



TelstraClear Limited
Submission relating to
Next Generation Networks study

13 February 2009

PUBLIC VERSION

Introduction

1. TelstraClear welcomes the opportunity to make further comment on the Commission's Next Generation Network study. Next Generation Networks will deliver a range of services from private IP traffic to internet, voice and video conferencing. The diversity of services the next generation networks can deliver will add to the complexity of the technical and commercial environment.
2. The challenges of migrating to an all IP environment are being considered around the world, not only in respect of interworking between networks, but also ensuring that the regulation settings appropriately reflect competition requirements in a NGN environment.
3. TelstraClear considers that technical interoperability and standards in an all IP environment are best dealt initially through the Telecommunications Carriers' Forum. Where TCF members are unable to reach agreement on technical matters, the Commission will have a key role.
4. This submission provides:
 - information to the Commission on TelstraClear's network, and
 - responses to specific questions raised by the Commission relating to approach to NGN, defining NGN, drivers of NGN and the implications of NGN.
5. This submission is public. Confidential information identified in square brackets [] has been removed.

TelstraClear's network

6. This section describes TelstraClear's existing core and access networks architecture.

TelstraClear's core network

7. TelstraClear's network is an all-IP core, with significant capacity running up and down the country, providing network diversity across its core. The TelstraClear IP core network is a packet based network [], and is capable of providing quality of service to multiple applications.
8. The TelstraClear DWDM Optic Network [] can provide fixed bandwidth and layered IP services, []. TelstraClear expect the network to have [] capability within five years.
9. TelstraClear's core fibre network stretches from Whangarei to Invercargill, as end-to-end optical. All core traffic is on diverse rings, with [] diverse paths offering maximum service availability.

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TelstraClear's Access Network

10. TelstraClear uses a range of access technologies to deliver services to our customers. This includes fibre to the premises (FTTP), fibre to the curb (FTTC) copper loops, hybrid fibre co-ax (HFC), wireless local loops, wholesale access service purchased from Telecom, and in the future, use of Telecom's unbundled copper local loops (UCLL).

Hybrid Fibre Co-ax (HFC) network

11. TelstraClear has deployed HFC in Wellington, Kapiti and Christchurch to deliver triple play (broadband, television and voice) to residential customers. This provides downstream speeds up to 25Mbps. TelstraClear is investigating further upgrade capabilities using DOCSIS 3.0 that will provide downstream and upstream speeds up to 100 Mbps.

On-net Fibre to the premises and copper loops

12. TelstraClear has deployed fibre to the premises in CBD reached by TelstraClear's core network, [].
13. TelstraClear was first to launch in October 2008 the fastest DSL broadband technology in the country, VDSL2. TelstraClear now has on-net VDSL2 available to businesses in fourteen centres across the country. VDSL2 is the most advanced standard of DSL broadband, capable of download speeds up to 30 Mbps and upload speeds of 7 Mbps.
14. Diagrammatically, TelstraClear's on-net access technologies are:
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Off-net services

15. In those areas where TelstraClear does not have its own access network, TelstraClear purchases wholesale access services, including bitstream and residential and business resale, to access customers.
16. TelstraClear will also use unbundled copper local loops (UCLL), with TelstraClear DSLAMs co-located in Telecom's exchanges, which will allow TelstraClear to further differentiate services to customers not currently within reach of TelstraClear own access networks.

Moving to an all IP environment

17. The future is likely to be an IP IMS-based converged network, with all services sharing the infrastructure. This includes voice, music, video, telemetry, interactive games, data, the web, and many new technologies as yet unconsidered.

Fresh regulatory approaches required in the NGN world over the long term

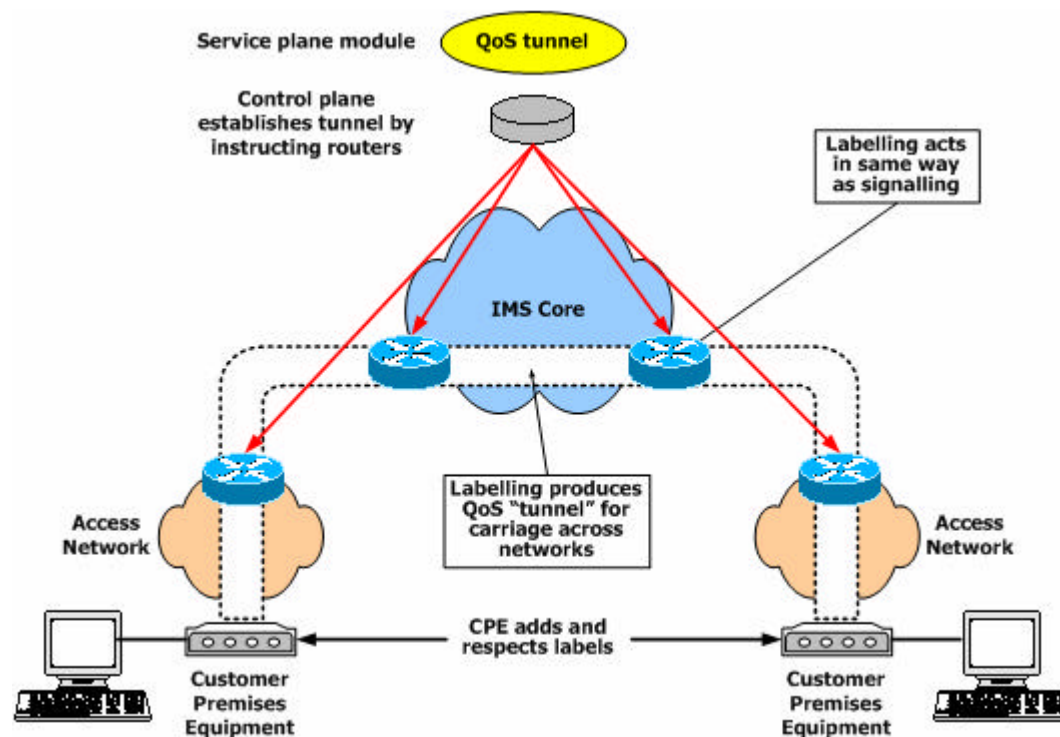
NGN Access services

18. In contrast to the legacy network, the NGN network architecture is inherently more unbundled, layered and open. The network and services planes are independently defined and, importantly for access seekers, the interfaces between the planes use open, externally defined standards.
19. Many of the problems for which operational separation is meant to solve in a legacy environment will not arise if access is provided to a raw bitstream service at open interfaces which give access seekers the same level of control over QoS, functionality and speed as the incumbent's downstream units connecting at the same interfaces. Take for example product development.
20. Much of the UK operational separation model is directed at turning product development into a neutral process run by Openreach and BT Wholesale, including non-discriminatory development of new products and restrictions on availability within BT Retail of any advance information about new features and functions. This reflects vertical configuration in the legacy services. However, if the bitstream product gives the access seeker equivalent scope to shape downstream services, there is much less need to quarantine and control product development.
21. The critical requirement of access seekers, and of the overall competitiveness of the market, is the ability to access a product which is "raw" enough that it can be shaped by the access seeker into its own downstream service.
22. Access seekers need to be able to control their own quality of service (QoS) in order to have sufficient flexibility in product development and service delivery to be able to drive innovation and deliver differentiated products.

23. This flexibility is critical to the overall competitiveness of the market – if access seekers do not have the ability to control their own QoS, they cannot compete in a meaningful way, and the retail market effectively becomes a “market of one” (i.e. all service offerings are limited to, and will reflect the characteristics of, the offerings of the incumbent).
24. The basic UBA (BUBA) service is a best efforts service, which is unrate-shaped, which allows the access seeker to determine speeds within its own network. However, the access seeker has no ability to set quality of services on an end-to-end basis.
25. The Enhanced UBA service (EUBA) is enhanced to the extent that it offers pre-set defined quality of service, through the 45, 90 and 180 kbps variants. However, the EUBA service description presets the channel capacity and service quality, with the result that:
 - access seekers are only able to differentiate up to the level permitted by Telecom Wholesale in the preset options which could well be limited to the regulated service elements incorporated in Telecom’s retail offering (i.e. it represents a “Telecom view of the world” as to the required service offerings); and
 - while the QoS incorporated in the Enhanced Bitstream is capable of supporting services such as VOIP, the Enhanced Bitstream service provides little opportunity for access seekers to develop their own differentiated products outside of the preset parameters (e.g. in relation to multimedia video services).
26. The operational separation undertakings require that Telecom undertake NGN consultation to address longer term NGN issues within the industry. Telecom has commenced its “Dialogue” consultation that will enable further discussion around the industry requirements and issues.
27. TelstraClear supports this initiative, and to the extent that the industry is able to address such NGN challenges as identified above, this will impact the regulatory backstop required in an NGN environment.
28. NGN Access will require network-to-network inter-operability from a POI at the Ethernet aggregation point, or equivalent. Once the NGN access arrangements and related QoS options are determined, QoS at the interconnection level can be addressed. The services enabled by the NGN access will inevitably drive network-to-network interconnection requirements, which are discussed in the next section.

Future IP Interconnection arrangements will be required to manage QoS

29. Quality of service is achieved in an NGN environment through a process depicted in the following diagram. A QoS service path with consistent parameters is created through the network along which packets comprising the message with the QoS commitment then travel.



30. This process comprises the following elements:
- Packet labelling
 - Service plane and control plane communicating with routers to create QoS paths
 - Customer premise equipment
 - Billing for QoS
31. Interconnected IP networks will need to agree on QoS parameters and also agree on the way in which they will respect the labelling of packets for different types of services that are reliant on QoS.
32. Creating a QoS path does not determine the direction of charging for wholesale or retail services. QoS paths permit a range of charging models which are not available in the current internet with its differential tiered charging.
33. The ability for a provider to differentiate the class of service is driven, amongst other things, by the providers' bandwidth capabilities. A provider with reasonable bandwidth capabilities obtained by network investment will minimise bandwidth contention and will in turn be capable of providing differentiated classes of service.

34. In an openly competitive environment the existence of differentiated classes of service for end-to-end services will play some part in overcoming QoS degradation issues. The existence of differentiated classes of service will encourage providers to invest in their respective networks.
35. It is important to consider the inter-working of IP networks and of IP networks with PSTNs during the transition period as today, VOIP originated calls will terminate in a PSTN (either domestically or internationally).
36. Furthermore managing QoS for end-to-end service requires agreed standards for inter-operability of networks to support the porting of different classes of service between operators. Effective border control systems will be required to manage packet inspection and routing.
37. Effective competition will drive price change and price differentiation by class of service. Price differentiation can help to distinguish the service delivered and should reflect the class of service. If this approach to pricing is implemented it may reward a provider that invests adequately in network and processes to provide a higher grade of service.
38. The requirements of end-to-end QoS will fundamentally change how IP networks interconnect. Current "best efforts" internet interconnection does not have to distinguish between different classes of traffic. But NGN networks will enable a model where one party takes the responsibility for establishing a "QoS path", maintaining the right quality level through the various network paths between sender and receiver. The appropriate arrangements will need to be in place to enable QoS for end-to-end services.

Commercial Models will need to evolve to support QoS

39. Interconnect charging arrangements will need to evolve considerably from today's models in order to support QoS for different types of end-to-end services. The current "best efforts" interconnection model may continue to apply to retail services for which QoS is not required. However, in order to encourage efficiencies it is important that these models are not simply transposed into the NGN world.
40. Relatively few network operators have yet committed to full NGN upgrades. Typically, core networks are upgraded, with upgrades to the access networks to follow at some future point. Services to take advantage of QoS-based end-to-end IP are still being comprehended and developed – with supporting wholesale and retail commercial models as yet uncertain. The imminent migration of services to NGNs has already sparked a regulatory and intellectual debate about the charging model that should be applied to IP interconnection.
41. As the debate on charging models in an NGN world is at an early stage it is too early to tell what model or models will prevail commercially.
42. The TCF IP interconnection working party has been established to develop an IP Interconnection code of practice and to facilitate the consultation process between Telecom and Service Providers in regard to the approach of IP interconnection services.

43. The TCF IP interconnection working party is reviewing a range of commercial models to understand the implications of the various pricing mechanisms. Important considerations include the number and location of points of interconnection, pricing for transit and addressing any residual market power concerns.
44. As the IP interconnection work stream is at an early stage, it remains unclear whether specific matters will arise that the working party is unable to resolve, or matters that would be inappropriate for the working party to deal with.
45. TelstraClear recommends that the Commission continue to monitor the progress of the TCF IP interconnection working party. Where the industry is able to agree a workable solution to IP interconnection, this is to be preferred to an imposed regulated outcome.

Responses to specific questions raised in the Commission's paper

Question 4: What do you think IMS fulfils? Is it necessary, or are there other ways of fulfilling its function? What are the implications of this layer for the future of NGNs?

46. A key feature in the NGN architecture is the IP Multimedia Subsystem (IMS) for delivering internet protocol multimedia services. Integration of Fixed and Mobile networks with IMS can deliver such benefits as the ability to manage QOS and connect access points in single converged network (FMC).
47. TelstraClear hold the view that IMS will have an important part to play in the long term future of IP interconnection particularly in terms of the core network architecture.
48. However, investment towards a true fully-integrated common IMS architecture infrastructure will not take place until an environment exists with regulatory certainty and internationally agreed deployment standards.

Question 6: Is industry consultation necessary on network design for NGN?

49. The TCF IP interconnection working party has been established to develop an IP Interconnection code of practice and to facilitate the consultation process between Telecom and Service Providers in regard to the approach of IP interconnection services.
50. The technical sub-group of the TCF IP interconnection working party is reviewing the various technical standards and service descriptions to understand the implications of network design for NGN.
51. TelstraClear recommends that the Commission continue to monitor the progress of the TCF IP interconnection working party. Where the industry is able to agree a workable solution to IP interconnection, this is to be preferred to an imposed regulated outcome.

Question 8: Part of the BIF is targeted at deploying open access urban fibre networks and the Government has indicated that it will set aside \$1.5 billion for open access FTTH rollout that will reach 75% of the population. What is your understanding about what is meant by open access?

52. At this stage, the specific details of the Government's FTTH rollout have not been announced, such as the nature of the proposed open access that will be available.
53. TelstraClear considers that the nature of access to an NGN / all- fibre network will move away from access to bottleneck components of the network such as unbundled local loops at the exchange and unbundled sub-loops from cabinet where fibre has been laid. NGN access will increasingly move away from these layer-1 raw network elements to layer-2 bitstream services. In order that access seekers can provide innovative, differentiated services over bitstream, the delivery of a clear channel will be necessary.

Question 9: What are the areas that are not likely to be commercially funded?

54. From a fixed network perspective, competition has largely arisen in areas with higher population density first. This reflects the lower costs of deploying infrastructure and greater revenue opportunities available in urban areas.
55. The Telecommunications Service Obligation imposes an obligation on Telecom, which receives financial compensation, to deliver basic service to high cost rural customers that are not commercially viable.
56. As a result, the economics of deploying fixed NGN infrastructure will be challenging, and the return may not be sufficient to prompt a purely commercial solution in those areas.
57. However, the economics of wireless networks to deliver telecommunications services differ from fixed networks, and as a result, assumptions around availability of service and levels of competition are increasingly being tested. For example, cellular networks now cover a significant proportion of the population and advances in cellular technology increasingly provide broadband at greater speeds. This capability is demonstrated in Australia by Telstra's Next-G national wireless broadband network that currently offers high speed broadband at 14.4 Mbps to 99% of the Australian population. Telstra have recently enabled their Next-G network at 21Mbps and have stated ambitions to be running at 42Mbps by 2010 and LTE in the years following.
58. In addition, satellite is an alternative to deliver broadband services to some rural areas.

Question 12: Is content ownership or access to content a hindrance to the development of broadband in the New Zealand market?

59. An investment in NGN is significant. A business case for a FTTH network, for example, must enable the delivery of value-added services including compelling content. Limitations of the NZ telecommunications networks have hindered telecommunication providers from delivering content-rich services, for example, IPTV. There are a number of ways to get access to content including exclusive access (such as Sky TV) but increasingly access to content is being provided via the internet.

Question 28: What additional factors have to be taken into account with regards to point of interconnection in an NGN environment and what is their effect?

60. The TCF IP interconnection working party is reviewing a range of commercial models to understand the implications of the number and location of points of interconnection. Important considerations include the transit market on IP-backbones and the broadband access market to be sufficiently competitive.
61. As the IP interconnection work stream is at an early stage, it remains unclear whether specific matters will arise that the working party is unable to resolve, or matters that would be inappropriate for the working party to deal with.

62. TelstraClear recommends that the Commission continue to monitor the progress of the TCF IP interconnection working party. Where the industry is able to agree a workable solution to IP interconnection, this is to be preferred to an imposed regulated outcome.