits that, now that this opportunity to be present at the workshop has been lost, the Commission at least reviews closely the transcripts and undertakes or obtains careful technical input on these particularly important issues. The statements made by Dr Potter merit particular attention.
- 10.5 Going forward to future determinations, InternetNZ submits that the Commissioners should consider carefully whether they should be involved in more of the technical workshops, particularly where issues at the core are raised, and that, while still relying of course on the technical experts, they are as actively involved in the technical aspects as, say, the economic and legal components. It is recognised that this is not easy but InternetNZ submits that this is the most appropriate course.

Appendix



Knossos Networks Limited

Submission on Proposed Technical Specification of the Bitstream Access Service

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Introduction

1. Knossos Networks Limited has been asked by InternetNZ to comment on the Commission's proposed technical specification for the Bitstream Access Service.

Downstream Peak Information Rate (PIR)

2. We are disappointed that the Commission has chosen to accept Telecom's suggested 3.5 Mbps PIR value, a figure apparently based entirely on the performance of Conklin DSLAMs configured with 2x 2Mbps trunk circuits. This is despite obvious and demonstrable errors in the theoretical evidence presented in support of this arbitrary figure.

Full-rate already offered

3. We remind the Commission that Telecom has always offered and continues to offer "full speed" ADSL services⁵, which qualify as internet-grade best-efforts service, with a downstream PIR in excess of 3.5 Mbps. Furthermore, when configuring such services, Telecom does not perform a line route qualification check beyond the same length check as for the other retail services.

Crosstalk analysis flawed

4. We must agree with TelstraClear's concerns regarding Dr Garth's crosstalk analysis⁶.
5. In addition, we note that crosstalk of 1% as assumed by Dr Garth would occur only on physically adjacent pairs. It is mechanically impossible to place 24 disturbing pairs adjacent to the disturbed pair for the entire length of a binder, as appears to be assumed by Dr Garth's analysis and therefore impossible for 24 pairs to interfere at the 1% worst case that the analysis relies on.
6. We must also reiterate the observation made at the Technical Conference⁷, that the figures presented by Dr Garth showed a serious discrepancy between Scenarios 1 and 4 of Dr Garth's presentation.
7. At 3 km, using the ACIF benchmark rates as a guide (see below), a 3.5 Mbps PIR (actually 4 Mbps raw bit rate due to overheads) service should be at essentially maximum power, as would an unrestricted service. (In fact, an unrestricted service on a 3km line would synchronise to a raw bit rate of about 4 Mbps.)
8. Thus, Scenario 1 and Scenario 4, where the interferers are both at near maximum power (note that at 750m, ADSL would not be operating at maximum power) should apply approximately the same amount of crosstalk to the "victim" line. The two scenarios should be roughly equivalent.
9. Dr Garth's analysis has the "victim" line in Scenario 1 failing (achieving less than 256 kbps) at 4.2 km, while the Scenario 4 "victim" fails at approximately 6.4 km. This is a vast discrepancy, and highlights serious errors in Dr Garth's methodology.
10. The analysis also makes no allowance for the effects of other forms of noise, effects that are likely to be dominant when signal levels are low due to attenuation from long line lengths.

⁵ <http://www.telecom.co.nz/chm/0,5123,204848-203868,00.html>

⁶ TelstraClear Wholesale Bitstream – Comments on Proposed Technical Specification, 12 September 2005, paras 24-28.

⁷ UBS Technical Workshop transcript pages 272-273

11. In short, Telecom has grossly overstated the effects of operating with PIRs of greater than 3.5 Mbps. Telecom has provided no evidence apart from Dr Garth's flawed analysis to support the claim that service beyond 3.5 Mbps will have adverse effects on reach.

ACIF benchmark rates misused

12. Telecom have asserted that if full-rate ADSL is deployed on a large scale, up to 73,000 lines may lose the ability to receive ADSL service.
13. We understand that this is based on the ACIF benchmark rates; the 73,000 lines being those which exceed 4.6 km in length but lie within Telecom's current length limits.
14. The Commission must understand that the ACIF benchmark rates are not a hard limit. While these rates are useful for worst-case engineering analysis, they represent a minimum performance standard, intended to define fault conditions in an unbundled local loop environment. They are inherently conservative, and take into account potential environmental factors other than crosstalk.
15. As such, the ACIF benchmark does not mean that a line of greater than 4.6 km will lose service; merely that a line of less than 4.6km must be declared faulty by the local loop operator if it does.
16. Thus, the 4.6 km figure does not justify the claim that 73,000 lines may lose access to ADSL service.
17. We must again remind the Commission too that a long binder configured with 2 Mbps services will introduce as much (if not more) crosstalk into a long "victim" pair as a short binder operating services at 6 Mbps or more.

Buffer overflow risks overstated

18. Telecom has also made frequent reference to buffer overflows caused by speed mismatches, and again has provided no evidence that such issues occur, are likely to occur in the future or have occurred in the past.
19. DSLAMs are inherently rate-adaptation devices; they take ATM cells from a high-speed trunk operating at 155 Mbps and insert them into low-speed lines operating at typically between 64 kbps and 7Mbps. Buffering is a key part of this, and all DSLAMs are designed to operate in environments where the network core does not know (or care) what rate the downstream ADSL lines are operating at.

Downstream rate should be 7.6 Mbps

20. The Commission therefore should substitute all reference to 3.5 Mbps in the Downstream PIR section of the Technical Specification with 7.6 Mbps, except in the case where the capacity between the DSLAM and the L2TP Access Concentrator is less than 7.6 Mbps.

Line Route Qualification Check Procedure

21. Should the Commission persist in using 3.5 Mbps as a "default" speed, we consider that the following procedure should be used in determining whether a candidate line can operate at higher speeds without disturbing a marginal line.
22. For the purposes of the following discussion, we will use the ACIF benchmark rates as a guide. For simplicity, we will refer to pair lengths in kilometres, although these are more properly measured in terms of attenuation; this being a function of distance and

cable type. Unfortunately, ACIF attenuation figures are measured in dB at 300 kHz, whereas Telecom express attenuation in terms of dB loss at 1024 kHz, making direct comparisons more difficult, and hence the use of length for simplicity.

23. Clearly, the actual qualification must work in terms of attenuation, not physical length for each tested line.
24. Firstly, a “marginal line” must be defined. The following table lists ACIF benchmark⁸ downstream ADSL and ADSL2+ rates by distance and attenuation.

ACIF benchmark ADSL downstream rates

Range (km)	Attenuation (dB @ 300 kHz)	ADSL Rate (kbps down)	ADSL2+ Rate (kbps down)
0.7	9.67	6,648	13,400
1.0	13.81	6,396	13,251
2.0	27.62	5,266	8,265
3.0	41.43	3,984	4,749
4.0	55.24	1,523	1,989
4.5	62.15	423	827
4.6	63.53	289	644
4.7	64.91	123	473
5.0	69.05	0	51

25. The ACIF benchmark rates indicate that a line should be able to operate at 256 kbps or better out to 4.6 km, under worst-case conditions. Therefore a line of less than 4.6 km in length is not a marginal line, and runs no risk of losing service should maximum-power services be provisioned on adjacent pairs.
26. An outer limit must also be applied to exclude lines that will never use ADSL. Telecom has stated that it does not provide ADSL on lines of greater than 5.5 km, but subsequently stated that some services are deployed beyond that. However, an outer limit should be applied, e.g. 6 km.
27. Thus, a marginal line is one that is between 4.6 and 6 km in length.
28. If a candidate line is greater than 3 km in length, it is unlikely that it will synchronise to a raw bit rate of higher than 4 Mbps (equivalent to a 3.5 Mbps PIR once ATM cell header and encapsulation overheads are removed). Such a line should be allowed to synchronise to the highest available speed. (This may be more than 4 Mbps raw, but the power backoff that would be achieved by restricting the line to 4 Mbps is unlikely to be significant.)
29. If a candidate line is of less than 3 km, **and** shares a binder with at least one marginal line, then the line can be limited to a raw bit rate of 4 Mbps.
30. Thus, the line qualification check should only fail if a candidate line is likely to interfere with a marginal line.
31. In the first instance, it may be acceptable to have this process performed manually. However, Telecom should provide the necessary functionality to perform this check on-line, at minimal incremental cost and as soon as is reasonably possible.

⁸ ACIF C559:2002 Part 2 Table 4-2

32. The above line route qualification check procedure should also apply to all Telecom full-rate ADSL services, both wholesale and retail.

Changes in line route qualification status

33. Where reconfiguration of the cable plant has potential to change a line's qualification status, the line qualification database should be used to determine if any existing high-speed services are likely to be adversely affected. Such changes should, where possible, be engineered around, e.g. by moving such pairs to different binders. If this is not possible, high-speed service should only be withdrawn if it can be demonstrated that the high-speed lines are adversely affecting services configured on marginal lines in the same binder.

Line rates on mini-DSLAMs

34. The above process should not apply to lines serviced by mini-DSLAMs on low-capacity trunk circuits (e.g. Conklins). Such lines should have a single speed profile for the bitstream service set to the effective speed of the trunks. For example, a line on a Conklin mini-DSLAM with 2x E1 (4 Mbps) trunk should be able to synchronise at 4 Mbps raw bit rate.

Downstream Sustained Information Rate (SIR)

35. The Technical Specification defines the downstream SIR as the weighted average SIR allocated per end user by Telecom for Internet grade best efforts services provided by Telecom.

Average SIR calculation to apply to all Internet grade services

36. Firstly, It is not clear whether "provided by Telecom" refers to all such services, including wholesale services, or just Telecom retail services.
37. There is a risk that Telecom, as the incumbent provider, may have a higher proportion of low-usage services than other providers may. Therefore as higher-speed wholesale services are deployed, SIRs calculated on Telecom retail services alone would not be representative of the usage experienced by ADSL users as a whole.
38. To mitigate this risk, any calculation of SIR must include all Internet grade services, including wholesale services such as UBS.

SIR service equivalence

39. Secondly, we are concerned that such a calculation will not achieve equivalence of service.
40. Assuming that of all Telecom ADSL retail users, 50% have 256 kbps downstream speed, 25% have 1 Mbps and 25% have 2 Mbps, the weighted average SIR (given a 50:1 contention ratio) would be 17.5 kbps per user.
41. To contrast this, the 50:1 ratio applied to 256 kbps users give 5 kbps; 1 Mbps gives 20 kbps and 2 Mbps gives 40 kbps. These are the SIRs actually applied to the existing Telecom retail services.
42. SIRs apply a share to a virtual path, such that when the path becomes congested, bandwidth is decreased per user in proportion to their relative SIR.

43. The effect of this is that a 3.5 Mbps UBS user would receive less than half the share of a 2 Mbps Telecom retail user. This implies that an access seeker could not offer a UBS service that was fully equivalent to Telecom's retail 2Mbps service let alone any future retail 3.5 Mbps that applied a 50:1 contention ratio.
44. This approach may be fine for an access seeker wishing to provide a high proportion of low-speed or low-usage services, but may prove limiting for an access seeker wishing to compete at the high end of the market.

Application of SIR parameters to network dimensioning

45. Thirdly, the definition of SIR does not define how the SIR figure is to be applied.
46. The SIR should only apply to the bandwidth share on the virtual path between the L2TP Access Concentrator (LAC) and the DSLAM. If the virtual path is not congested, there should be no other impediment within the UBS to the UBS user obtaining the maximum negotiated downstream speed.
47. In particular, the SIR must not be used to dimension the PVC from the LAC through the network interconnection point to the access seeker's BRAS. Similarly, the SIR must not be used to restrict any future backhaul purchased by an access seeker.

Interleaving

48. Telecom's 9 September submission continues to assert that testing is required for interleaving.

No evidence of adverse effects

49. Telecom have thus far failed to present any evidence that disabling interleaving on one line can have adverse effects on other users of the service.

Minimal profiles

50. In addition, Telecom now states that it could not configure an interleaving-off profile on the Conklin mini-DSLAMs, as there are insufficient profiles available.
51. Given that the mini-DSLAMs can not operate the high-speed option (see above), only two profiles would need to be added, one 3.5 Mbps with interleaving on, one 3.5 Mbps with interleaving off.

Low-latency option should be considered

52. Finally, the option of lowering the interleaving delay should still be considered. Telecom currently set this to 16 ms (a round-trip time of 32 ms due to interleaving alone); an interleaving delay of 4 ms would bring the round-trip time down by 24ms without disabling interleaving and without significantly increasing error rates.



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