BUSINESS STRATEGIES FOR THE NEXT-GENERATION NETWORK

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About the Author

After a period as a mathematics teacher and commercial programmer, Nigel Seel spent the 1980s in the UK lab of IT&T working on formal methods for software development, artificial intelligence and distributed computing. He also completed his Ph. D. in artificial intelligence and mathematical logic.

In the 1990s Nigel worked in Bell-Northern Research (Nortel's R&D organisation) and later Nortel itself as a carrier network architect, latterly being lead designer for Cable & Wireless's £400 million UK network rebuild in 1998/9. He then freelanced as an independent designer until 2001 when he was hired by Cable & Wireless Global as chief architect, and relocated to Vienna, Virginia. Subsequently he was appointed VP for portfolio development.

Following the collapse of C&W Global Nigel relocated back to the UK. After more freelance consultancy, he worked with the UK management consultancy Mentor from April 2004 through to January 2006. He is currently freelancing again through his company *Interweave Consulting*.

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Introduction

This is not the first attempt to build the Next-Generation Network (NGN). Back in the 1980s, when the carriers controlled innovation, they had come up with a wonderfully complex architecture for voice, data and video services, called the Broadband Integrated Services Digital Network (Broadband-ISDN). This architecture was layered upon a standard protocol called ATM - Asynchronous Transfer Mode - and those 53-byte cells were deceptively simple. All the real complexity was in the multiple adaptation layers, which allowed very different services to be successfully adapted to and to be carried by the relatively uncomplicated ATM transport layer, and in the signalling required to make, manage and tear-down connections.

As we all know, Broadband-ISDN took years in the preparation, as the standards bodies tried to design in every conceivable requirement before the standard could be finalised and equipment could be built. In the meantime, the Internet happened, using a good enough protocol which couldn't do one tenth of the things ATM was supposed to do. But the things it *could* do were what were needed back then, and it was extensible in service.

The current concept of the NGN is emphatically *not* the Internet. The NGN is in reality Broadband-ISDN mark 2, leveraging Internet technologies. So is it all going to end in tears again? Hard to say - the NGN specification roadmap is now in the hands of all the usual carrier standards bodies, the ITU-T, ETSI, ANSI etc, and stretches out past 2009. However, unlike with ATM, the new NGN is leveraging protocols and standards which have some real-world experience behind them, and it's tackling problems of multimedia service networking which we actually have. So it's got to be in with a chance.

Let's assume the new NGN is one of the right answers to the world's networking problems right now (many would disagree, but the premise of this book is that it is, near enough). A related question is whether carriers will be able to make the transition from their current networks, processes and systems to the next-generation network. It will neither be easy nor cheap, and some certainly won't make it. Let me put it like this. Carriers are typically large, complex organisations with poor customer relations and an unusual resistance to change. The next-generation network is a concept and architecture for a complete reconstruction of the way carriers work, based on Internet technologies. Putting the two together, it is obvious we are going to have a problem here.

It is worth reminding ourselves how the Internet came to happen in the first place. It was certainly not driven by the carriers (although it used their pre-existing transmission and switching networks). The Internet was driven by new-economy vendors like Cisco and a new class of communication companies, the ISPs. We even had a name for the new and old guard: net-heads vs. bell-heads: those who 'got it' and those who didn't.

Well, ten years later carriers have belatedly got it, or at least the technology part. The Internet is real and its technology base is here to stay. The old carrier dreams of ATM and Broadband-ISDN, which they clung to for so long, have finally evaporated. The task now is to re-tool with IP-based platforms. Will the carriers succeed in remaking themselves? Has the Internet merely been a historical transient, a brief period of glasnost before the re-imposition of centralised carrier control - business as usual?

When I worked as a carrier architect at Bell-Northern Research, a precursor to Nortel, it seemed to me that our carrier customers had it easy. Carriers had networks, customers and recurrent revenues. If they did nothing but keep their equipment running, they got paid. By contrast, in Nortel, if we didn't make new sales every day, we didn't get paid at all. We had to struggle for lunch. Many of the people who work at carriers, perhaps even most of them, are not directly involved in the day-to-day operations which keep the cash flowing in. They do things like network planning, product development, marketing and strategy. Yet at the heart of the carrier is a rigid, process-centric hierarchy: carriers have lots of customers, and serving them all needs a complex machine of processes, people and IT automation.

Changing this machine is difficult: much easier just to layer the new upon the old, a technique as old as history. When Troy was excavated in modern Turkey, it was found that the site was composed of nine cities layered one upon the other, dating from 3,000 BC to Roman times. Carriers have their historical layers too: ancient networks like Telex, asynchronous (PDH) transmission on coax or microwave, strange pre-digital voice switches (although most of these are now gone) and X.25 data switches. These are layered below the merely legacy such as circuit switches, frame relay switches and the more modern SDH transmission network. Finally we see the most modern layers such as wave-division multiplexing, IP/MPLS routers and SIP servers transmuting to IMS call session control function devices in the next-generation network. This forest of acronyms, by the way, is explained in chapter 2.

The forty or fifty years of network history embodied in the most venerable of our incumbent carriers is paralleled by a similar museum of IT automation: old computers, old programming languages and old paradigms of computer network architecture. The processes and manual work-arounds which made all

this operate end-to-end are still there, and it's just too expensive to modernise them, given that these are legacy products and platforms. It's just that these legacies have real customers with real revenues and the case for keeping them alive seems to win out year after year.

Given the sheer density of distinct roles, processes, automation systems and ad hoc interfaces which keep most carriers in business, the process of transformational change feels like *wading through treacle*.

- Initiatives spawned by senior management get bogged down in the middle management bureaucracy and peter out.
- Expensive programmes flow around the edges of the real problems and fail, wasting millions.
- Incremental programmes - adding something new - often do succeed, but leave the legacy heartland untouched, and operational costs continue to rise.

Yes, transforming carriers is hard work and attempts at transformation fail far more often than they succeed.

Paradoxically, vendors find change easier than carriers. Lacking recurrent revenue flows, the vendors are more exposed to the volatility of the market - a fact plainly seen after the collapse of the Internet bubble in 2001-2. Market forces smash though the organisation and it has no alternative to laying people off, closing some divisions and reorganising others. This brutal, creative destruction removes bureaucratisation, incompetence and now-redundant activities, and forces modernisation. But on the carrier side, even the bankrupt carriers were left operationally intact so they could maintain services to their customers. Clearly-superfluous staff *were* laid-off, but internal products, processes and automation were not much changed.

The first part of this book, *Technology*, starts with a review of the failure of the previous attempt by carriers to retool for the future - Broadband-ISDN. I then examine in detail Next-Generation Network as technologies and capabilities supporting multimedia interactive services, specifically IMS. The third chapter looks in detail at TV delivered over the Internet and Video-on-Demand, but I pay equal attention to business models and changes in the value chain. Finally in this section I take a look at carrier IT renovation programmes.

In the second part of the book, *Transformation*, we look at how carriers have attempted to remodel themselves as IP companies. Carriers are perennially trying to move their businesses away from being

'mere bit carriers', but we are entitled to ask whether it is always and everywhere such a bad thing to be a bit carrier, and what the alternatives really amount to. The alternatives open to a carrier depend on its position in the market place - is it a large generalist, a small niche player or stuck in the middle? I review some influential thinking about market structure and company strategies.

Business strategies for next-generation networks are about more than technology and marketing. I next examine how to choose the right people and the right roles for transformation projects. It seems obvious that the personal characteristics and skills needed to *drive change* are markedly different from the more operational and routinist aptitudes needed to run a well-oiled (or even badly-oiled) machine, but somehow this has been ignored in programme after failing programme. I finish this section with a 'worked example' of how to start-up a major change programme, and show how personal style can be as important as methodology.

In the third section of the book, *Business Issues*, I identify some more innovative business models. Service Providers such as Vonage and Skype have redefined what voice means for the portfolio, but what has been the carrier response? Proposing to block their traffic has had at least as much air time as more forward thinking business models. And public resources such as spectrum, which have hitherto been used 'for free' by carriers, are at last being monetised, through such mechanisms as public auctions. A good thing or a bad thing? I then look at Peer-to-Peer Networks, both how they work and the associated politics, economics and security issues. Finally in this section, I examine the prospects for the automation of natural language understanding and production. You may have had the experience of ‘talking’ with an automated call centre agent to book a flight or a hotel. Unless your transaction was extremely conventional and routine, you may have encountered problems which resisted all attempts to ‘back out’. Our next-generation networks are still primarily a mechanism for transporting conversation, yet the networks themselves do not understand what is being said. If this changes over the next few years, what will be the implications?

Finally, in part 4, we get down to *Business Strategies* in detail. My anchor concept here is that of value nets and market power. Business strategy is fundamentally economic, and is about securing market positions where premium returns can be achieved. In both consumer and business segments, carriers and the NGN are embedded within broader value nets including content providers and systems integrators. Who gets to win in this game? I look first at prospects for the incumbents, then at strategies for alternative, competitive network operators, and finally at the consumer market. I conclude that all is not doom and gloom, but that the back story is one of the relentless encroachment of commoditisation.

Will the next-generation network mark the re-imposition of central control from the carriers, damping down the spirit of freedom and creativity which flowered on the back of the unplanned and unanticipated Internet? I address this fundamental issue in the conclusion.

There is a website associated with this book, where additional information and links to relevant resources can be found. The address is http://ngn.interweave-consulting.com/.

Please note that names and dialogue details have been changed throughout, and that where roles are mentioned, "he" should be read as "he or she".