



**Telecom New Zealand Limited**

**Response to Commission questionnaire**

**Commerce Commission NGN study**

**Public Version**

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## CONTENTS

<b>Executive Summary .....</b>	<b>1</b>
<b>I. Introduction .....</b>	<b>4</b>
<b>II. General Issues .....</b>	<b>5</b>
A. <i>Convergence is reshaping the communications sector.....</i>	<i>5</i>
<u>Layering of markets .....</u>	<u>5</u>
<u>Convergence across services and markets.....</u>	<u>5</u>
<u>Changes in consumer’s attitude and use of services.....</u>	<u>5</u>
<u>Investment in improved service performance .....</u>	<u>6</u>
<u>Globalisation of services and operations.....</u>	<u>6</u>
B. <i>Role of the Commission .....</i>	<i>6</i>
<u>Regulatory analysis needs to reflect New Zealand conditions.....</u>	<u>6</u>
<u>Key issues relate to interconnect and service migration.....</u>	<u>6</u>
<u>Commission should support industry led solutions .....</u>	<u>7</u>
C. <i>Issues that the Commission can focus on in its NGN study .....</i>	<i>8</i>
<u>Ongoing review of market changes .....</u>	<u>8</u>
<u>Ensure any regulatory obligations are technology and provider neutral.....</u>	<u>8</u>
<u>Review regulatory pricing principles for an NGN environment.....</u>	<u>9</u>
<u>Develop a regulatory framework and regulatory principles.....</u>	<u>9</u>
<b>Appendix 1 – Response to Commission’s Specific Questions.....</b>	<b>12</b>
A. <i>Services .....</i>	<i>12</i>
B. <i>Architecture .....</i>	<i>17</i>
C. <i>Transition .....</i>	<i>21</i>
D. <i>Environment .....</i>	<i>23</i>
<b>Appendix 2 – Summary of Proposed IP Interconnection Model.....</b>	<b>25</b>
A. <i>Introduction .....</i>	<i>25</i>
B. <i>Why a new interconnect model is required for an IP services and market .</i>	<i>25</i>
C. <i>A proposed IP Interconnect model.....</i>	<i>26</i>
D. <i>Benefits of the proposed model.....</i>	<i>27</i>
<u>Maximising the potential for retail and service innovation .....</u>	<u>27</u>
<u>Facilitates agreement over the transition from old to new arrangements....</u>	<u>30</u>
<u>Inherently solves for the location of POIs.....</u>	<u>30</u>
<u>Is agnostic to operator business model, including content providers.....</u>	<u>31</u>

## Executive Summary

1. The Commerce Commission has indicated a desire for a collaborative approach with the industry for the NGN study. The Commission has stated that there are no assumptions about the requirement for, or scope of, likely regulation.
2. Telecom supports this approach. By far the greatest value that can be achieved from this NGN study is a fresh, in-depth and comprehensive examination of market trends, adopting a first principles approach to any issues that may arise in the NGN world.
3. At this early stage, the study should focus on clearly articulating and consulting on what the Commission's policy goals are for NGN. With this clear and shared vision, a sensible and informed discussion can then subsequently occur as to the application of a regulatory framework in line with best practice principles that should guide whether any future regulatory intervention in the NGN world is appropriate, and if so, when.
4. Enhanced regulatory certainty, which in turn will foster investment and innovation, is key.

### *Markets are developing*

5. The Commission should not assume that Telecom will be the first-mover or that it should be a necessary focus of regulation. Any consideration of regulation is premature prior to a thorough understanding of market trends.
6. The deployment of new digital based technologies by network and content providers is changing the way the New Zealand market operates. The nature of competition will change and new forms of market power may emerge while existing forms may reduce. The New Zealand market will also increasingly reflect global market forces and scale, and technologies and standards development will be driven by overseas markets.
7. The Commission's ongoing approach will need to reflect the reality of converged and dynamic markets. New technologies will create opportunities for changed business models, convergence of platforms and services, and changes in customer behaviour. Providers no longer operate solely in historic markets and significant change is occurring through the value change from content creation through to service delivery.

### *Facilitating investment for the long term*

8. The NGN highlights the importance of infrastructure investment. It will bring real benefits and opportunities. At the same time, there is some uncertainty as to exactly who will want what services and how and where new access networks to deliver those services will be built. Investment must be supported. Ofcom has this week rightly stated that:

*"It is imperative for us that regulation does not become an impediment to investment."*<sup>1</sup>

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<sup>1</sup> Ofcom: *Delivering super-fast broadband in the UK, setting the right policy framework*, 23 September 2008, p11.

### *Role of the Commission and industry*

9. As we move to an NGN world, it is clear that the key issues relate to interconnection, interoperability and customer transition.
10. New arrangements for the exchange of traffic between service providers and a greater level of interoperability between service and application systems will be required. It is not yet clear what arrangements will best suit a diverse range of new services and technologies. It is important to remember that the innovative services, business models and international standards are still developing.
11. NGN services will also work differently and some wholesale customers will find adapting to this challenging as they will need to adapt to technology change. Retail customers will also need to be educated about the new services.
12. The industry should be given the first opportunity to explore and resolve the issues and it is well-equipped to do so. The TCF is already considering IP interconnection issues.
13. The Commission should be heavily influenced by industry led proposals and outcomes. The Commission should have a bias against intervention. It should not intervene unless there is clear evidence of enduring market failure and only where the benefits of intervention clearly outweigh the costs.
14. The risks of regulatory error during a transition to NGN are too high. Premature intervention risks supplanting industry informed agreement and deterring investment in what is still a developing market where customer demand is uncertain.
15. While it may be attractive to the Commission to adopt overseas examples of NGN regulation, a consensus on what that should be is far from clear. In addition, it is critical that any intervention is targeted to reflect New Zealand conditions and the minimum necessary.
16. In New Zealand, a number of NGNs have already been deployed or are in the process of being deployed, comprehensive industry regulation already applies to NGN services, and an effective industry led process (the TCF) is already well-placed to consider industry-wide issues such as interconnection and relevant standards. These different circumstances mean that overseas solutions should not automatically be applied to the New Zealand market.

### *Focus for Commission's NGN study*

17. The Commission is best placed to support industry resolution of any issues that arise through contributing to, and being informed by, the industry. Additionally, the industry will be supported by an in-depth look at market analysis and trends in this study and by clear policy articulation by the Commission for the NGN world before any intervention is discussed. The focus of the remainder of the study should be on providing the right incentives for efficient and timely investment in NGN services.
18. The Commission can do this by:

- (a) Forming a Commission view on the impact of convergence on the market and competition processes, and adopting a first principles approach as to the implications for current regulated services.
- (b) Developing a regulatory framework and regulatory principles that will guide the consideration of any regulatory intervention in the NGN market and the specific tools or remedies that the Commission may use should it decide to intervene. This framework will promote regulatory certainty, which in turn will foster investment and innovation. A useful framework would set out how the Commission will determine whether competition is limited, and where it considers the benefits of intervening clearly outweigh the costs.
- (c) If regulation does become necessary in the future, ensuring any regulatory obligations are technology and provider neutral and are the minimum necessary. Any access and equivalence obligations should apply to all NGN access and network providers.
- (d) If regulation does become necessary in the future, review the regulatory pricing principles for access services in an NGN environment. Current pricing principles are insufficient to incentivise investment in access networks. It is important that investors are able to gain returns from investment in service performance. Risky investments should be allowed to earn returns that reflect the level of risk faced when the investment is made.

## I. Introduction

19. In March 2008, the Commerce Commission (**Commission**) commenced a study under section 9A of the Telecommunications Act (**Act**) into next generation network (**NGN**) issues. This is the first study by the Commission using its powers under section 9A of the Act.
20. The Commission has indicated a desire for a collaborative approach with the industry for the NGN study. The Commission has further stated that it is entering this process with no assumptions about the requirement for, or scope of, likely regulation. Telecom supports this approach.
21. As part of the initial scoping phase, the Commission has released the NGN Study Consultation Questionnaire. Our understanding is that the Commission anticipates that the questionnaire will inform further research, information gathering and a Commission conference (which is currently proposed for February 2009).<sup>2</sup> Commission staff have indicated that, following this scoping phase, they are likely to seek to identify and focus on key issues. As the Commission identifies the issues it intends to focus on, we are happy to participate in further Commission analysis and consultation.
22. In the meantime, in our response to the Commission's questionnaire, we have:
  - (e) Provided comments on the general issues posed by the deployment of new digital based technologies by network and content providers. We have set out the key trends that we are seeing and the implications we see for the industry and the Commission's role. We have also suggested areas for the NGN study to focus on.
  - (f) Addressed the Commission's questions in Appendix 1, these largely repeat our general comments and provide some more detail.

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<sup>2</sup> See the Commission's Terms of Reference <http://www.comcom.govt.nz//IndustryRegulation/Telecommunications/Inquiries,ReviewsandStudies/ContentFiles/Documents/Final%20TOR%20for%20NGN%20Study.pdf>

## II. General Issues

23. The general issues posed by the deployment of new digital based technologies by network and content providers are set out below.

### A. *Convergence is reshaping the communications sector*

24. The deployment of new digital based technologies by network and content providers has already changed the New Zealand market and will continue to change the New Zealand market.

25. We can not predict how the market will develop in the future. We can say that convergence is reshaping the communications sector. The market is being shaped by a number of technology, consumer and regulatory trends. Commission initiatives need to reflect the reality of converging markets.

26. We agree with Commission staff that the key issues relate to the commercial and competitive environment rather than any detailed analysis of technology change.<sup>3</sup>

### Layering of markets

27. The availability of digital technologies and use of computers in the network has led to a layering of businesses and convergence. Where services were once delivered through a vertically integrated capability, it is now possible to split the underlying connectivity from the services. Further, services can be hosted on servers that are independent of the service application.

### Convergence across services and markets

28. This technology change is enabling network and service convergence, and new business models. Vertical separation between network and services means firms can focus on a particular network component or application (i.e. Google, Citilink). Alternatively, firms are blurring market boundaries by expanding in to adjacent markets (i.e. mobile network based service providers in to fixed voice and broadband and voice markets, and Vector in to telecommunications markets). Network innovations have led to cost savings and created possibilities for alternative networks.

29. Up until the mid 1990s service innovation was based on elements of the PSTN based service. In an NGN environment, however, service innovation occurs on the basis of a broadband connection and includes a wider set of products, for example, voice and content/media applications.

### Changes in consumer's attitude and use of services

30. At the same time, the nature of customer demand is changing. Consumers are demanding open network services and devices, readily adopting internet based services, and creating their own content. There is price erosion around traditional voice services and the demand for new services is uncertain. Consumption is growing while prices are declining.

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<sup>3</sup> See OECD (2008) *Broadband, Growth and Policies in OECD Countries, Ministerial Background Report* <http://www.oecd.org/dataoecd/32/57/40629067.pdf>.

### Investment in improved service performance

31. Incumbent telecommunication operators are investing to upgrade access networks and implement new systems and business models. This implies deploying fibre deeper in to the network by shortening, or replacing completely, copper access lines. Network upgrades will support higher bandwidth services to customers and associated system and business model changes reduce costs.
32. However, there are serious challenges to funding infrastructure improvement, given that the demand for NGN services is unclear.

### Globalisation of services and operations

33. The New Zealand market will be driven by technologies and standards developed for overseas markets (the standard itself and pace at which it develops). Communications companies increasingly compete on a global basis, with consumers able to obtain services from offshore sources. For example, two of Telecom's largest competitors are based on Australia and the UK.

## *B. Role of the Commission*

### Regulatory analysis needs to reflect New Zealand conditions

34. The impact of the NGN is being considered by a number of overseas authorities. While it is instructive to consider overseas examples, the market and regulatory circumstances in New Zealand are different, which means that overseas solutions must not automatically be applied.
35. New Zealand has some unique characteristics, including:
  - (a) **Deployment of new networks.** A number of NGN networks have already been deployed or are in the process of being deployed. For example, Vodafone has announced the nationwide roll out of its 3G mobile network.
  - (b) **Existing industry regulation.** The New Zealand Government has implemented a significant regulatory package that will further shape the New Zealand market. This regulatory package includes the operational separation of Telecom, a requirement to provide access to new NGN access services on an EOI basis, the determination of a sub-loop access service.
  - (c) **Industry process.** An effective industry led process (TCF) has been established to consider industry issues such as interconnect and relevant standards.

### Key issues relate to interconnect and service migration

36. A number of NGNs have already been deployed in New Zealand. The key issues that are therefore likely to occur relate to how these NGNs interconnect, interoperate and how customers transition from old to new services.
  - (a) **Interconnect.** The NGN requires new arrangements for the exchange of traffic between service providers. It is not yet clear what

arrangements will best suit a diverse range of new services and technologies. It is important to remember that the innovative services, business models and international standards are still developing;

- (b) **Interoperability.** The nature of NGN services means there will need to be a greater level of interoperability between service and application systems;
- (c) **Service migration.** NGN services will work differently and some wholesale customers will find this challenging as they will need to adapt to technology change. Retail customers will also need to be educated about the new services.

37. It is inevitable that new issues will develop as NGN markets evolve.

Commission should support industry led solutions

- 38. It is appropriate for the industry to be given first opportunity to resolve these issues. There is general recognition that industry led solutions tend to be more flexible and less costly for business and consumers than regulatory intervention. The industry has the right incentives to address these issues efficiently. All providers (network, content and application) will be concerned about preserving the ability to invest, innovate and compete. These providers will want to manage and attract customers to new services or platforms.
- 39. The industry already has processes in place to manage industry-wide issues. For example, the TCF is currently considering:
  - (a) IP interconnect issues. Telecom has proposed a flexible approach to interconnect whereby a set of default rules are established against which market participants can agree to adapt to suit a range of circumstances.
  - (b) Emergency Services Calling standards in consultation with Officials.
  - (c) The administration of numbering going forward.
  - (d) The Telecom Dialogue program (via the TCF) has a specific service migration workstream.
- 40. It is important that the Commission allows the NGN markets to develop and the industry the opportunity to explore and address any issues that arise. However, Telecom is happy for the Commission to attend and participate in industry-led discussions. This will allow the industry and the Commission to share their thinking on issues.
- 41. While some NGNs have already been deployed, significant future investment is still required in network performance and service innovation. This significant new investment is required where demand for NGN services is still uncertain.
- 42. The Commission should only intervene where there is enduring market failure and the benefits of intervention clearly outweigh the costs. If the Commission intervenes too early, it will risk frustrating industry agreement and deterring investment.

43. Instead, the Commission can help facilitate industry agreement by developing and committing to a regulatory framework that allows market participants and potential entrants to understand the conditions under which the Commission will seek to intervene.

*C. Issues that the Commission can focus on in its NGN study*

44. The Commission can support industry resolution of issues and influence incentives for providers to invest in new services and innovation. The current regulatory environment is unlikely to support efficient and timely investment in NGN services. We suggest that the Commission focus on the following issues in its NGN study.

Ongoing review of market changes

45. By far the greatest value that can be achieved from this NGN study is a fresh, in-depth and comprehensive examination of market trends, adopting a first principles approach to considering the issues. A simple desire to replicate current regulation in an NGN environment would be entirely counter-productive.
46. The combination of convergence, changes in consumer demand and globalisation is changing the way the market operates. For example, the Commission should not assume that Telecom, as the incumbent operator, will be the first mover or that it should be a necessary focus of regulation. Nor can it be assumed that Telecom will have a service connection to all end-user sites (i.e. beyond the physical infrastructure). The Commission's ongoing approach needs to reflect the reality of converged and dynamic markets.
47. The Commission can be most effective in a dynamic market by:
  - (a) Monitoring market changes on an ongoing basis (building wider market elements in to existing reporting); and
  - (b) Forming a view on the impact of convergence on the market and competition processes, and taking a first principles approach to the implications for current regulated services.

Ensure any regulatory obligations are technology and provider neutral

48. The Commission's study should ensure any regulatory obligations are technology and provider neutral. The regulatory principle of technology and provider neutrality is well-established internationally.
49. Technology and provider neutrality is important for efficient investment choices and service innovation, particularly in a market that is still developing and further investments are yet to be made. Any regulatory bias will skew investment decisions, as investment will focus on the least regulated technologies and providers. This will ultimately impact end-users.
50. The Commission's study should also consider the conditions under which access and equivalence obligations are required and how these can be imposed in a technology and provider neutral way.
51. At present, only Telecom is obliged to offer regulated access services and has committed to an open access network, offering any new connectivity

services to access seekers on an EOI basis. Competing providers do not face similar obligations. Asymmetry of regulation will likely distort the competitive landscape.

#### Review regulatory pricing principles for an NGN environment

52. The Commission study should consider appropriate pricing of regulated access services in the NGN environment (**NGA**) and ensure that any pricing mechanisms used reflect the level of risk in NGA investment. NGA investment is associated with uncertainty - the investment costs are significant and the demand for NGA services is unclear. The key issue is how to encourage (or at least not hold back) that investment.
53. There is a general acceptance that current regulatory pricing models may be insufficient to incentivise NGA investment. Generally, telecommunications regulation and pricing has grown around existing assets. However, substantive investment in NGA is yet to be made. The Commission will need to review the use of legacy benchmarks for SLU services and historical TSLRIC based pricing models.
54. Ofcom is currently considering its approach to regulatory pricing for NGA networks. Ofcom has acknowledged that traditional pricing methods may be inadequate for encouraging NGA investment:

*"In this situation [NGA investment] investors in a free market would seek higher returns from their investment to compensate for the higher degree of risk. Applying traditional cost based approaches may not adequately reflect this higher risk profile, and therefore could disincentivise investment. As a result, deployment of next generation access could occur inefficiently late."*<sup>4</sup>

55. In its latest consultation "Delivering super-fast broadband in the UK, setting the right policy framework", Ofcom acknowledged that pricing mechanisms for NGA services must reflect a risk premium, and allow investors the freedom to experiment and try combinations of new services and prices. Ofcom is seeking views on an approach to wholesale pricing that:
  - (a) Allows network operators freedom to set the price of active products; and
  - (b) That applies more traditional approaches based on costs for wholesale passive products, but with suitable considerations for the risk incurred in any investment.<sup>5</sup>

#### Develop a regulatory framework and regulatory principles

56. For any investor, the decision to invest is based on expected returns from that investment. The return on that investment will depend on the actions of the Commission. To support efficient and timely investment it is important that any regulatory intervention is predictable and there is a credible commitment not to change the rules to, for example, expropriate sunk investment.

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<sup>4</sup> Ofcom: *Future Broadband, Policy approach to Next Generation Access*, 26 September 2007, p34.

<sup>5</sup> Ofcom: *Delivering super-fast broadband in the UK, setting the right policy framework*, 23 September 2008, p5.

57. The Commission can foster a predictable and consistent regulatory environment by developing a regulatory framework and principles that the Commission will use to guide any regulatory intervention in the NGN market and which sets out the specific tools or remedies that the Commission may use should it decide to intervene.
58. This framework will promote regulatory certainty, which in turn will foster investment and innovation. It would also support industry resolution of key issues. Early and unpredictable intervention will discourage industry agreement over key matters.
59. The importance of regulatory certainty has been recognised by Ofcom. During its NGN consultation, Ofcom received feedback from stakeholders that one of the most valuable ways regulation can support private sector investment is to provide a clear, consistent and transparent regulatory regime. In its most recent consultation, Ofcom stated:
- "Regulatory certainty is key: we will aim to deliver this certainty by committing to ensuring our decisions are clear, timely and consistent over the longer term."<sup>6</sup>*
60. A useful framework would set out how the Commission will determine whether there is enduring market failure, and where the benefits of intervening outweigh the costs. Further, the framework should set out a Commission bias against intervention - maximising the opportunity for markets and industry to address issues and acting only where limited competition is seen to be enduring and the benefits of intervening clearly outweigh the costs.
61. With a move to the NGN world, the Commission has the opportunity to review the regulatory framework and adopt regulatory principles at the outset that enhance certainty and guide when, whether and how intervention might occur. Ofcom publishes high level regulatory principles that it uses to inform its day-to-day work. These principles cover when Ofcom will regulate, how it will regulate and how it will support regulation<sup>7</sup>. Ofcom has also developed draft principles underlying its approach to regulation of NGA and has identified specific remedies to impose in order to promote competition in NGA networks.<sup>8</sup>
62. In addition, alongside impact assessments at the time of the consideration of regulation,<sup>9</sup> Ofcom evaluates its application of its regulatory principles and the impact of its decisions on a regular basis.<sup>10</sup>
63. The Commission has a specific role under the Act and the Ofcom approach cannot simply be transplanted to the New Zealand environment. Nonetheless, Ofcom's framework, articulation of regulatory policy and vision enhance the discussions and guide the approach – all of which increase regulatory certainty.

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<sup>6</sup> Ofcom: *Delivering super-fast broadband in the UK, setting the right policy framework*, 23 September 2008, p2.

<sup>7</sup> See <http://www.ofcom.org.uk/about/sdrp/>.

<sup>8</sup> See <http://www.ofcom.org.uk/consult/condocs/nga/>.

<sup>9</sup> Ofcom: *Better Regulation Making – Ofcom's approach to impact assessments*.

<sup>10</sup> Ofcom performance and evaluation (quarterly updates in annual plan).

64. Finally, Ofcom is committed to keeping opportunities in sight for de-regulation and to minimising the administrative burdens that regulation imposes.<sup>11</sup>

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<sup>11</sup> Ofcom: *Simplification Plan*

## **Appendix 1 – Response to Commission’s Specific Questions**

### *A. Services*

*Covering the commercial and technical models and functions required to support the retail and wholesale services in the NGN operating environment.*

*A.1. What are your views on the appropriateness or otherwise of retaining the existing commercial models (e.g. PSTN interconnect) in the NGN environment?*

65. The NGN environment has some fundamental differences to the existing PSTN environment, in particular the potential for a wide range of new services not available on the single service architectures of the past. Whereas innovation occurred on the PSTN, in an NGN environment service development occurs over a broadband connection. The possibilities are far wider than that anticipated by PSTN based arrangements.
66. There are a range of commercial constructs in the current market covering arrangements between carriers such as: wholesale access services and interconnect; access to content/application services; and industry services such as non-code access, number portability; and customer identification (E164, IP Addresses, domain names).
67. It is likely that all arrangements will evolve over time as the market develops. However, two commercial models that will need to change are IP interconnect and coded and non-code access.

#### IP Interconnect

68. New interconnect arrangements are necessary to cater for IP-based services. We have proposed a model for IP interconnect of networks and services. This model is currently being considered by the TCF. The key points of this model are summarised in Appendix 2.
69. One of the key issues of IP interconnect in the UK market was the change in location of a significant number of Points of Interconnect (POI).
70. Telecom has previously consulted with the industry on the proposed location/hierarchy of NGN interconnection/handover locations and we expect this to be discussed in more detail in the IP Interconnection working party.
71. The combination of advance notice and a high degree of alignment of NGN POI locations with Legacy POI locations should ensure there are few barriers relating to the change from Legacy to NGN Interconnect construct.

#### Coded and Non-Code Access

72. A feature of the current PSTN interconnection commercial model is the provision of coded and non-code access to facilitate toll-bypass competition (the ability for a service provider to provide calling services to customers subscribing to Telecom’s access).
73. The perceived need for this capability arose out of the particular circumstances of the market at the time – Telecom’s previous monopoly on the provision of PSTN services including long distance calling, and Telecom’s ongoing dominance in the provision of access.

74. Interconnection arrangements for the PSTN were initially established with the sole intention of enabling of toll bypass competition. This was made possible by the provision of coded access – that is, the use of toll access code digits as a means for a customer to indicate which service provider they wish to use on a call-by-call basis, and for this choice to be implemented in call set-up and billing. Provision was also made for carrier pre-selection (a means for a customer to avoid having to dial the additional digits of the toll access code if they wished to use a particular service provider as their default provider), and this was implemented by means of Non-Code Access.
  75. The question is what becomes of coded access and non-code access in the IP Interconnect world?
  76. The legacy of historical pricing practices means that Telecom is the only operator effectively required to separately charge for access and calling. For example, cellular mobile network operators have been able to bundle access and calling such that calling bypass (the ability for another operator to provide the calling service to the customer making use of the mobile access) has not been viable.
  77. In the IP Interconnection world, customers will have increasing freedom to choose who will supply them various services, whether bundled or not. For example, it is possible for customers to access voice applications over their broadband connections.
  78. We expect that the market will naturally evolve away from toll bypass in the form currently understood (required separation of access and calling). Provision of coded and non-code access (or successor services using different technical approaches) may be negotiated between interconnection parties where it makes commercial sense to provide these functions.
  79. Toll bypass is a solution to problems that no longer exist.
- A.2. What do you believe are the appropriate retail and wholesale commercial models for the various NGN services?*
80. We have no view on any specific commercial models, except to the extent that there will be a variety of commercial arrangements.
  81. Our proposed interconnect model is about ensuring the industry is able to develop innovative arrangements and solutions. Our proposed approach to interconnection will also leave retail service providers with the freedom to develop innovative services and pricing. See Appendix 2 for more detail.
- A.3. What are your views on the opportunities, merits or desirability of fostering an environment facilitating services based versus facilities based competition in the evolving NGN market?*
82. The Commission should focus on facilities based competition rather than services based competition, as facilities based competition in the long term will lead to outcomes that benefit end-users more than services based competition will.
  83. Services based competition relies on competition between services delivered over a single technology platform. This means that the range of services, and therefore the extent of competition, is limited by the choice of platform.

It also means that end-users will not benefit from technology platforms that may have emerged to be superior to the installed platform. The cost of missed opportunities can be significant. In contrast, where services are provided over different competing platforms then the total potential range of services to end-users is not limited by any one platform, therefore the range on offer is greater, resulting in additional benefits.

84. The risk that regulation presents is to chill the incentive to invest in technology platforms and facilities. This risk not only applies to Telecom. It also can negatively affect the incentive of competitors to invest in facilities that could compete with the regulated services.
85. It follows, in order to minimise this risk the Commission should only regulate where competition is limited and the benefits of regulation clearly outweigh the costs. Furthermore, even if the Commission determines that competition is limited "today" in a particular market, there is still a positive probability that at a future point that competition may emerge. In this case, the Commission should ensure that the implementation of the regulation "today" does not foreclose competition in the future.

*A.4. Can you envisage any areas where industry limitations are likely to prevent (e.g. commercial or technical) agreements?*

86. The approach Telecom has proposed for IP interconnect provides the framework for the industry to produce agreed approaches, and for parties to reach appropriate bilateral agreements. The proposed Coasian framework balances commercial power and provides a solid framework from which competition law can work. We believe that there is cause for optimism. The following paragraphs outline how this would work in a little more detail.
87. The existence of default rules, as proposed, provides a backstop to negotiation. The chance of commercial negotiations successfully resolving matters between parties who may have differing degrees of market power is enhanced by the existence of these default rules or minimum commitments which ensure that interconnection would occur despite any lack of agreement.
88. We see this working at two levels:
  - (a) The rules provide a key element of the framework within which parties can negotiate their bilateral agreements.
  - (b) In addition, the rules provide a framework for multi-lateral industry discussion and agreement on matters such as standards and the settling of basic interconnection terms. As a result of these industry discussions Telecom envisages establishing Reference Offers for commonly occurring forms of IP Interconnection, so that there is clarity and transparency about the terms on which Telecom will interconnect with any operator who wishes to do so. The existence of such reference offers does not rule out the ability of operators to negotiate different arrangements with Telecom.
89. The industry is currently engaged in a process for establishing these new arrangements. While originally initiated as a result of the consultation requirements on Telecom under its Separation Undertakings, the TCF's IP Interconnection Working Party has chosen to tackle these issues as industry-wide issues and is proceeding accordingly.

90. We have talked elsewhere about the uncertain nature of the NGN environment. The industry needs the time and the freedom to work out the most effective arrangements to meet end-user needs. The discussions to date, founded upon the approach outlined above, give cause for optimism that the industry can work this out. All the factors are there for commercial arrangements to occur. There is nothing to suggest the issues can not be resolved.
91. The Commission should avoid pre-judging market failure and support the industry group discussions and let them lead.

*A.5. Can you envisage any areas where policy support would likely aid or facilitate agreements?*

92. It is essential that there are appropriate processes to deal with the wider NGN issues. We consider that the industry, which is already engaged on the key public policy issues, has the right processes in place to do this and is best placed to lead these processes.
93. The industry has shown that it is capable of approaching industry-wide issues in a mature, collaborative and consultative way (for example, on the TSO and Emergency Services standards).
94. In many cases, the best means to address these issues is through standards development and industry co-ordination. Again, the industry is best placed to lead this process to ensure that any arrangements enable providers to develop innovative products for end-users. The TCF working parties can also address issues that are wider than those that the Commission can consider.
95. Telecom has agreed with the TCF that the Dialogue Programme engagement with the industry can be achieved by any of the following:
  - (a) Formal TCF working party;
  - (b) TCF Dialogue Discussion Forum; and
  - (c) Bi-lateral negotiations.
96. Telecom is happy for the Commission to attend and participate in the TCF Discussion Forums. This will allow the industry and the Commission to share their thinking on issues.
97. The Commission can facilitate industry agreement and efficient and timely investment by developing a regulatory framework and regulatory principles. This should set out a bias against intervention, maximising the opportunity for industry-led solutions. This would make any regulatory intervention predictable and provide certainty to providers. Regulatory certainty means that business cases can be developed, new investment can be made and commercial arrangements can occur with confidence.

*A.6. Can you envisage any areas where significant barriers to entry are likely to emerge?*

Policy support

98. A number of providers are rolling out fibre based networks. There are challenges to further investment, however it is unlikely that these challenges are barriers to entry in an economic sense or issues that need to be addressed through the Act.
99. The OECD has identified a number of areas where policy support can promote the development of digital economies.<sup>12</sup> While it is too early to say definitively where issues might arise in the New Zealand context, key inputs to monitor are likely to be access to:
- (a) suitable wireless/mobile spectrum;
  - (b) compelling local mass market content/applications such as sport and online auctions; and
  - (c) global applications on commercial terms that support continued investment in local network.

Interconnect

100. The proposed approach to interconnect and the availability of regulated services on an EOI basis means there are no residual market power issues or significant barriers to entry, and the environment is now such that we do not envisage any arising.

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<sup>12</sup> See OECD (2008)

## B. Architecture

*Seeking information about the technical and commercial issues around the multiple NGNs, NGANs, and service providers operating in the market to provide innovative services to end-users.*

*B.1. What technical issues need to be resolved to allow you to offer the services you would like to be able to offer today, and over the next 1-3 years?*

101. A number of technical issues need to be resolved. Whilst the technologies underpinning NGN (IP, Ethernet and so on) are mature technologies with deep experience to draw upon, the application of these technologies to services such as voice, television and the provision of substitute services for existing PSTN-based services is relatively new. Rapid evolution of these technologies to support such applications creates an environment of constant learning, evolution and adaptation.

102. The key technical issues include:

- (a) Interoperability - NGNs are flexible, supporting a wide variety of applications, which implies integration between a range of disparate functions. Ensuring interoperability and maintaining stable interactions through a time of rapid change is a challenge both within and especially between network and service providers.
- (b) Operational capability - every service provider is operationally unique, and largely needs to learn its own ways to manage new technologies and services in a manner appropriate to their unique scale, mix of services and mix of technologies, and this takes time to develop new skills practices, and experience.
- (c) Matching technical capabilities, service design and customer needs - not only service providers, but customers also will learn and adapt to new services, new capabilities, and there will be a constant adaptation required to match the technical capabilities of new technology to evolving customer needs and preferences.

103. Some specific technical issues:

- (a) Copper spectrum management – current spectrum rules have the potential to stimulate or cripple new DSL technologies. It is likely current rules will need to evolve to realise the potential of technologies such as VDSL2. Further, it is unclear how a dynamic spectrum management can be effectively deployed where there are multiple SLU based operators.
- (b) Adapting wholesale service constructs to optimise customer experience and adapt to differing mixes of services, and reflect practical learnings of implementing multi-service models. Rigid service definitions which cannot adapt to changing needs and understanding will hamstring development of new services and allow progressive implementation of practical learnings to improve broadband service delivery.
- (c) Interoperability between different service providers' networks (interconnection) - reaching an appropriate balance between the need to ensure interoperability and maintaining sufficient flexibility to allow

development of new services, different operators preferences, rapid evolution of technology and evolution of services and functionality.

*B.2. What commercial issues need to be resolved to allow you to offer the services you would like to be able to offer today, and over the next 1-3 years?*

104. The Undertakings oblige Telecom to deliver a number of EOI services and grandparent or withdraw some retail services. A key issue for Telecom will be the customer migration to EOI services. This will impact both wholesale and retail customers.
105. We are consulting with the industry on customer migration issues through the Dialogue programme. The topics that will make up the Dialogue programme are supported by three primary workstreams:
- (a) **IT & Process.** This forum will deal with topics such as B2B Gateway / Self Service Portal, Industry Validation & Churn in UCLL/NGN world and system retirement/migration planning.
  - (b) **IP Interconnect.** We refer to our discussion above and to Appendix 2.
  - (c) **Product.** This forum will deal with topics such as Product Roadmaps, Grandfathering roadmaps, Product migration planning and Product enhancement programme (PEP).
106. Issues around equivalence will be covered in both forums (for front-end equivalence (IT & Process) or EOI (Product)).
107. If the Commission is interested in these topics, Telecom would be happy for the Commission to attend and participate in these industry discussions. This will allow the industry and the Commission to share their thinking on issues.

*B.3. Which of these issues do you believe can be satisfactorily resolved through the current industry work groups in a timely manner?*

108. These issues are being addressed either through the Dialogue programme or TCF working parties. Processes have been established and we do not see any issues at this stage.

*B.4. Do you envisage any issues in NGN interconnect or in relation to current peering arrangements?*

109. Our proposed approach to IP interconnection deals appropriately with any potential issues.
110. The approach Telecom is proposing for IP Interconnection is essentially the same as that it is implementing for "Local Peering" for internet traffic.
111. Under Telecom's Local Peering offer anyone who meets the minimum technical requirements, complies with the stated business rules and has a local internet traffic handover point established, may interconnect to exchange best efforts internet traffic. Each peering party defines their coverage zone for their handover point on their network; these do not need to be the same as Telecom's. Each party bears their own cost to reach the other. Each party terminates traffic received at its handover point for that

coverage zone at no charge. A variety of additional commercial services can be purchased in addition to the underlying interconnection arrangement, for example commercial options for shared facilities, and commercial transport of non-local traffic.

112. InternetNZ's review of the New Zealand internet peering environment reported favourably on Telecom's approach:

*Telecom is negotiating in the market parallel to these consultations with an offer to exchange local data through specified interconnect points. The changes proposed by Telecom will potentially allow providers access to some Telecom content for a reduced cost. It is not clear however that all network providers will be in a position to fully utilise this offering.*

*Telecom's local interconnect proposal received a good initial reception from service providers, with negotiation focusing on number and distribution of interconnect points, fair arrangements around bilateral links, shared connections and connections at peering exchanges.*

*If successful, Telecom's proposal would provide for value-neutral data exchange with other networks for data with source and destination in local areas - effectively resulting in an unbundling of local and national interconnection.*

*It is unclear what effect Telecom's unbundling of local and national interconnection will have on TelstraClear's offerings. TelstraClear currently offers a bundled local/national transit product. What is clear is that this will represent a significant point of differentiation between the two main carriers.*

*Telecom's proposal would be expected to improve traffic routing locally, according to how much of an ISP's traffic that is local or national, and to the degree that an ISP connects locally around the country, while taking a national transit arrangement for the remainder.*

*Telecom, in reaction to suggestions from the industry has agreed to provide this service in conjunction with other existing Telecom services. This would allow network providers to use their existing links to connect to this new service.*

*It is not clear to what degree Telecom's proposal would assist content providers, particularly since the requirement, with the evolution of rich media, is for a low-latency low-cost service consistent around the country. Some content providers would embrace an ability to connect in local regions, while others prefer for content distribution to be handled on a national basis by their ISP, telco or other provider. At a minimum, this proposal offers a choice for content providers to either remain with national transit arrangements or look towards local delivery of content with its*

*inherent attractive performance characteristics and potential change in cost structure<sup>13</sup>.*

*B.5. Do you envisage any issues in NGAN to NGN interconnect?*

113. See our response to B6 below.

*B.6. Do you envisage any issues around NGN to service, content and application provider interconnect?*

114. Our proposed IP interconnect model, which is being considered by the TCF, applies equally to these scenarios. Our proposed model is independent of interconnecting party, i.e., the interconnect party could be a network or content provider. An overriding consideration is to ensure that the arrangements enable network providers to continue to invest in infrastructure.

115. Local internet peering effectively forms a subset of our proposed interconnect arrangements being considered by the TCF. Further, technical issues are being considered by a specific IP Interconnect working party workstream.

*B.7. Do you envisage any issues around agreement on appropriate parameters and values relating to Quality of Service in the NGN environment?*

116. There is a potential issue around defining the desired level of user-experience and how to support that experience across multiple networks. For example, a provider may deliver PSTN quality service over its own network but the service may decline where the call crosses multiple networks.

117. The industry is currently engaging on how to address this issue. International standards bodies (ITU and ETSI) also have this issue on their work agendas. The industry is best placed to consider this issue, while the engagement is effective and industry standards are still developing.

*B.8. Do you envisage any issues around the integration with the developing open access fibre networks?*

118. At the retail level, we expect to be able connect to providers' open access networks. For example, the Telecom's wholesale access services are open access and, for Gen-I, this will look similar to other wholesale networks.

119. At this stage, it is unclear whether there will be any integration issues.

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<sup>13</sup> InternetNZ External Peering Group: *Issues regarding Internet peering and interconnection in New Zealand, Draft Report Version 0.99*, October 2007, pp. 12-13. <http://www.internetnz.net.nz/issues/current-issues/resolveuid/17a980ffd404248ae53b0aea6dc97267>

### C. Transition

*Exploring the issues around service continuity and user education where changes to current basic consumer services are occurring through technology evolution.*

#### *C.1. Can you comment on the need or timing to migrate from IPv4 to IPv6 and any role you see for government in this transition?*

120. Indications from international forums suggest that IPV4 address space exhaustion will become real within 2 years, although there are, of course, opinions across the spectrum. Telecom's current planning has required IPV6 capability in key network elements for some time; however the real implications of IPV6 deployment and migration will only become real in the context of actual service development and design.
121. The deployment of IPV6 will be driven by end-user customer demand. We believe that, where required, service providers will be able to provide appropriate gateways to manage IPV4 to IPV6 translations. To that end, Telecom is keen to work with customers interested in converting their own networks to IPV6 as a customer driven approach is the best means of making the transition. There is no need for government in this transition. Regulatory intervention would almost certainly be counter-productive. As a customer, government agencies could assist in or even stimulate demand for IPV6 customer applications.

#### *C.2. Can you comment on the need for revisions to numbering plans for new services, and the need or otherwise for non-geographic codes recognising increasing user nomadicity?*

122. The Number Administration Deed establishes principles, which we believe give sufficient flexibility and guidance for an NGN world.<sup>14</sup>
123. An important principle is that numbering should focus, not on technologies as such, but on key differentiators of end-user service outcomes. The current approach to number regulation appears to have entirely discounted this.
124. It is certainly possible that there may be a need to make revisions to the numbering plan for new NGN services, but at this early stage it is unclear as to what changes might be needed.
125. Internationally different regulators have adopted different approaches, and where specific ranges have been established to deal with nomadic services this has been against a background of the need to make consumers aware of the difference between the service in question and some required standard of a primary line voice service. In New Zealand we do not - at this time - have such a required standard over against which a new service would be defined. That is an issue that is currently being addressed by the TCF in its TSO work.

#### *C.3. Do you have a view as to the best approach in dealing with stranded assets in the event of significant network rearrangements?*

126. This was discussed during the UCLL determination process.

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<sup>14</sup> See <http://www.nad.org.nz/>.

*C.4. Do you have a view on emergency services, mains powering and location information in an NGN environment?*

127. The TCF is developing an Emergency Services Calling Code of practice that sets out minimum standards for 111 calls. That Code is being developed in consultation with officials and addresses mains powering and location information issues.
128. To reflect the need to continue evolving the overall 111 system, it is intended to implement an ongoing TCF/officials consultation program.

## D. Environment

*Covering broader cross industry issues effecting the NGN environment.*

*D.1. Is access to physical infrastructure such as ducts, poles and rights of way likely to impact on NGN rollouts?*

129. A number of providers are already investing in fibre networks, using their own infrastructure such as ducts, poles and rights of ways, which they use to reticulate other services such as electricity lines.
130. Therefore, access to this physical infrastructure does not appear to be holding back the roll-out of fibre networks. Any regulatory intervention regarding access to this infrastructure is likely to reduce the incentive of these operators to invest. If the Commission does want to consider passive infrastructure further, it needs to look at all providers and owners.
131. The Commission needs to differentiate between the NGN core and NGN access networks. A number of NGN core networks have already been deployed and do not rely on access to physical infrastructure (such as ducts, poles and rights of way). The key issue for the roll-out or service improvement to NGA networks is the challenging business case, i.e., the risk adjusted returns available to investors.

*D.2. What is your view on the ability to provide services into multi-tenant buildings, and the potential to share optical line termination equipment?*

132. We have not seen this as an issue to date. We are happy to discuss this further with Commission staff.

*D.3. Do you have a view of the role of the regulator and other industry bodies (e.g. TCF) in the evolving NGN environment?*

### A preference for industry led solutions

133. As the industry moves to deploy NGNs the need arises to interconnect them to enable end-to-end service completion. Sorting out how we do this is ultimately a shared industry-wide challenge. Telecom strongly supports the role of the TCF in dealing with this challenge.
134. Due to the small scale of the industry in New Zealand, we believe that the industry must work co-operatively to get the outcomes we are all seeking from the move to an NGN world. Telecom supports the work of the TCF and is keen to use this industry body to facilitate requirements gathering, agree industry positions, poll members on issues etc.
135. The TCF's IP Interconnection Working Party, while initially established as Telecom's preferred vehicle for the consultation required under clause 66 of Telecom's Separation Undertakings, reflects this industry wide approach. The Project Scope notes:

*While the wider industry acknowledges that Telecom's separation undertakings oblige Telecom to consult with the wider industry on IP interconnection with the NGN, it is clear that generally there is an appetite within the industry for an overarching approach and the creation of a voluntary code that can be applied to all future IP interconnection.*

136. Telecom appreciates the energy and enthusiasm with which the other parties have approached the work of this Working Party.
137. The TCF IP Interconnection Working Party has discussed the role that industry standards might have – in particular, whether they will be voluntary or mandatory. Telecom cannot speak for the Working Party, but simply draws the Commission's attention to the position we outlined in our Discussion Paper on IP Interconnection (paragraphs 193 to 196).
138. Taking a wider perspective, Telecom's agreement with the TCF regarding the Dialogue consultation framework allows any agreement by the industry, resulting from Dialogue consultation activities, to easily move beyond mere consensus.
139. The TCF Dialogue Discussion Forum framework allows any member of the TCF to draft a project scope to setup a working party to define the agreed position as a draft Code. This can then go through the formal TCF process for the ratification and adoption of a formal code.
140. Telecom is happy for the Commission to attend the TCF Discussion Forums.

*D.4. Do you have a view on whether or how the "Ladder of Investment" model could operate in the NGN environment?*

141. It is unclear what is meant by the "Ladder of Investment" concept. This model does not appear to have a standard nor unique definition, nor is it a generally accepted regulatory principle, nor is it clear what regulatory issue the model is attempting to address.
142. Telecom considers that the Commission has sufficient regulatory "tools" for determining whether to regulate and the form of regulation. In general, these tools are based on meeting the purpose of the Act, determining whether competition in a market is limited, and if the total benefit exceeds the total cost of proposed regulation. It is unclear what the Ladder of Investment concept adds to this accepted approach to regulation.
143. The Commission has never been clear on its thinking on the Ladder of Investment. In our view, this concept should be abandoned and the Commission should develop and commit to an overarching regulatory framework and regulatory principles. The industry would be happy to engage with the Commission on this.

*D.5. Do you see any issues or opportunities relating to the access to and use of spectrum now, and potentially emerging from the current Telecommunications and Broadcasting convergence?*

144. Overall, we are comfortable with the approach taken by the MED which relies on an auction process, so long as the auction process remains open and contestable and seeks to balance the competing drivers.
145. The UHF broadcasting band, is likely to be used for communication services. We believe that the band should be made available to all providers as soon as possible, and allocated through a competitively neutral process such as MED's auction process.

## **Appendix 2 – Summary of Proposed IP Interconnection Model**

### *A. Introduction*

146. This attachment summarises a discussion paper prepared by Telecom for the TCF IP Interconnect working party. It sets out:
- (a) Why a new interconnect model is required for IP services and market;
  - (b) A proposed IP Interconnect model;
  - (c) The benefits of the proposed model;
    - i. maximising the potential for retail and service innovation;
    - ii. facilitates agreement over the transition from old to new arrangements;
    - iii. inherently resolves for the location of POIs;
    - iv. is agnostic to operator business model, including content providers.

### *B. Why a new interconnect model is required for an IP services and market*

147. There are currently well established arrangements for PSTN voice interconnect, however, the current commercial models are unlikely to be effective in the NGN world. There are fundamental differences between PSTN and NGN worlds. The business models may be different and, in particular, there will be a wide range of new IP based services not available on the single service architectures of the past.
148. Current PSTN interconnection arrangements are based on particular expectations about the distribution of end-user benefits, and resulting conventions of retail and interconnection payments (typically 'calling party pays' at retail, matched with 'calling party's network pays' at interconnect).
149. It is not yet clear what models will be best for diverse future services. Around the world there is still no consensus commercial approach for NGN services. Given the uncertain environment, we believe a flexible approach is needed in relation to the commercial models: the existing PSTN model does not provide this flexibility.
150. The change to IP traffic necessitates some kind of change to the interconnection arrangements: IP traffic is packet based; current interconnection arrangements are call based. While it is still possible to deal with voice on a call (session) basis, voice is not the only service we need to solve for in the IP world. There are arbitrage risks if there are different treatments for different services, if it is possible to disguise one service as another, or if one service can be provided within or over another.
151. Voice can already be offered as an application over the top of other IP-based services (e.g. as voice over the internet). The difference in treatment between PSTN voice and voice over the internet is already a source of dispute and arbitrage, both here and overseas.

152. To avoid such disputes and arbitrage risks, we therefore want a unified model which is capable of being used for any application/service.
153. Under the current approach to PSTN interconnection, traffic passed from one network to another is treated as a cost imposed by the originating network on the terminating network – an externality. In economic theory there have been two quite different approaches proposed for dealing with an externality – that of Arthur Pigou and that of Ronald Coase. Under the Pigovian approach, externalities are internalised (shifted to the party generating them) by means of taxation. The main problem with the Pigovian approach is that it relies upon exact assessment of the level of tax required to internalise the externality.
154. The Pigovian philosophy applied to interconnection results in termination charges, whereby one operator (for most call types, the originating operator) compensates the other operator for the cost caused by the requirement to carry traffic over the latter operator's network. This approach tends to determine retail commercial models, and in effect makes arbitrary allocations of which end-user and party benefits from the communication. Errors in assessing the level and structure of the 'tax' lead to perverse economic incentives.
155. This traditional approach to PSTN interconnection creates incentives for gaming, arbitrage, and avoidance, and incentivises disputes about who benefits from the flow.
156. The current model gets tied up in the operator's choice of access technology, as it attempts to estimate the costs of termination on the different technologies. Again there are opportunities for misspecification and for arbitrage (claiming to be using a costly technology while actually using a cheaper one).
157. We therefore believe that it is necessary to adopt a more flexible regime; one which is capable of application in a unified fashion to all potential NGN services.

*C. A proposed IP Interconnect model*

158. We've proposed that IP Interconnection be handled in a manner different to that applied currently to PSTN interconnection. In summary Telecom's proposal is:
  - (a) That the focus be on defining the necessary rights and obligations that will create the framework within which parties can resolve most interconnection matters commercially. This reflects the alternative approach to externalities put forward by Ronald Coase. The Coasian approach relies on the creation of markets. It limits the regulatory rules to those required to define appropriate property rights, and allows the market to work things out from there. Under the Coasian approach regulatory errors are less harmful, and changing circumstances can be adapted to, because market transactions can be used to rearrange the rights. The property rights can be set in a way that is technology neutral, product neutral, and resistant to market power.
  - (b) That the rights/obligations be defined around four core principles:

- i. the freedom for operators to develop and innovate their services and retail pricing plans;
  - ii. the requirement to interconnect, and to carry the traffic of another party in the same way as one's own traffic to the extent provided for in the service purchased by the end-user;
  - iii. an obligation to provide the connectivity required to transport the packets that originate on one's network to the other network's handover point (but freedom as to whether this connectivity is built or bought); and
  - iv. provided that one's end customer has purchased an appropriate service, an obligation to terminate, at no charge, packets delivered to one's network at the point one has identified as serving the destination customers. Each party is free to choose their own handover points and the coverage of them (possibly subject to any market power concerns that may arise).
- (c) That these rights/obligations be entered into reciprocally; and
- (d) That any other matters can be left to be resolved commercially between the parties, e.g.:
- i. Transit/transport services;
  - ii. Any settlements negotiated by the parties to facilitate different end-user charging arrangements;
  - iii. Cost sharing of bi-directional links.

159. The default rights, which provide a backstop to commercial negotiation, deal with the key regulatory concerns that can arise in interconnection – access cannot be refused, terminations cannot be charged above cost, and there can be no strategic price discrimination.

160. The question of “commercial models for the various NGN services” (question A.2) does not arise in a sense, because we propose a unified regime. However the application of this regime to different NGN services can result in differences in the details of the arrangement ultimately established. This is illustrated in the retail service scenarios provided in Telecom's IP Interconnection Discussion Paper for the TCF Working Party.

#### *D. Benefits of the proposed model*

##### Maximising the potential for retail and service innovation

161. Unlike today's PSTN interconnection model, in which the model at the wholesale level is tied up with the retail model (typically 'calling party pays' at retail matched with 'calling party's network pays' at interconnect), we propose an approach to interconnection which leaves retail service providers with the freedom as to their retail charging. The default interconnection rules provide a backstop against which retail service providers can negotiate variations which allow for flexibility of retail charging arrangements supported by, if necessary, agreed financial transfers between parties.

162. It is too soon to identify which retail commercial models might be appropriate and successful for new (and in many cases unknown) NGN services.
163. We believe retail pricing freedom is vital to allow innovation which will better meet end user needs, to provide affordable service options, and to provide return on investments in increased network capacity and reach. With pricing freedom operators can use many different parameters (subscription, traffic downloaded, speed, service quality, events, applications, etc) to provide customers the freedom to choose how, and how much, they pay. This encourages innovation in services and pricing, and enables operators to keep subscription charges relatively low and thus drive penetration and participation. In an industry with high fixed costs a uniform price set to cover all costs and provide a rate of return may be unaffordable for a section of the potential customer base. However, the market as a whole benefits from high participation rates. Being able to provide more greatly differentiated services to customers means that those who cannot afford a uniform price set at average total cost can be charged a lower price to participate without jeopardising the economic viability of the operation as a whole. The approach to interconnection which gives operators freedom to choose end-user charging arrangements, including for receiving traffic, thus helps the network grow.
164. Pricing according to customers' willingness to pay is therefore welfare enhancing. The basic issue is that in an industry with high fixed costs a uniform price set to cover all costs and provide a rate of return may be unaffordable for a section of the potential customer base. However, the market as a whole benefits from high participation rates. Being able to more closely match willingness to pay means that those prepared to pay more contribute more to the revenue pool, and those who cannot afford a uniform price set at average total cost can be charged a lower price to participate without jeopardising the economic viability of the operation as a whole. The approach to interconnection which gives operators freedom to choose end-user charging arrangements, including for receiving traffic, facilitates such non-uniform pricing. A more formal discussion of non-uniform pricing is set out in the following paragraphs.
165. A telecommunications network is characterised by large fixed and sunk investments. The economics literature has made it clear for many years that non-uniform approaches to pricing (e.g., multipart tariffs and Ramsey pricing) provide an efficient mechanism for funding investments of this kind. While the traditional public utility literature analysed the financing problem in the context of monopoly provision, more recent literature notes that non-uniform pricing (often termed "price discrimination" in the literature) also occurs in competitive markets<sup>15</sup>. Firms in many workably competitive markets can and do price discriminate, e.g., books, fresh fish, banking,

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<sup>15</sup> See Cooper, J C, L Froeb, D P O'Brien and S Tschantz (2005) "Does Price Discrimination Intensify Competition? Implications for Antitrust", *Antitrust Law Journal*, 72, 327-373; Levine, Michael E (2000) "Price Discrimination Without Market Power", Harvard Law School Discussion Paper No. 276; and Asplund, Marcus, Rickard Ericsson and Niklas Strand, "Price Discrimination in Oligopoly: Evidence from Swedish Newspapers", SSE/EFI Working Paper Series in Economics and Finance No 468. More generally, see the "Symposium on Competitive Price Discrimination" in the *Antitrust Law Journal*, Volume 70, 2003.

movie theatres, hotels and airlines. Baumol and Swanson (2003)<sup>16</sup> show that (page 662):

*... scale economies in general, and repeated sunk costs in particular, force firms in the affected industries, if they operate in competitive markets, to adopt prices that are discriminatory and exceed marginal cost...*

166. Similarly, Varian (1996)<sup>17</sup> states:

*The outcome of this investigation is that (i) efficient pricing in such environments [including telecommunications] will typically involve prices that differ across consumers and type of service; (ii) producers will want to engage in product and service differentiation in order for this differential pricing to be feasible; and (iii) differential pricing will arise naturally as a result of profit seeking by firms. It follows that differential pricing can generally be expected to contribute to economic efficiency.*

...

*The evidence shows that differential pricing is ubiquitous in industries that exhibit large fixed or shared costs. This is true for industries that are highly concentrated and industries that are highly competitive ... If there are large fixed costs, and low marginal costs, differential pricing may be required for a producer to be economically viable.*

167. Carbonneau, McAfee, Mialon and Mialon (2004)<sup>18</sup> show theoretically that price discrimination is not correlated with market power, and confirm this finding empirically using evidence from the U.S. airline industry, which in fact shows a negative correlation. Their conclusion is that:

*... no generally positive relationship exists between the prevalence of price discrimination and that of market power, even in the short run.*

168. As the Chairman of the U.S. Federal Trade Commission stated:

*Most real world markets, even those for relatively 'homogeneous' products and a market structure inconsistent with significant market power, exhibit significant price variation. These price differences do not prove that the firms have market power. Moreover, price discrimination can be pro-competitive<sup>19</sup>.*

169. These quotes focus on the dynamic efficiency justification for price discrimination. However, it is important to note that price discrimination

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<sup>16</sup> Baumol, W J and D G Swanson (2003) "The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power", *Antitrust Law Journal*, 70, 661-685.

<sup>17</sup> Varian, H (1996) <http://www.firstmonday.org/issues/issue2/different/>.

<sup>18</sup> Shane Carbonneau, R. Preston McAfee, Hugo Mialon and Sue Mialon (2004). "Price Discrimination and Market Power", Emory University, Department of Economics Working Paper 04-13.

<sup>19</sup> Timothy J. Muris, "Improving the Economic Foundations of Competition Policy," Remarks before the George Mason University Law Review's Winter Antitrust Symposium (January 15, 2003).

can also improve static efficiency. To understand this, note that if a firm with the ability to set prices is forced to set a uniform price, then it will raise the price in high-elasticity markets and lower the price in low-elasticity markets. The increase in price in the high-elasticity markets may induce consumers in those markets to stop purchasing.

170. A necessary condition for static welfare enhancement is that the discrimination raises output<sup>20</sup>. The ability to price discriminate may permit some elastic markets to be served when they would be ignored with a single uniform price.
171. This is efficient behaviour. As Varian notes<sup>21</sup>:

*Efficient pricing only requires that the marginal unit of the good must be sold at marginal cost – not that every unit of the good be sold at marginal cost.*

Facilitates agreement over the transition from old to new arrangements

172. The need for a change in the commercial model necessitates a transition from the present regime to the new one in relation to the services for which interconnection exists today – it is not possible to simply ‘change gear’ from one commercial approach to another.
173. The present structure of interconnection payments creates a significant rigidity for all players, Telecom included, in trying to move to the NGN world because of the substantial revenues and costs involved and because retail customers are accustomed to the particular models of charging that are reflected in the present interconnection regime.
174. The challenge lies where there are existing sets of interconnection arrangements and associated retail service constructs. Voice is the primary issue, but there are also existing interconnection arrangements for text and multimedia messaging for example.
175. We believe that the proposed flexible framework facilitates the transition because parties can bilaterally agree to vary from the underlying default rules to preserve, in relation to their own bilateral interconnection, desired aspects of the existing regime. This might embrace aspects of the technical standards, or the termination payments regime, for example.
176. By clearly defining certain obligations and rights, the participants are then able to negotiate appropriate commercial solution. This model is still being discussed in the working party.

Inherently solves for the location of POIs

177. Under Telecom’s approach determining the number and location of the handover points at which an operator will receive traffic (for free termination to the customers covered by that handover point) is a matter for that operator to decide. This decision will reflect a series of trade-offs as to technology, service architecture, and commercial opportunities. In

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<sup>20</sup> See, for example, Hausman, J A and J K MacKie-Mason (1988) “Price Discrimination and Patent Policy”, *Rand Journal of Economics*, 19(2), 253-265.

<sup>21</sup> Varian, H (1996) <http://www.firstmonday.org/issues/issue2/different/>

Telecom's view these trade-offs should be made freely, subject only to addressing any concerns around the exercise of market power.

178. It is well known that Telecom has chosen to have 29 handover points. These align with the Tier 0, 1 and 2 nodes in our network architecture. The location of these nodes is driven by population density, and network transport links design and reliability issues primarily driven by geographic factors (e.g. if an area is geographically isolated we may put more equipment in the region for service reliability reasons). The 29 points are the same points as those established for other services such as HSNS, local peering, and UBA and UCLL backhaul.
179. Under the default rules framework, each party is responsible for providing the connectivity required to get traffic to the other party's handover points. We envisage having commercial linking products available as an alternative to build (or purchase from other parties).
180. Beyond the default rules, service providers may want to aggregate handover links to carry traffic to and from a variety of Telecom Wholesale services. This would be a commercial offering.

Is agnostic to operator business model, including content providers

181. While the focus of Telecom's interconnect proposal has been NGN to NGN interconnection for completion of retail service from end to end (i.e. a common retail service provided to the end users at both ends), it is also possible for services or applications to be offered in a non-reciprocal fashion, as for example when one operator provides an internet access service and the other provides a voice over the internet application. The default rules framework proposed by Telecom also operates effectively in this kind of scenario.
182. The default rules include a prerequisite that the end-user has purchased an appropriate service. In this case that prerequisite is one-ended: the application to be delivered must be capable of being embraced within the service being provided by the end-user's operator (e.g. the internet access provider's service). It is the end-user's service which determines what is possible: the end-user's operator cannot be required to redesign its retail service in order to accommodate an application for which it was not intended – the internet access provider cannot be required to upgrade to facilitate real-time QOS for example.
183. The reciprocal default rules are the same as those set out above, except of course that the retail services in question will be that of each operator (for one operator the internet access service; for the other a voice application for example).
184. Other matters may be agreed between parties by negotiation. Any lack of agreement on these additional matters does not leave one or other party without an effective interconnection arrangement, due to the default rights created and the offer of best efforts service.
185. If a content provider wants to ensure that end users get different options and that they themselves obtain a different revenue share, they can negotiate it with the terminating network operator or directly with the end user (e.g. pay before download). Such issues are resolved commercially. They are not issues of market power in the access network, because (i) the

default rules mean that the content provider has a default interconnection arrangement that will transport its content to end users, and (ii) such a provider has the same access to services provided on an 'equivalence of inputs' basis (UBA for example) that Telecom's retail units have, and this allows it to independently compete for end users. At present the regulation is solely concerned about market power in the access network, and does not concern itself with the exercise of market power by applications and content providers.