

**VODAFONE NEW ZEALAND LIMITED
SUBMISSION TO THE COMMERCE
COMMISSION**



vodafone

**Response to the Commerce Commission's NGN Study
Consultation Questionnaire.**

14 October 2008

Public Version

Introduction

1. This document is Vodafone's response to the Commerce Commission's NGN Study Consultation Questionnaire.
2. No sections of this document are confidential.

Background

3. The Commerce Commission (**the Commission**) released its NGN Study terms of reference in May 2008, followed by its NGN Study Consultation Questionnaire in June 2008.
4. The questionnaire consists of a number of open-ended questions under four categories:
 - **Services**, covering the commercial and technical models and functions required to support the retail and wholesale services in the NGN operating environment.
 - **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.
 - **Transition**, exploring the issues around service continuity and user education where changes to current basic consumer services are occurring through technology evolution.
 - **Environment**, covering broader cross industry issues effecting the NGN environment.

Key Issues

5. The NGN is not just some future state of the telecommunications industry, but rather something that already exists today. Some network operators such as Vodafone already operate an NGN, while others such as Telecom are still on an evolutionary path towards their NGN.
6. Vodafone strongly believes that all technical issues associated with the

evolution of the NGN are best solved by the industry, in the form of TCF Working Parties.

7. The evolution of the NGN will not require new and additional regulation, but rather a continuation and perhaps refinement of existing regulation that promotes effective competition, primarily through mandating unbundled access on fair standard terms to defined bottleneck infrastructure, i.e. infrastructure that cannot be economically replicated, particularly ducts and cables. The current regime should be able to deal with new bottlenecks as they occur. In order to ensure certainty for investors and therefore promote investment, rigorous analysis and consultation are required to identify such bottlenecks.
8. The key regulatory issues with the NGN relate to the migration of the access network from copper to fibre, and the need to maintain fair and reasonable access to this key bottleneck. Existing regulation must be refined to encompass moves to FTTH and FTTN or cabinetisation.
9. While cost effective last mile access is a very real issue, cost effective backhaul and international connectivity are even more significant issues that must be addressed for New Zealand to move forward.
10. The aspect of the NGN evolution that is likely to have greatest impact on end users will be the requirement to replace much of today's legacy CPE (Customer Premises Equipment). This will be compounded by the separate need to migrate from IPv4 to IPv6.
11. The Commission's interest in wider issues in relation to NGN migration, including commercial aspects and issues such as emergency services, is commendable. However, the Commission should ensure it remains focused on regulatory roadblocks rather than the wider questions that might be more appropriately considered by policy agencies or left to the market to resolve.

Response to questions

A. Retail and Wholesale Services

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

There are two key issues to consider here – where should interconnect occur and who pays for what.

There are several existing commercial models in use for different services and between different parties. Telecom is the architect of the most significant models and they are all based around its relevant network architecture. Telecom has:

- 24 LICA (Local Interconnect Calling Area) groups for legacy PSTN interconnect (voice and dial-up internet).
- 34 USAPs (Unbundled Service Aggregation Points) for legacy ATM-based UBS (Unbundled Bitstream Service) handover.
- 29 NAPOIs (Nearest Available Point Of Interconnect) associated with its NGN and promoted for UBA (Unbundled Bitstream Access) handover and Internet Peering among other things.

All three Telecom interconnect models are currently in operation, clearly a non-ideal situation.

Apart from the issue of multiple interconnect models, the large number of interconnect locations is a significant issue to all other network operators. At the other end of the scale, some network operators are saying that there should only be one national interconnect handover, while most seem to be ready to settle on three national interconnect handover locations in Auckland, Wellington and Christchurch. Indeed Vodafone has established an interconnect model of three LICA groups, agreed bilaterally with several other operators. Regardless, it is clear that the industry needs to move to one physical interconnect model for all types of interconnection, and the NGN or IP interconnection provides that opportunity.

Traditionally for voice, the operator doing the retail billing for the call is required to

provide the interconnect link to the other operator, although for some other types of interconnect (e.g. UBA), Telecom requires that the other party comes to them, or alternatively pays for the link. Further to this, for voice interconnect, Telecom currently insists on uni-directional links, as well as separate links for different call types. As well, interconnect for UCLL, UBA and internet peering are not currently able to be aggregated. This is clearly not the most efficient option.

Ideally interconnect should occur at neutral peering locations, unless agreed otherwise through bilateral agreements.

From a payment perspective, the existing Telecom PSTN model is a mix of bill-and-keep for local calls, plus differentiated payment for different traffic categories. This existing model has evolved over many years, and is well understood. But that does not mean that we should embrace this (or any other) legacy model blindly. We need to ensure that the new models are not just mechanisms for shifting cost inappropriately and that a cost-causer pays model should prevail. Any change to the current regime should be shown to distribute costs more fairly and offer clear long term benefit to end users.

A.2. What do you believe are the appropriate retail and wholesale commercial models for the various NGN services?

The concept of interconnect does not really apply to the retail environment. Interconnect should be considered a wholesale concept, over which retail services may well be carried. Vodafone believes that the Commission should not concern itself with retail models for NGN services. These are matters for operators to develop and should only concern the Commission in situations where they might cause concern relating to anti-competitive behaviour.

A change of technology should not require a change in commercial interconnect models. Any changes to existing interconnect models need to seriously consider the complex inter-relationship between interconnect and retail offerings. Operators will always seek to maximise the opportunities within any interconnect regime. Vodafone believes that interconnect commercial arrangements should provide operators with reasonable cost recovery mechanisms, and any changes to the current regime should be shown to clearly promote competition for the long term benefit of end users.

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?

For the benefit of the end user, and to foster innovation, the focus on infrastructure based competition associated with network ownership should reduce, with more emphasis being placed onto services or “application-based” competition, including converged, integrated, personalised, location-based services offering greater flexibility to the end user. There are relatively few infrastructure providers, but the opportunity exists for many service providers large and small, with significant opportunities for competition and innovation.

Promoting standards-based protocols for interconnect application servers onto core network elements is key to making this happen. The benefits of evolving standards-based protocols will be particularly beneficial in the areas of SIP (Session Initiation Protocol) for open network interfaces as well as third party applications and SDKs (Software Development Kits). Standardised Presence across networks is also required. The development of these standards should be done through industry led and agreed processes.

Services and applications should be agnostic of any network and any device, across mobile and fixed. Tighter integration between the traditional Telco and the Internet/WEB 2.0 service providers should promote more innovative services. A mechanism (like a standards-based service control) should be able to integrate the synchronous/real-time services (traditional Telco) and asynchronous/non-real time (generally WEB 2.0 although this includes SMS and MMS) community to offer fully converged services, agnostic of any network or device.

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

Most potential limitations should be able to be overcome by the industry working together, in particular through the TCF IP Interconnection Working Party. Potential problems could include lack of agreement on technical interface standards; on interconnect locations and the number of interconnection points. There could well also be limitations around lack of open access, or at least fair wholesale access, to key bottleneck infrastructure (i.e. infrastructure that cannot be economically replicated, particularly ducts and cables). It is also possible that the existing free

local calling regime could be a barrier to the introduction of new commercial interconnect models.

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

We would expect that most issues that are within the industry can be solved by the industry, in particular through the TCF IP Interconnection Working Party.

The existing operational separation of Telecom should ensure that access to the major bottleneck assets continues on fair terms.

However, there are areas that extend beyond the industry where policy support could well be of benefit. In particular the Resource Management Act, where it would be helpful to have greater national consistency, with more reasonable standardised arrangements to allow infrastructure build.

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

Perhaps the biggest barrier to entry is uncertainty in the regulatory regime, which can equally limit investment from existing operators.

Restricted access to defined bottleneck infrastructure is also a real barrier to entry. Today this is largely the copper access network, but increasingly this is becoming fibre access and backhaul. Any fibre that is deployed with Government or public funding must be open access, and other defined bottleneck infrastructure should be accessible on fair wholesale terms. The current regime should be able to deal with new bottlenecks as they occur. In order to ensure certainty for investors and therefore promote investment, rigorous analysis and consultation are required to identify such bottlenecks.

Funding of open access fibre networks may well be an issue if there is no sustainable return on investment from either service providers or end users.

Unreasonable interconnect requirements, such as Telecom's multiple interconnect models and 29 NAPOIs, can also create barriers to entry, by causing additional cost and inefficiency.

B. Architecture

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

- Perhaps the most significant technical issue is the ongoing interoperability of CPE. Many types of existing CPE may not make the transition to an IP or NGN environment.
- There is a need to standardise SIP protocol for interconnect, VoIP, and multimedia services handling. This also applies for corporate IP PBXs.
- There is a need to use open interfaces for third party applications and SDKs, from clients on the devices and onto the application servers.
- There is a need to standardise Presence across networks, both domestic and international.
- There is a need to have an end-to-end IP QoS view across different networks and internationally.
- We should target high reliability on both hardware and software architecture, although there is a place for cheaper services offering lower availability, as long as this is clearly communicated to the customer.
- Innovative IP services should be able to interoperate with the legacy SS7/circuit switched services (like voice). Interoperability issues when the type of service being used varies during a session, should also be considered.
- Support of legacy services such as low speed data (dialup) is a major technical issue. Service providers should consider moving users off low speed data to ease migration to NGN (e.g. Sky, St Johns medic aid, home alarms).
- There is a need to rationalise Naming, Numbering, Addressing schemes and Identity Management in the context of multi-media service offering across the Telco and WEB community.
- Consideration will need to be given to IP security, Lawful Intercept, and SIP traffic over the public Internet.
- Consideration will also need to be given to Roaming IPX (Internetwork Packet Exchange) or GRX (GPRS Roaming Exchange) requirements, in order to

ensure seamless service when roaming as well as sending billing information to the home network.

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?

There are several regulatory issues to be resolved that impact on Vodafone's commercial objectives for the coming years.

The high cost of international connectivity, as a result of reliance on the Southern Cross cable capacity is a key issue. Data-caps that are low by international standards are an outcome of this situation and will always be necessary while this issue remains. It may be appropriate for the Government to assist in the area of international cable capacity.

Secondly the high cost of managed-service type national backhaul has a very real impact on the cost and nature of services provided. The availability of open access fibre or wholesale access to dark fibre on fair standard terms, or shared infrastructure builds will all help in this area.

This issue is compounded by the current requirement for expensive legacy interconnection technologies, such as ATM or E1s. Migration to Ethernet over fibre will help in this area.

Access to the copper local access network is not the issue it used to be, although the problems of cabinetisation will need to be dealt with via an effective sub-loop unbundling regime. Similarly, as FTTH or equivalent becomes more widespread, this will require open access or fair unbundled wholesale access.

Interconnection must be available on fair and reasonable terms, which includes dealing with the issue of the number of interconnect models, locations and technologies.

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

The current TCF IP Interconnection Working Party should be able to deal with any technical issues. It is always preferable for the industry to solve technical issues itself, and in New Zealand the industry has done well in its inclusion of user

representation (TUANZ, InternetNZ, Consumers Institute and others), to ensure that agreed solutions work for end users as well as service providers.

Vodafone is confident that the TCF is best placed to resolve issues of concern in the overwhelming majority of cases. Should TCF processes be unsatisfactory for meeting Vodafone's objectives, Vodafone will raise issues with the Commission as required.

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

Such issues have already been covered in our response to A.1. and B.1.

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

Issues will emerge where there is a requirement to interconnect infrastructure provided by different entities. Any Government or public investment in fibre access networks must consider how backhaul is to be provided, so that service providers are able to make effective use of open access fibre.

Care will be needed in dealing effectively with Telecom's cabinetisation program. While shortening the copper local loop is a step closer to FTTH and clearly benefits end users by improving DSL line speeds, it also has the potential to preclude effective competition. Sub-loop unbundling has the potential to open up this portion of the market to competition again, provided the cost of doing so is in line with that of exchange unbundling. The key issue here is the cost effective provision of sub-loop fibre backhaul.

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

Interconnection at an application level is likely to be very costly and complex. Basic interconnection at a transport layer is likely to be a more realistic approach, with a number of specific services carried between operators.

Issues will be minimised where the services are easily adapted to the NGN environment. However some services (such as fax) will require special adaptation; while still others may not be readily adapted at all and it may not be worth the effort

of doing so.

Some parties will claim that vertical integration will create barriers, but this can be managed through appropriate interconnection standards.

It will be important that each contributor in this environment, from infrastructure provider through to service, content and application provider, is able to collect an appropriate share of the total revenue.

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

This should be within the scope of the TCF IP Interconnection Working Party, which should be responsible for developing a common industry standard, preferably based on appropriate global standards. It will be important to retain the flexibility to offer both highly managed services with tight service level guarantees at the same time as budget best efforts services.

It will also be important to standardise terminology so that end users understand what they are purchasing.

Enhanced UBA is an example of the regulatory process not delivering what end users or service providers really want. Enhanced UBA only exists because Basic UBA is of such low quality, but the price differential between the two is not justifiable.

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

Vodafone supports the development of open access fibre networks, but there are many potential issues to be worked through. Perhaps the biggest is connectivity from any future open access fibre network back into the core, if there is inadequate planning into the provision of open access backhaul. Currently only Telecom has such a nationwide fibre backhaul network. While “open access” is not appropriate for existing privately owned backhaul, open access, or fair wholesale unbundled access to dark fibre backhaul is necessary to make use of last mile open access fibre networks.

There are no technical issues integrating fibre technology into the network for

backhaul between NGN infrastructure nodes, although some last mile technologies (such as GPON) exclude infrastructure based competition by requiring the fibre to be connected to a single carrier.

C. Transition

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?

IPv4 address space for internet based services is likely to be exhausted in 2009. Vodafone has active plans in both the fixed and mobile businesses to introduce IPv6. Vodafone does not see any need for an IPv6 timeline to be mandated, as such timelines are likely to be driven by commercial dictates.

Foreign jurisdictions have shown that government procurement policies can influence the adoption of technologies such as IPv6. Vodafone believes that the Government should lead the way by introducing IPv6 capability requirements to its own telecommunications procurement regime to encourage the introduction of IPv6 in the industry.

The Government also has a role to play in the education of application providers and end users, as well as encouraging the upgrading of CPE to IPv6. The biggest issue with the introduction of IPv6 is likely to be the replacement of legacy IPv4 CPE.

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?

It is generally recognised that New Zealand's numbering regime is a national resource which should be administered in the interests of end users, although there is currently some debate as to whether the current industry process is doing this well enough.

The existing arrangement with both geographic and non-geographic number ranges continues to make sense, although some of the benefits of this, including the ability to determine the physical location of either party, and pre-determine call charges, has been eroded over time.

Service providers and end users should continue to have the choice of numbering type, although other technology solutions may be required to assist the process of pre-determining call charges and caller/called party location.

Numbering rules should be technology agnostic, although it would be good to retain some capability for numbers to pre-determine call charges. Any introduction of a new numbering scheme for nomadic services would need to offer a clear benefit in this respect.

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

If regulation is likely to lead to stranded assets then that regulation should also provide a solution or else it may become a disincentive to further investment.

Where an operator of bottleneck infrastructure that has to provide regulated access to that infrastructure, devises a means to strand the assets of an access seeker, then the regulatory process should provide a solution to that situation also.

A current example of this is cabinetisation, which can lead to stranded assets in an access seeker's network, unless dealt with through effective sub-loop unbundling regulation, combined with alternatives such as dual feed.

Of course stranded assets can also occur for other quite separate reasons during the evolution of the NGN. Stranded assets could occur in three main areas; core service platforms, access infrastructure and especially CPE, where a number of technologies are likely to become redundant such as modems, fax machines, security alarms etc. CPE is commonly owned by the end user, who will not appreciate having to fund any necessary upgrade. This will be an ongoing challenge for service providers to manage.

In the access infrastructure area, increasing technology demands over time may mean that assets become stranded, e.g. the current pressure to move from copper to fibre. The best approach here is to ensure that assets are used to best advantage before being discarded. This means progressively upgrading the transport technology, e.g. from ADSL1 to ADSL2+ to VDSL2 while also shortening the copper local loop where necessary, before eventually abandoning the copper completely with FTTH.

NGN infrastructure assets are expected to be able to deliver more revenue generating services at a lower cost. This will tend to drive a natural evolution of telecommunications networks towards this IP based NGN infrastructure. Competitive pressures to retire non-NGN service platforms early are likely to result in stranded assets.

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

These issues have formed part of the TCF's consideration in its Emergency Services Working Party. The Working Party is expected to produce its final report before year end.

D. Environment

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

The issues around access to physical infrastructure do not change with the evolution of the NGN. There is limited access to such infrastructure today and infrastructure access that has been provided through recent regulation has been at the physical cable level or further up the hierarchy.

Cost effective access to infrastructure is critical to promote competition and the current environment of unbundled access to the copper local loop should be continued as the local loop infrastructure becomes increasingly fibre based.

Infrastructure sharing is an efficient and effective way to encourage ongoing investment.

The Resource Management Act should allow for automatic upgrading of similar infrastructure (e.g. copper to fibre) on the same right of way without requiring a new consent.

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?

Shared transmission or electronic infrastructure should be by commercial agreement

rather than regulation. It may well make sense for second-tier operators to get together and share the likes of DSLAM infrastructure in street cabinets and multi-tenant buildings, and certainly services can be provided in such a manner by multiple providers. But this should be encouraged rather than mandated.

Shared infrastructure makes most sense at the physical duct or perhaps cable level.

Wholesaling infrastructure is sometimes a more viable alternative to sharing. Vodafone wholesaling its UCLL infrastructure to CallPlus is a recent example of this.

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?

There is a clear role for industry bodies, most appropriately the TCF, in the formation of technical standards in relation to IP interconnection and other NGN technical issues. This is already underway.

The scope of the TCF may require expansion to incorporate the proliferation and diversification of service, content and application providers likely to be brought about by the evolution of the NGN environment.

The role of the regulator is not changed by the move to an NGN environment. New or additional regulation should not be required, but rather a continuation and perhaps refinement of existing regulation that promotes effective competition, primarily through mandating unbundled access on fair standard terms to defined bottleneck infrastructure. The current regime should be able to deal with new bottlenecks as they occur.

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

The requirement for a ladder of investment to function is that an efficient market entrant is able to build sufficient market share and investment return on the first ladder rung to justify the investment to move onto the next ladder rung. The ladder of investment model should be an environment that ensures an operator has the incentive to move to the next rung where it is efficient for them to do so. It should not mean providing subsidies to encourage inefficient operators.

If the Government wishes to encourage competition it is important that the ladder of investment model continues to operate in the NGN environment. This means that access fibre infrastructure will need to be available on an open access basis or mandated unbundled access on fair standard terms basis. Similarly Telecom's increased FTTN or cabinetisation must be made available through suitably priced sub-loop unbundling.

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?

Vodafone sees two opportunities for release of spectrum that could play a significant role in the development of NGNs.

The first piece of spectrum is the 70-90 GHz band that can be used for high capacity short haul linking. While wireless cannot match the speeds provided by fibre networks the 70-90 GHz has the ability to provide Gigabit links in a cost effective manner. Considerable effort has been put into rolling out fibre. However, fibre is not likely to be cost effective to connect every street in New Zealand. Vodafone is of the view that this 70-90 GHz band is likely to complement the fibre network for providing very high capacity back haul network. High capacity backhaul links are vital for the deployment of high speed mobile broadband. The Ministry of Economic Development is currently considering industry views on this band. Vodafone encourages the MED to release this band for use in the next two years.

Increasingly mobile is playing a greater role in the provision of NGN services. While mobile is not able to match the speed provided by fixed infrastructure, it offers the benefit of mobility. Increasingly companies are mobilising their work force. A recent study by Ovum (Home Workers and the Enterprise, May 2008) found that the highly mobile and moderately mobile part of the work force in 11 countries varied between 21-43%. A study conducted by Stanford University and Hong Kong University of Science and Technology of Companies in America, Europe and Asia found a heavy reliance on mobile for email and internet connectivity. A number of these companies had over a billion dollar in revenue and over 10,000 staff. About 64% of the response gave a rating of very important or important for mobile email and internet connectivity. About 59% of the respondents used mobile email over 60% of the time and about 65% of the respondents use mobile internet over 60% of the time.

The second piece of spectrum is the UHF spectrum likely to be released from the so called “digital dividend.” This relatively low frequency band provides significant advantage for mobile network coverage of large sparsely populated areas. This band has the potential to provide large bandwidths (2x20 MHz) required by future wireless services which are capable of providing up to 100 Mbps. The Australian Communication and Media Authority (ACMA) in a recent discussion paper has stated its preliminary view that around 100-150 MHz could be released from digital dividend.¹ Similar amount of spectrum in New Zealand could provide a significant boost to providing high speed mobile/nomadic wireless capability which will play a significant role in delivering NGN services.

¹ Section 4.3 (page 23), Five-year Spectrum Outlook 2009-2014 Consultation on ACMA's draft spectrum demand analysis and indicative work programs for the next five years, April 2008