

TELSTRACLEAR

Telecom NZ Next Generation Network

Regulatory Issues raised by NGN Deployment

TELECOM NEW ZEALAND NEXT GENERATION NETWORK

Introduction

Next Generation Networks (**NGN**) are being deployed on a global basis using equipment from all major vendors. Telecom New Zealand (**TCNZ**) has announced that it will use Alcatel equipment for its NGN and Murray Milner, CTO of TCNZ, has co-authored a paper on the pragmatic evolution to NGN in New Zealand.¹

There is no limitation, from a technical perspective, on the number of NGN in any country. As ever, the incumbent operator is in an advantageous position in determining the standards that will be used in NGN.

This was recognised in Australia where the ACCC commissioned a report from the Royal Melbourne Institute of Technology on the issues of interconnection of NGN. The ACCC subsequently held a conference on the subject and then passed responsibility for resolving interconnection issues to the operators themselves under the auspices of the industry body, the Australian Communications Industry Forum.

Layer Based Interconnection

In the previously cited Milner paper, the authors argue that there is a distinction between current, circuit based networks and NGN. This distinction appears at layers above the physical and network layers (layers 1 and 2 of the OSI model) and allows the intelligence associated with NGN to be held in the edge devices. That is, the paper sees the power of NGN residing at layers 5, 6 and 7 rather than at the layers associated with copper or fibre.

This is set out in figure 1 below.

¹ Telecom New Zealand: Pragmatic Evolution to Next Generation Networks, Milner and Pizzica, Alcatel, April 2003

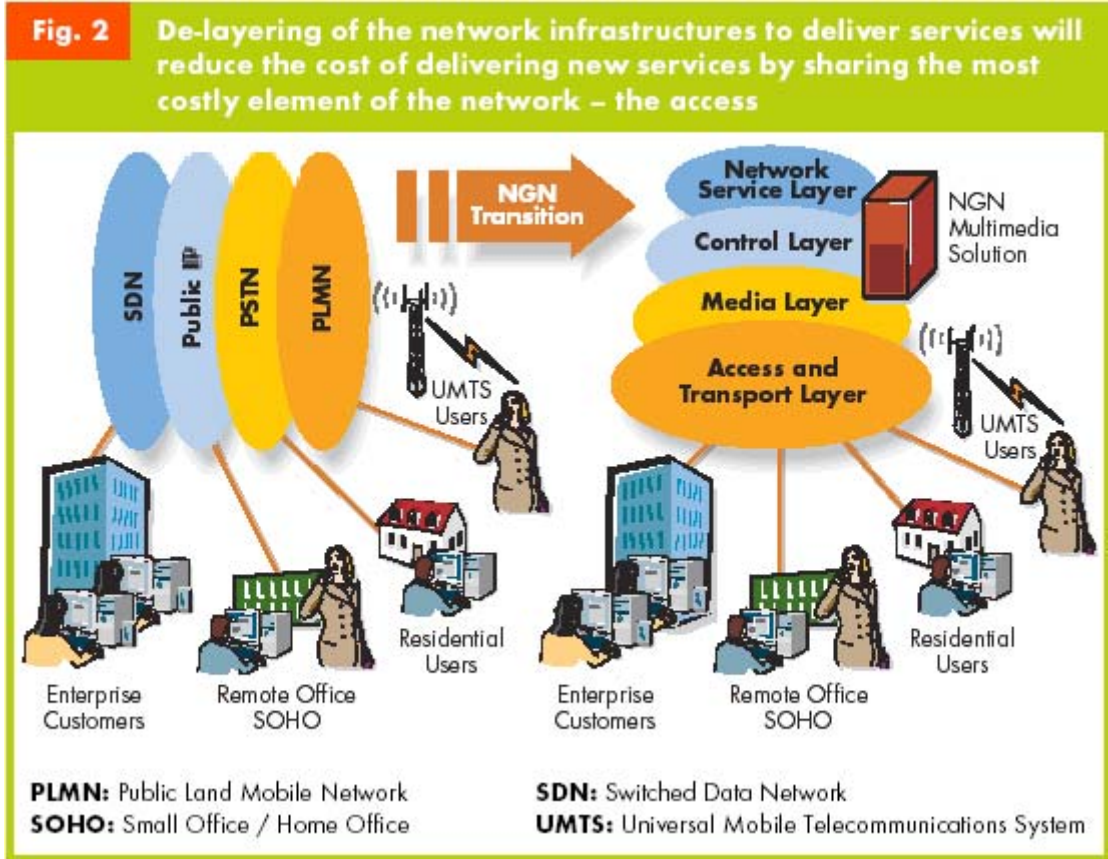


Figure 1 - TCNZ view of layers

TelstraClear has argued that it only needs access to layers 1 and 2 (with access to layer 3 information for tunnelling) in order to provide competitive services to TCNZ. That is, TelstraClear needs to be able to acquire a bitstream service from TCNZ, rather than a managed IP service.

Proprietary Systems

The NGN solutions proposed by vendors, including Alcatel, use internationally agreed standards as the basis for delivery of layers 1, 2 and 3. In general, there is substantial scope for unbundling as the vendors have been aware of the regulatory requirements imposed in both Europe and the USA. The use of standardised DSL solutions could be extended from any exchange building via active pillars through to customer premises equipment (CPE).

If standardised equipment is used throughout the network, a high degree of unbundling at any layer is available. That is, the implementation of L2TP is technically feasible.

However, TCNZ has the choice of the technology for the link between the active pillar and the CPE, or from exchange building to CPE where the distance permits. This technology choice may be G.shdsl, which is a symmetric high speed (2 Mbit/s) service

which has the disadvantage that the copper pair cannot simultaneously carry analogue voice and gHDSL².

This limitation on the symmetric delivery system leads to the need for an Integrated Access Device (IAD). Other technology directions (for example, the move to maximise the use of voice over Internet Protocol) may also demand the use of an IAD. The IAD multiplexes voice traffic with data traffic. It is the requirement for an IAD that changes the analysis of the access network in New Zealand to one similar to the line sharing analysis performed elsewhere in the world. It is likely that, if TCNZ is to maintain its voice network, TCNZ will have to manage the multiplexing process. That is, the access network of all NGN will be managed by TCNZ and rival operators will manage their own core networks.

Bitstream

The proprietary nature of TCNZ's NGN solution does not prevent TCNZ from providing a wholesale bitstream service. It clearly does not prevent local loop unbundling. From a technical perspective, an appropriate tunnelling protocol will not interfere with the provision of voice service by TCNZ nor will it restrict the delivery of services by TelstraClear.

Indeed, Milner argues that this is the architecture of the TCNZ solution:

Within an NGN, services are delivered to users over IP based Virtual Private Networks (IP-VPN). In the architecture used by Telecom New Zealand, there are essentially three types of IP-VPN:

- *Shared IP-VPNs, typically used by small single site users, including residential subscribers within a free local calling area.*
- *Customer private office IP-VPNs, typically used by larger multi-site businesses.*
- *Service-specific IP-VPNs, used to deliver network-centric services, such as the Plain Old Telephone Service (POTS).*

TCNZ is likely to argue that a managed IP service has some efficiency benefits compared with a wholesale bitstream service. There is merit in this argument. However, the stimulation to competition provided by an obligation to deliver wholesale bitstream services outweighs the marginal efficiency arguments that can be put.

² Get Ready for Symmetric DSL (G.shdsl)

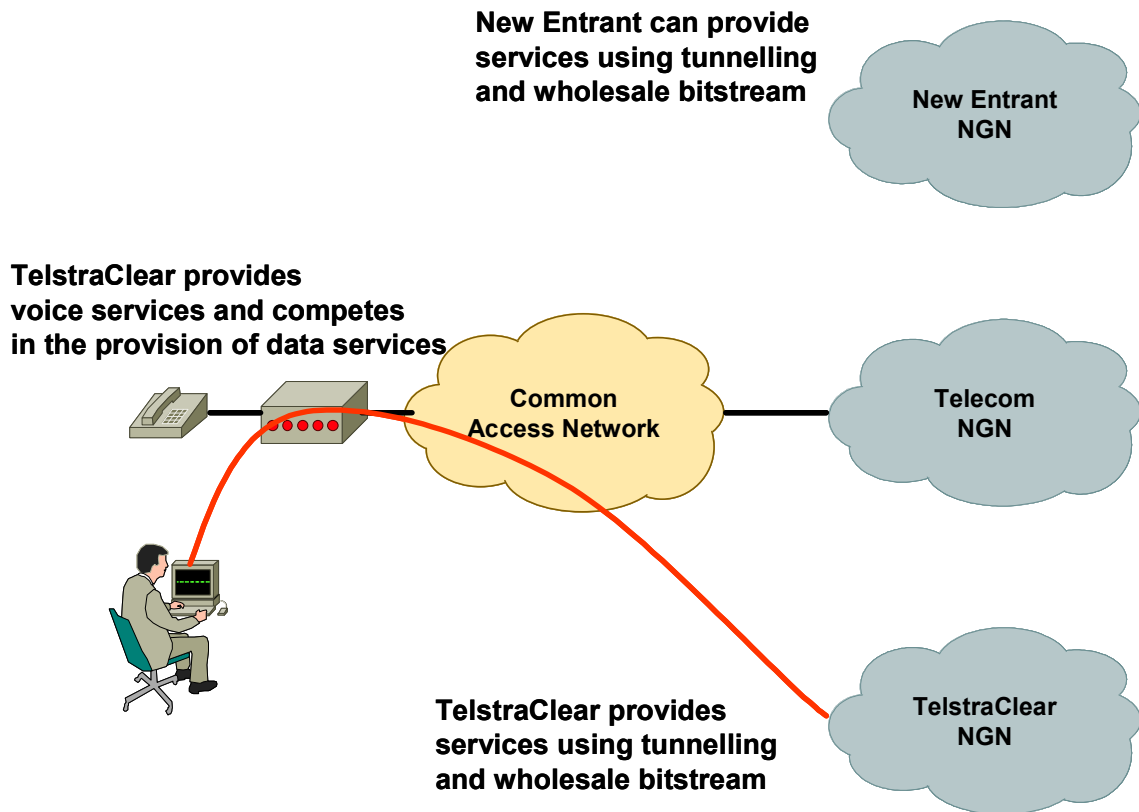


Figure 2 – Bitstream solution

REGULATORY ISSUES RAISED BY NGN DEPLOYMENT

In its Response to the Commission’s Draft Report, and its submissions at the LLU/uPDN Conference, TCNZ has quoted extensively from the report commissioned by the European Commission on NGN regulation (the ‘Siticom Report’), in support of its proposition that possible regulation of its NGN functionalities will deter investment in packetised technologies³. It should be noted at the outset that that report does not express the views of the Commission, and that its stated purpose was to ‘*raise the awareness of regulators to NGN developments and to stimulate debate and discussion on policy issues ...*’ (at page 115).

Given that TCNZ has quoted selectively from it, TelstraClear notes that the Siticom Report also discusses the following issues.

³ ‘Regulatory implications of the introduction of next generation networks and other new developments in electronic communications’, Devoteam Siticom, 16 May 2003

- **NGNs can enhance opportunities for access seekers**

TCNZ implies that it would be more difficult to provide third party access to NGN than legacy networks. However, given that NGNs are deployed in functional 'layers', they can be more readily disaggregated. The Siticom report notes that '*NGN's are implemented in such a way that the functions performed by the network are separated into functional planes. The functional planes include access, transport, control & intelligence, and service. Layers are independent in the sense that they can be modified or upgraded regardless of other functional layers The functional planes are separated by open interfaces in order to facilitate the interconnection to other operators' networks but also the integration of third parties' services and applications.*'(page 5)

As noted by TelstraClear's CEO, Rosemary Howard, in her presentation to the Commission on 12 November 2003, access seekers are unlikely to seek access to the core functions of TCNZ's NGN. Provision of access to legacy copper loops will enable access seekers to use them to provide advanced, packet-based functions over their own IP core networks. However, as noted by the Siticom Report, NGN deployment will raise the possibility of innovative types of access:

'... an NGN environment offers opportunities for third party service providers. In traditional telco networks such as PSTN and GSM networks, the services accessible by the end users are limited by what has been implemented by the operators on their networks Users can 'control' these services but only within the scope of what has actually been allowed by the operator. In an NGN environment based on IP and the tools and technologies described above, third parties can have a greater importance and the end users will also have more choice with regards to services and environment personalisation – provided that there are not exclusionary practices and that NGN are open to third party service providers.' (page 30)

- **NGN deployment will involve a long period of co-existence with legacy networks**

The Siticom Report anticipates a period of at least ten years of coexistence between circuit based and packet based technologies, as NGN is deployed (see page 10). This confirms the importance of regulating existing access bottlenecks now rather than deferring the unbundling decision as suggested by Telecom.

TCNZ has confirmed that its approach to network deployment is not to be at the 'bleeding edge', but to deploy new technologies only once they have been proven (Dr Milner's (first) presentation to the Commission at its LLU/uPDN Conference, 10 November 2003). In an investor briefing in March 2003, TCNZ confirmed that its replacement of NEC switches, by which voice traffic will be shifted onto packetised technology, is planned to occur on a 'gradual' basis and take approximately ten years ('Briefing for Investors, Rhoda Holmes, Network Investment, 19 March 2003). In such circumstances, the circuit/packet-based technological co-existence anticipated by the Siticom Report would seem a likely outcome for NZ in the medium term.

Further, the Siticom Report notes the views of some operators that migration to IP networks could be delayed because access costs per line of circuit-switched equipment are less than that of IP, while still providing greater clarity.

- **NGNs may perpetuate, not remove, economic bottlenecks existing in circuit-based networks**

The Siticom Report anticipates regulatory intervention during the transition period in respect of residual market power and bottlenecks carried over from circuit-based systems (see page 98). It notes that '*Some of the traditional regulatory requirements may become less relevant with NGN, others will remain but change character.*' (page 100).

It identifies as a concern the ongoing market power of national incumbent operators with control of broadband access, given that they will retain the ability to control prices and quality of interconnection services, and suggests that this will require monitoring and possible regulatory action (- as identified by a 2002 study into the economics of IP networks. See page 88). It also identifies the example of customer control as a result of billing relationships, as a current regulatory issue which will remain relevant in an NGN environment (at page 96).

- **NGNs may create new bottlenecks**

The Siticom Report raises the likelihood that incumbent operators will, as they deploy NGN, be able to leverage their market power in the transmission layer into other aspects of service provision. (On 11 November, in response to Professor Hausman's modelling, the Commission noted the issue of whether TCNZ could leverage its position in the circuit-based environment, into the market for Pay-TV services which will emerge as NGN is deployed.)

The Report notes that:

- as a consequence of the communications market becoming inherently more integrated with '*information society services*' due to the structure of NGN networks, regulatory concerns will '*shift upwards to the higher levels of the network hierarchy*' (page 100), such as services and content provisioning. The report discusses the possibility of a regulated requirement for interoperability and open interfaces, to ensure third party access to the service layer through an '*open service creation interface*' (page 80);
- this leverage may occur by way of various mechanisms already deployed by incumbent operators in the circuit-switched markets in which they traditionally operate (such as price squeezes, bundling, and service discrimination – see page 82);
- operators with control of access networks may exercise control over termination capabilities (page 102).

- **NGNs may require regulation**

The Report anticipates that the dominance of NGN control points could lead to '*serious barriers to market entry*' which in the absence of ex ante regulation

could *'hamper development of the information society and the associated benefits'* (page 106).

The technology-neutral regulation of electronic communications networks required by the EC's revised telecommunications framework will encompass NGN networks, and the Report notes that 'wholesale broadband access' has been identified as a relevant market for consideration of significant market power (in Commission Recommendation C(2003)497, of 11/02/03 – see page 113).

- **Appropriate regulatory analysis for packet-based technology is 'service' rather than 'network' based**

The report's conclusions in terms of the appropriate analysis for future NGN deployment are consistent with TelstraClear's interpretation of the scope and meaning of the section 64(1)(b) reference to unbundling. Dr Milner's paper of 11 November 2003 ('Part III: Data Access', paragraph 125) affirms the following approach to regulatory analysis, set out at page 117 of the Devoteam report:

'As NGN develops, the wholesale markets for interconnection should be narrowly defined in terms of the services requiring interconnection, rather than broadly defined in terms of networks.'

This is a point repeatedly made in the report:

'When considering what type of regulatory principles to apply to a given interconnection task, it seems ... more logical to focus on the category of service to be interconnected, than on the origin of the network.' (page 101)

'It makes more sense to accept different types of network interconnection agreements for different market categories defined by their service characteristics rather than by network technology.' (page 112)

Such a service-based approach to regulatory intervention is consistent with TelstraClear's view that the appropriate basis for examining uPDN is the unbundling of PDN services, rather than the network asset-specific approach advocated by TCNZ in its Response.