
Chapter 16: Conclusions

The story of the next-generation network is a history in three parts: the original carrier concept of Broadband-ISDN, the unlooked-for arrival of the Internet, and the current carrier project, the ITU-T standardised NGN.

Back in the 1980s the telecoms industry was dominated by large, regulated monopolistic carriers. Technologies were often proprietary, always complex and innovation was refracted through cumbersome national, regional and global standards bodies. Carriers knew that the technology of end-systems was rapidly evolving, with the invention of personal computers and LANs. They also knew that the future network would have to carry a combination of voice, video and data. The project to move the voice-centric carrier networks to this multimedia future was called Broadband ISDN and was years in the making.

The major feature of carrier standards-setting is that the standards will define the equipment, and the equipment will be expensive and will be in the network for decades. Therefore, the standards have to anticipate the services for the next 10-15 years. So they end up by being very complex. And it all takes a very long time.

The main products in service in the 1980s were transmission and the public switched telephone network. Transmission is all about getting bits sent from place to place reliably, and this had been achieved in the 1980s with the PDH 'asynchronous' digital transmission networks. Indeed these were on the point of being replaced by the more modern SONET/SDH networks. The PSTN was available in all offices and most households, and worked to a high degree of reliability.

It turned out that by simply adding two pieces of equipment, the existing PSTN and transmission networks across the world could be turned into a data network which anyone with a phone could access. The two pieces of equipment were the modem and the router. Thus was born the Internet as a mass phenomenon, and the Internet Service Provider as the company which could package Internet access to customers.

ISPs constituted a classic competitive market. Entry was easy and the service was not highly differentiated (access, email, web hosting). Many value-added services were available, as PCs and

servers, functioning as Internet end-systems, became more powerful: games, Internet shopping, information retrieval and so on.

In the early years, carriers viewed the Internet as a frivolous distraction. However, as the nineties progressed, most carriers developed an Internet arm which often achieved a dominant market presence. As the Internet became carrier-grade, with new carrier routers and broadband access at the turn of the millennium, it gradually became clear that the Broadband ISDN dream was dead. But the Internet was not a ready-to-hand replacement.

The problem with the Internet was that it grew organically and incrementally, without any strategy. This was no good to companies which needed to plan ahead and which had to manage enormous capital budgets. The Internet was *protocol*-centric, developing new protocols as need became apparent, ‘on-demand’. The carriers, however, were *architecture*-centric, developing platforms which would address both present and anticipated future needs, *especially* including billing, and which would need to be in service for an extended period.

It took a number of years for the Internet to catch up with carrier needs - specifically in the areas of multimedia signalling (SIP), security (IPsec, Diameter), and service differentiation (Diffserv). In the end, the carrier next-generation network architecture programme was actually applying a *forcing function* to the IETF to develop its protocol suite to the level the carriers needed.

Over the next years (to around 2012) most of the work will be completed, and the Internet will evolve to the architecture of figure 1. The next-generation network architecture shown in the figure retains the open, layered Internet architecture. There is no going back to the old days of closed, monolithic and proprietary architectures. The other feature of note is that the carriers do not have a monopoly of supply at any layer. Sure, you can access a carrier application (D) running on a carrier application-hosting platform (F) with carrier voice, video, email and instant-messaging services (H) running on a carrier network (K). Everything will be integrated and no doubt there will be just one bill.

But you could equally imagine accessing a user-generated content site such as eBay (A) or an independent application services provider (C), running on an independent hosting company’s platform (E), bundled with Skype (G) and running on a network infrastructure established by Google (J). At the price of paying several bills. And no doubt in the UK you will be watching Sky TV (B) over Sky’s

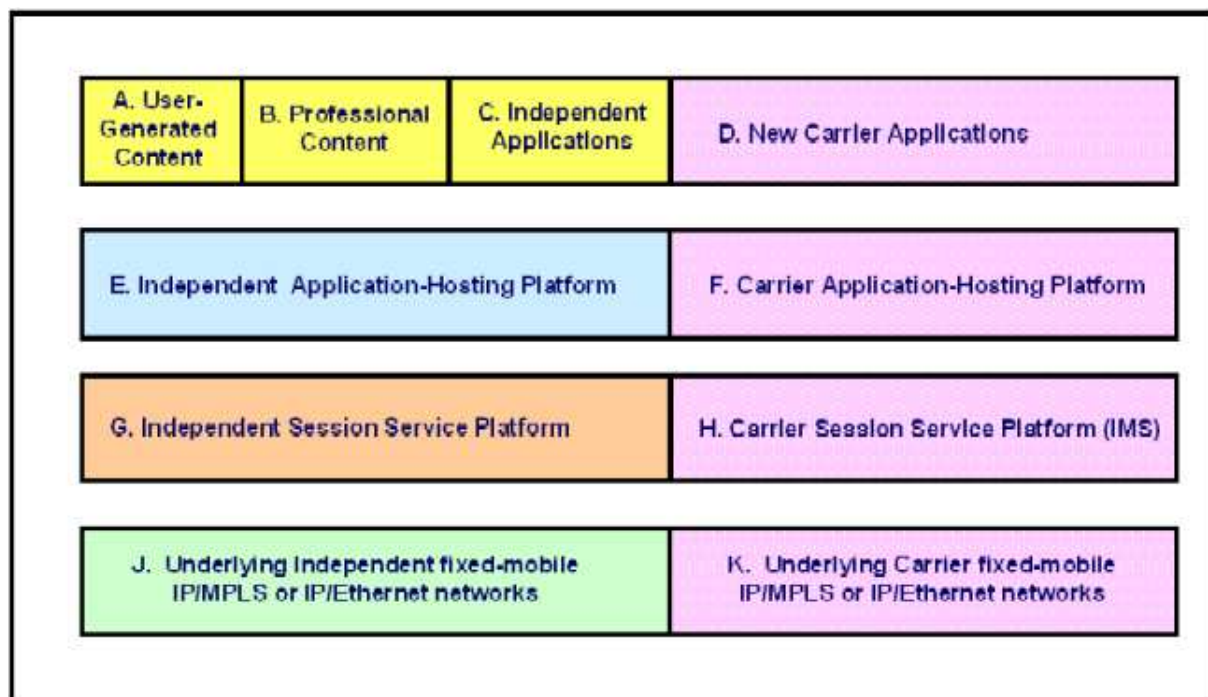


Figure 1. The next-generation architecture.

broadcasting/VoD system (E) over Sky’s IP/MPLS network (J?, K?) and be back to one bill again. Does this make Sky a carrier?

Figure 1 indicates the main *functional* components which will be put in place over the next few years. Imagine each box A-K to be a country, capable of being coloured to represent it being the property of one or another empires. Then a value-net analysis identifies players such as carriers, broadcasters, Service Providers (Google, Yahoo!) and more generic eBusinesses (e.g. eBay) and asks which boxes they own now, and which ones they aspire to own through forwards or backwards integration. Or is the trend the reverse, that the current multi-box ownership of vertical integration will fragment into independent companies in a process of dis-aggregation?

We had this discussion in chapter 15, where we saw examples of carriers moving into the content-aggregation and broadcasting space, while broadcasters acquired carriers and moved into session, hosting and network services. There is every reason to believe that this process will work its way to completion over the next few years. We will therefore see large, vertically integrated companies from these very different backgrounds confronting each other in the new converged marketplace. However, I emphasise that the independents and innovators will still be there. Just as in all the creative arts, their challenge will

be to get noticed, to get mass audience share, and then to avoid being suffocated by the ‘embrace and extend’ strategy of the majors with their copycat acts, productions, applications, services and websites: we have been here before with software. Or else the carriers will extract a large part of the value through rents as described in chapter 13.

So in conclusion, if we were looking back, say, from 2012, we would observe that the period 2007-2012 was when the Internet shed its bottom-up wild west image and became a sophisticated global utility which finally began to fulfill its service delivery potential. We would note that the carriers were still making a very good business running a variety of platform services, but that content companies had also successfully colonized this new distribution and communication medium. The degree of innovation would be greater, not less than today. The genie of user-generated content and innovative applications and services would not have been rebottled.

To make a specific prediction, I imagine that technical innovation in terminal devices together with ever-increasing bandwidth will allow something truly spectacular to arise in the areas of computer gaming (and virtual worlds in particular), and in the various spin-offs from this genre. Networked gaming seems to combine the best in professionally-developed content with mass user-creativity in a scalable medium, with interactivity designed-in from the outset. Perhaps I’m just saying that it’s finally virtual reality time!

And the need for intelligent and precisely targeted regulation will not have gone away.