

Response to Questions Contained Within

Discussion Paper on Next Generation Networks

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Introduction

The following provides a response to the above referenced questions. The material which follows is a summary of the key points. I would be pleased to have the opportunity to expand on my responses at the appropriate occasion.

Question 1

What are your views on the approach to development of the market framework and industry consultation that should be considered in New Zealand?

My key points would be:

- Avoid regulations unless market failure is clearly identified
- Establish an industry consultation group
- The industry consultation should include a membership wider than just the service providers to ensure that end user requirements are properly considered.

Question 2

Do these core principles provide a useful underpinning for considering NGN issues, or whether they should be modified or supplemented?

Yes, the core principles do provide a useful underpinning.

Question 3

Are there additional elements that have to be taken into account when defining NGN? If so, what are the additional elements, why should they be taken into account and what impact do they have?

The following elements should be included in the mix:

- Interconnection, to ensure that the NGNs do not become isolated islands,
- Internet, to ensure that the Internet as we know it today is a complementary part of the NGN picture of the future,
- Customer Premises Equipment and LAN capability be considered to ensure that services can be delivered in a satisfactory manner from end-to-end which is required to ensure a satisfactory end user experience,
- Open application Inferences are provided, to ensure that the NGN environment is as rich as possible in terms of applications which can be supported and that all applications have equitable access to the networks.

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?

IMS is one form of standardised approach to manage IP based sessions. There are other ways to do this today such as Peer-to-peer. Each architecture has its strengths and weaknesses. For example, the IMS architecture when properly implemented can deliver service level guarantees. On the other hand, the P2P approach has some challenges to provide such guarantees. However, each approach has its place in the NGN environment in the future, so there should be no regulatory constraints on which approach must be used. There should be choice so that service providers can offer a variety of capability and the end users will make their choices depending on what outcomes they want. This though does require highly transparent information to be available in the marketplace – see my later comments on this subject.

Question 5

Where and how should the balance between coverage and speed be struck?

The wider the coverage of a given capability the better the experience will be for all users. However, this basic requirement will be moderated by the willingness of

parties to invest. The return on investment will be the final driver of coverage. If the return is not sufficient then coverage will not be provided.

On the other hand, if the Government wishes to achieve some social inclusion objectives, then it will need to be willing to pay for these objectives to be achieved. Obviously, the Government can also mandate coverage by various means such as through mechanisms similar to the TSO. Again these are all valid choices, but are going to be supplementary to the basic willingness of commercial entities to invest.

Question 6

Is industry consultation necessary on network design for NGN?

Industry consultation should not be required for the DESIGN of NGNs. The critical area requiring industry consultation is on the principles for pricing, interconnection, equitable access to the capabilities, non-discrimination, etc. In addition, in order for these principle based conversations to have a foundation in reality there will be a need to have industry consultation on architectural elements of the NGN. This is occurring in terms of the IP Interconnection today where there are requirements to define segments of the architecture to ensure end-to-end performance goals are achieved. However, detailed design should not be the prerogative of industry consultation.

Question 7

i) How does the deployment of NGN change bottlenecks characteristics?

The primary change for bottleneck characteristics is that they are no longer service specific. The NGN delivery model is to provide multiple services over a single access. This requires that the access seeker has good access to the base parameters of the access circuit. Any access should be as transparent as possible to the access seeker so that they can tailor the delivery to best meet the needs of their customers.

ii) Is access to the infrastructure still an issue? If not, what other elements could become important?

Access to the access infrastructure will always be an issue as it is largely a natural monopoly. Hence there will need to be continued diligence in terms of ensuring that basic access components are available for purchase on an open access basis. The move to FTTN means that the copper must then be offered on a sub-loop basis. However, in most parts of the network the economics of Sub-UCLL are terrible, including high barriers to entry. Hence there needs to be new open access services introduced to enable open access with lower barriers to entry. This suggests the need for open access layer 2 bit-stream services based on the Ofcom model of Active Line Access.

In addition, it is important that the NGNs don't create bottleneck access to applications and content. The applications and content should be available to all users, no matter whose NGN they are connected to. This requires the provision of a rich IP interconnection regime, including both technical and commercial features that enable a good end user experience. It also requires that applications and content can be connected to any NGN through open interfaces, with simple technical and commercial arrangements.

If all these conditions are met then the NGN world will deliver a rich and highly competitive environment for end users, where they have ample choice in terms of range and quality of content at prices that they can afford.

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?

The key parameters which define open access are:

- Non-discrimination in the delivery of services to anyone who wants to use them,
- Transparency in service characteristics in order to encourage upstream innovation

Open access for the future can include open ducts and tubes at layer 0, dark or grey fibre at Layer 1 and must include open bit-stream services at layer 2. These latter services must not be based on past practices such as those related to the regulated UBA and E-UBA products, which are highly constrained and hardly transparent to the upstream access seeker. This is a new type of service defined along the lines of the Ofcom Active Line Access service.

Question 9

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

This will not change just because we have a change in technology. Commercial funding will only be applied where there is an adequate return on any investment which must be made. The two key candidate areas for lack of commercial investment are:

- Rural services and broadband in particular,
- Anywhere where demand doesn't enable a return to be made on investment.

Question 10

i) What do you believe is needed to drive broadband penetration and speed in the future in New Zealand?

The prime drivers for broadband penetration are:

- Applications and content that New Zealanders are willing to pay for – either more than nothing or more than a dial-up connection.
- In the long term this will be driven by the natural human attribute of “impatience”.

Some steps which could be taken to change the current market conditions include:

- Caching of rich media content on shore in New Zealand and removing the “data caps” to enable access to this “local” content,
- Opening up the content market in New Zealand to increased competition and innovation,
- Encouraging customers to feel the value of broadband in their day-to-day lives and hence drive a willingness to pay for applications and content.

iii) Do you agree that cost savings are one of the core drivers for NGN deployment in New Zealand?

Yes, but only in a carefully defined context. The PSTN is a low cost platform for the support of high quality voice communication only. The NGN is a low cost platform for the support of multimedia services of all sorts, one of which might be high quality voice communications. If high quality voice communications was the only service that was supported over the NGN then it would be a very high cost platform for this purpose alone.

iv) How will competition enable innovation?

Competition and innovation are synonymous. Innovation is required to drive competition and competition is required to drive innovation. The critical issues with both market attributes is that there is a low barrier to entry to access customers and there is ability within input services to enable innovation. These requirements then drive the need for:

- Open access at various levels,
- Interconnection,
- Standards based open interfaces for application and content providers.

Question 11

Many are of the view that the pipes should be built first and services will then follow?

Others believe that a lack of services and demand for broadband services are an issue. What is your view?

This perspective is totally driven by who is doing the investment. If I am not the party putting up the investment, then of course the capability should be provided ahead of the market demand. However, if I am the one putting up the investment, then I will have a totally different perspective and I will want to ensure that the capability is put in place to match the demand as best as I can. If the Government is putting up the investment, then it may be possible to move more towards building capability ahead of demand if the social and economic policy objectives are clearly communicated and the tax payers are willing to support such an initiative.

Commercial entities must have confidence in the potential for return on investment within a reasonable time horizon in order to invest –thence demand must be demonstrable in order for them to invest. We have a global financial crisis based on people investing ahead of known customer demand and ability to pay. Look where this has got us!!!!

Question 12

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

Content ownership in the New Zealand market is definitely a hindrance to the development of broadband. Willingness of people to pay is almost entirely dependent on the perceived value of content and applications. While much high value content is tied up in long term contracts by entities such as Sky TV, there will always be a shortage of valued content for wider distribution. Furthermore, there is no issue with Sky retaining the rights for subscription distribution of content providing they also enable that same content to be distributed in many other more interactive formats, made possible using Broadband. It is essential that content be made available in many different formats and end users be given the choice in how they wish to access and view it.

Question 13

How is the nature of New Zealand's subscription TV market likely to impact the development and take up of NGN in New Zealand?

Subscription TV is only one of many formats for the distribution of rich media content today. Why should a very few entities dictate how the public of New Zealand access certain types of very popular content? Why should subscription TV be the only format offering a reliable service to access live sport? Why is live sport not able to be distributed over broadband with highly interactive features so that viewers can watch the game from any perspective in real-time?

Most rich media needs to be increasingly interactive and on demand in a multitude of forms, many of which we don't know about today. However in order to develop a rich media market there needs to be access to the content, especially live sport and movies. Currently these are tied up by a few players in the NZ market and these

players have not been willing to enable content to be distributed in a more interactive manner to date.

Question 14

Is the service scenario approach seen as a useful one for the purpose of studying the New Zealand NGN market, and if so what would be the elements of practical and relevant scenarios?

NO. What about telephony, multi-media collaboration and a massive range of business applications. These are not even mentioned in the service scenarios depicted. The view provided is highly consumer centric and is by no means complete, even based on today's know range of services, let alone those that we don't know about today.

The service scenario model need to be highly generalised so that it is encompassing of all known services today and also enables future services to be included.

Question 15

What other implications for the value chain of traditional operators and suppliers can be expected when moving towards an all –IP environment?

The following are some of the implications that need to be considered:

- Application and content providers need to recognise that their applications drive demand for network capacity and hence drive cost,
- Someone must pay for this capacity driven by some means –directly or indirectly or invest will dry up and everyone will suffer,
- There needs to be a test against the principles –how is investment to be future proofed?
- Investors in network infrastructure must receive adequate return on their investment to ensure that investment is sustained,
- In the end the user pays principle will need to apply in some way.

Question 16

What other effects on the competitive environment could be expected when rolling out next generation networks?

This is an enormously complicated question. Time only permits a few observations at this time. There will be many business models for NGN deployments. In order to ensure a competitive market in such a small market as New Zealand, there will certainly need to be Government intervention. Some of these interventions will include issues around:

- IP Interconnection,
- Open Access,

- Network security issue,
- User privacy issues,
- Copyright issues and their flow-on into storage of content, including caching.

Question 17

How do these effects influence the roll out of the next generation networks and innovative services?

Many have the potential to constrain investment, and/or deter innovation. Without investment, the NGN is nothing. Without innovation there will be reduced demand and poor competition. Others will increase costs of delivery for some services, applications and content. For example it is simpler to engineer an NGN with no security than it is one with security mechanisms included. However, some minimum level of security is required by all customers and for some high levels of security are required and there is a willingness to pay for them. Another area of concern would be the potential impact on the performance of critical business services and emergency services.

There needs to be choice. Customers should certainly be able to purchase cheap and cheerful no frills services, at a price which they can afford. Equally other customers should be able to purchase services with defined characteristics and associated guarantees and again pay a suitable price for these guarantees. Both should be available and customers can make their choice. The critical issue is the information associated with any service to inform customers exactly what they are purchasing. Customers must not be able to purchase a cheap service and expect that it will perform the same as a much more expensive service. There must be clear guidance provided as to what to expect and what not to expect.

Question 18

To what extent is symmetric speed or capacity necessary to provide future services to customers?

Again this is largely a customer choice issue – let the market decide. If asymmetric services can be provided at much lower cost than symmetric services, then customers should be able to decide what they want to purchase.

Having said the above, it is likely that customers will need more symmetric services going forward, but perfect symmetry is NOT essential. A 4:1 asymmetry is entirely acceptable for many applications. Need for symmetry is driven by particular customer needs and is not universal by any means. There should be choice in the market so that customers can balance their need for symmetry against price.

Question 19

What are the most important and significant drivers of bandwidth demand?

In the long term the most significant driver of bandwidth demand will be the human attribute of impatience. The human impatience can be illustrated through a simple example. There was a time when people were willing to visit their local music store in order to purchase their music requirements. Then along came access to music over the Internet, using a dial-up connection. People downloaded the music over the dial-up connection which typically took 10 times as long as it takes to play the same music in real-time (assuming high quality digital music downloads). However, this was still much quicker than going down to the local music shop and the price was attractive.

Then along came broadband Internet access which offered the opportunity to download high quality music in real-time and people took the opportunity to do so. However, being connected to the wired broadband Internet was not always a convenient way to listen to music. Hence the revolution in the availability of portable music devices, such as the Apple iPod. Using these devices, the music could be downloaded over the Internet onto the portable device and played back at convenient times and locations to the individual. Initially people were willing to download the music they wanted access to on their portable device over night or several nights in large volume. However, this soon became inconvenient as people wanted to download new tracks as soon as they became available and so high speed download was required. Hence today music can be downloaded at 10 or more times the real-time speed, simply in order to satisfy the human attribute of impatience. Who could predict that people would want to download music at many times faster than real-time and be willing to pay for this feature?

This example relates to a particular media. One can imagine that human impatience and ingenuity will drive the analogous requirement for video based content. People will want to download full length videos over the Internet at speeds of 1000 times real-time, in order to load up their portable video player with the latest movie release before hopping on the train to go to work in the morning. This is but one of many possible examples of how the human impatience concept could come into play as a driver for the need for ever increasing broadband capability. Furthermore, most of the requirements that we will see in 10 years time have not even been identified today.

However, this human need is not recognized today by most of the New Zealand population. This means that there is no value proposition around this attribute for most New Zealander's today. They do not realize that one day they will be willing to pay to satisfy their impatience, but that day will come for most of us. When it will come is the big question? Most likely it will be recognized by people over time, evolving over several years. A few people will recognize it now, and these people will be the early adopters – willing to pay a premium to have fibre optic based broadband at the earliest opportunity. However, these people will certainly be in the small minority of New Zealanders today. We would though expect the proportion of

such people to grow over time, the speed of growth being unknown today. The evolution of portable music players has evolved over a 20 year period of time, starting with the portable cassette player of the early 1980s. The big step in music downloads over the Internet onto these portable devices came with the introduction of the Apple iPod in the late 1990s. The iPod brought the download of music into the realm of the mass market, due to the low cost and ease of use. Even so it has taken another 5 or more years for portable music devices modelled on the iPod to have almost universal take-up in peoples' pockets and bags. Hence even for this technology example, the time to achieve mass market penetration of a consumer market occurs over decades, not just a few years.

Hence, over the longer term 10-20 years, New Zealanders will be willing to pay for more and more capable broadband services in order to satisfy their impatience. This will drive the migration away from constrained broadband technologies onto less constrained technologies over time. However, the timeframe for this migration for the mass market is highly likely to take some decades, even if some early adopters of technology are willing to pay for this capability today.

The result of human impatience is the need to upload and download rich media content in larger and larger quantities in shorter and shorter periods of time. In order to deliver this outcome ever increasing bandwidth will be required over time.

Question 20

Is a differentiation of classes of services an appropriate approach for solving QoS degradation for end-to-end services?

Static QoS based on Class of Service is a valuable first step. This should be implemented in NGN architectures and be available for use by any application, for any customer. However, whether the application provider or customer takes up this option is a choice which should be available. In the near term providing the choice in a convenient, personalised manner is not simple. Over time this feature will be implemented through dynamic QoS and this should be the real goal.

Question 21

What issues and effects could possibly arise due to a differentiation of service classes?

A direct consequence of differentiated class of service is differentiated price of service. All services will not be delivered equally – there will be different Service Level Agreements (SLAs) offered for the same service, each of which will attract a different price in the market, related to the end user willingness to pay for the SLA based guarantees. Hence if you pay more you get more. This type of differentiation can clash with the Net Neutrality ideals. However, so long as anyone can pay to get improved QoS and hence improved SLAs, then there will be no discrimination and so Net Neutrality shouldn't be an issue.

Question 22

Will the approaches to pricing change for NGN, particularly where different classes of service are offered?

As indicated above this is a definite outcome. Differentiated pricing will occur in many forms:

- If customers only want “best efforts” service than they should be able to get this and pay a suitable price for it.
- If on the other hand they want service level guarantees then they should also be able to get those in various forms and pay appropriately for them.

Question 23

Beyond the costs for NGN core, access, CPE and drop lead, are there additional costing elements to be taken into account? If so, what is their likely impact?

There are many costs which are not considered in this list. These include:

- The cost of support systems,
- The cost of customer acquisition and life cycle support,
- The cost of network maintenance and fault resolution,
- The cost of service selection,
- The cost of service provider transition,
- The cost of Interconnection,
- The cost of application and content support,
- And many, many more total cost of ownership cost components.

Question 24

Do you agree that in an NGN environment, higher proportion of cost of the network is shared in common cost? What in your view is the best method for allocating costs. Should it be based on volume, minutes or new drivers such as capacity?

Yes, it is true that a higher proportion of costs are common. Why is there a requirement to allocate common costs and if so why do we need a single approach?

If such a need is proven, then it must be based on volume and contention for bandwidth primarily, with a lesser component of distance, as these are the primary cost drivers. Although reliance on distance is reducing, there is still an order of magnitude difference in cost between access, regional aggregation, national transport and international transport. Similarly, if an application requires high capacity and low contention to function properly, then the costs will be higher than one that requires low capacity and high contention. Hence this is a reasonable allocation mechanism using these three parameters.

Question 25

What is your view on the benefits and constraints of PON (passive Optical Network) and P2P (Point to Point)?

Both are useful in different situations. The choice should be left to the service provider. A 15% increase in cost to deploy P2P may break a business case relative to PON. Alternatively, the customer may demand P2P capability. Hence it is important that flexibility be provided in the passive infrastructure so that a choice can be made. This decision should not be pre-determined.

Question 26

Do you agree with the generic definition of the terms interconnection and access? If not, what would be the alternative definitions?

I largely support the definitions provided. However, I think it is very important to retain a distinction between access interconnection and network interconnection as many of the conditions are different, especially in a horizontally dis-aggregated market for service providers. Both the technical and commercial terms can be quite different in these two situations.

In some ways there is also a third category which is application interconnection. However, I think this can be considered in a similar manner to network interconnection but does require further consideration.

Question 27

Do you agree with the pricing concepts outlined for NGN? What other pricing mechanisms could be applied?

The pricing concepts considered probably cover the range, subject to more detailed definition. I am of the belief that at a retail level, any of the outlined pricing mechanisms could apply in the market under various conditions. Hence choice should be enabled to the greatest extent possible.

Bill and Keep based pricing has many positive attributes when applied correctly and so should definitely be one of the options, but not the only one.

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?

The basic requirement for interconnection is to ensure that a customer connected to one network can communicate in any way desired with a customer or application attached to another network, assuming willingness to pay for the privilege. Hence all the features required to ensure that this can happen must be put in place. For voice

services this means the equivalent of PTC331 based on SIP. For other services there will be other requirements. The list of parameters and features indicated and more are all important, including:

- Network security,
- User identification,
- Authorisation,
- Accounting,
- Interoperability,
- Service Level Agreements,
- Etc.

Question 29

What are the implications for these issues in New Zealand? Are there specific regulatory issues anticipated?

All of the issues listed are important. They will all require some regulatory intervention, but hopefully industry collaboration will minimise this need. In the end it is the need to satisfy customer's expectations that will define what is absolutely required. Where any issue stops the delivery of good service to customers, then there will need to be intervention to rectify this situation. Hopefully this type of issue will only occur rarely.

Question 30

What additional factors need to be taken into account and what is their effect?

One of the most important factors that has not been highlighted in the discussion document is keeping customers informed and educated to be discriminating purchasers of NGN services. Customers must understand what they are purchasing for a given price. Equally as important, customers need to know and understand what they are not purchasing.

A cheap best efforts VoIP service might meet a customer's needs, but may not support an emergency service. The fact that it doesn't support emergency services is not important. What is important is that the customer knows that this is so. The customer hopefully had the choice to purchase a VoIP service that did support emergency services and one that didn't and he or she made a conscious choice to purchase the one that doesn't.

An emergency service in this context is but one example of a service attribute that the customer needs to understand in making a purchasing choice. There will be many others. The trade-offs need to be clearly communicated to customers so that they can always make informed decisions. This will be a critical factor in customer satisfaction with the move to NGN based services.

