

Yesterday, NGN, Tomorrow.

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Abstract:

The introduction of Next Generation Network concepts to telecommunications was a logical follow-on to the progressive internal restructuring of the infrastructure used to implement the legacy public telephone networks. However, this time the restructuring has changed not only the infrastructure but has also made possible changes in the business models around that infrastructure. This paper looks at how regulatory authorities and providers of informational services and of telecommunications services are viewing these new business models, and draws some conclusions on the likely roles of these players in the knowledge based society of the near future.

Introduction

It has become popular to refer to IP based telecommunications networks as being Next Generation Networks. However appealing such a trend might be, it is helpful to examine the facts closely to see whether the use of the term NGN is obscuring our view of reality. This short paper looks at some of the effects of IP and NGN on the telecommunications and informational services markets.

Yesterday

The public telephone service has been a key stone of telecommunications for well over one hundred years. Initially it competed with the telegraph system, now it competes with the Internet. In the author's opinion a globally addressed interactive speech telecommunications system will continue for many more years, but speech telecommunications systems are no longer the dominant force in telecommunications.

With but a few exceptions, the public telephone service providers have provided only transport services and not informational services. The public telephone service providers had systems that could, on request, connect a valid service access point (a telephone) to another telephone identified by a public telephone number.

The public telephone service providers were not involved in providing users with access to content except in the limited cases of such as: directory enquiries service, time of day service. The public telephone service was entirely unaware of the value associated with the information that it carried, if a user telephoned his bank and arranged a large cash transfer then the transaction was invisible to the telephone network.

Even in the pre-ISDN days, the public telephone network was carrying machine-to-machine communications. The facsimile machine (fax) was invented 20-30 years before the telephone, and was improved many times before it found popularity in the 1980's, a commercial tele-fax service was in operation in 1865 between Paris and Lyon in 1865. By 1924 the American Telephone & Telegraph Company (AT&T) company had improved the fax to work successfully over the public telephone network.

A major legal battle in the 1960's permitted an end-user to connect devices to the public telephone network that were type approved but not necessarily supplied by the public telephone service provider. This regulatory change was driven by an end-user (Carter, U.S.A.) who wanted to mechanically connect an acoustic modem to a telephone handset to better support machine-to-machine communications over the public telephone network.

The adoption of digital techniques in public telecommunications led to the creation of the ISDN, a digital incarnation of the public telephone service.

Technical accuracy requires us to recognize that the public telephone service is neither:

- A content service,
- nor,
- A speech only service.

For various reasons, the providers of public telephone services concentrated on telecommunications services, content if provided was typically limited to directory enquiries services.

The introduction of the Intelligent Network concept in the 1980's made it possible to offer flexible number translation services, and possibly of more value, the collection from subscribers of revenue that was passed on to value-added telephone numbers. This represented a major addition to the revenue streams of the public telephone service providers, but did not represent entry of the public telephone service in to informational services delivery.

In summary, the history of the public telephone service providers is one of telecommunications service delivery, and not of content or informational service delivery.

NGN

It is difficult to link the term NGN (Next Generation networks) with any particular technology. The Internet Protocol and the Internet existed without NGN, but when one thinks about NGN one usually ends up thinking of IP.

Access to the Internet was initially provided by specialist service providers such as UUNET and AOL who were not from the public telephone service arena. Until the early 2000's the Internet was typically accessed via expensive leased lines, or via dial-up connectivity over the public telephone network.

A wonderful aspect of the Internet is its flexibility. The Internet is a set of addressable end-points that have agreed on the use of the IP as the unit of exchange between users. The Internet, viewed as a network, imposes a minimum of restrictions on the use of an IP packet. Whilst the early use of the Internet was to support emails and remote terminal interfaces, applications were developed such as the World Wide Web that have enabled a massive growth in electronic informational services being available to the public.

The realization that the public telephone's copper access circuits could be used to carry IP without needing the telephone service as a data carrier was a major boost to the interest and success of the Internet, and also a major risk to the public telephone.

Broadband access to the Internet, via technologies such as Digital Subscriber Line and the cable industry's DOCSIS technologies, resulted in the slow death of the dial-up internet access. This hit the public telephone service providers cost equations badly since they had built up their telephone networks to support dial-up Internet access. Additionally the Internet, especially via broadband access, was found to support speech communications.

The Internet thus eroded the revenue of the public telephone networks on two accounts:

- It provided a better data communications transport for non-real time data.
- It could support a voice service that was roughly comparable to the public telephone service.

The public telephone network operators found themselves sitting on a pile of assets whose real value was decreasing far faster than originally expected. In addition, the late 1990's saw a wave of liberalization in the public telephone service markets, and a massive growth in the mobile public telephone service. Providers of fixed access public telephone services faced a major squeeze.

NGN, if anything, was the fixed access public telephone service providers' hope. Whilst it is true that NGN is IP based, it has provided a stimulus and a philosophy for fixed access public telephone service providers. The stimulus was in the form of a single transport network that could provide a competitive cost base with Internet service

providers, whilst supporting a reduced cost base for legacy public telephone services. The philosophy that accompanied NGN was one of strong decomposition of functions in to well-defined modules that could easily be replaced or even outsourced.

The public telephone service providers were thus able to incorporate broadband Internet access in to their telecommunications portfolio. However, the availability of (relatively) low cost information processing systems has created a massive business opportunity for information service providers. Many of the combined public telephone and Internet access providers, as well as pure Internet access providers, have branched out in to the information services market.

The liberalization of the telecommunications markets is often justified on the basis of studies that have shown a correlation between the increase in the public telecommunications capabilities in a country and an increase in that country's gross domestic product. This correlation is, potentially, justification enough for a government to impose regulations on the public telecommunications capabilities and the telecommunications service providers to foster national wealth enhancement. The government body charged with converting the statement *telecommunications services can be a driver of national wealth* to the statement *telecommunications services is a driver of national wealth* is usually referred to as the National Regulatory Authority (NRA).

Given that the NRAs usually consider market competition as a effective means of driving increased telecommunications capabilities in a country, and thus of driving national wealth, it is interesting to pose the question how will the NRAs regard a business which provides informational services and obtains a market advantage for the informational services through ownership of the telecommunications network?

The growing response from the US and EU is known as *network neutrality*, which in essence says that a transport related advantage should not be allowed.

Tomorrow

It is likely that the NRAs will argue for a radical split between providers of information services and of providers of telecommunications services. The split is likely to go beyond a simple *network neutrality* requirement, and will probably require that the business' operational, support and infrastructure components are fully independent and that they are demonstrably not cross-subsidizing one-another.

Another area of contention is the Next Generation Operational Support System (NGOSS). NGOSS is intended to be a highly flexible, easily modifiable, cost efficient management system for a telecommunications service provider; however, it is equally targeted at informational services. Any combined telecommunications and informational service provider who is currently planning on a NGOSS should consider making it possible to split the NGOSS in to two independent components (one for telecommunications services and one for informational services). This would then be compatible with the expected telecommunication and informational service split.

A less obvious consequence of NGN is that it enables not just a merging of the infrastructures for fixed access public telephone services and Internet access services, but also a merging of the infrastructures for fixed and mobile access public telephone services. This places the NRAs in the spotlight since they must now address the issue of fixed-mobile interconnection tariffs, and decide how a combined access public telecommunications service provider competes fairly with a mobile access only provider who has interconnection fees to access the fixed network.

It is likely that the provider of the public telecommunications services of tomorrow is going to have a tough time. Local government in some countries is taking steps to make sure that the broadband Internet access, that is critical to attracting and retaining businesses, is available even in areas where the financial justification is weak.

A trend is appearing on the horizon, maybe some parts of the telecommunications infrastructure may return to public ownership.