Deployment of Network Managed Services

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Abstract

The next generation network (NGN) which is based on linkages with both fixed and mobile communications and broadcasting services is expected to form the foundation for bringing about significant advancements in IT and Internet-related businesses. Nevertheless, the systems and technologies that support the networks are extremely advanced and complicated and the network operation and investment costs have now become a heavy burden for the carriers. This paper introduces network managed services and the outsourcing services by which networking operations are entrusted to the vendors, as potential solutions for this problem.

Keywords

next generation network (NGN), CAPEX, OPEX, network managed services, outsourcing

1. Introduction

The world communications market has recently been developing on a massive scale. With the number of cellular phone subscribers exceeding two billion and Internet users reaching 200 million, new businesses using the networks are rapidly expanding.

Additionally, research into the next generation network (NGN) is advancing as a new communication infrastructure that is expected to implement a variety of services by integrating fixed and mobile communications and broadcasting services in the future. However, as technical innovation and market expansion have advanced rapidly, the increase in the network operational and investment costs has become a major problem in the management of the communications carriers. In this paper, we will introduce some of the solutions for this problem, such as a managed service for carriers and an outsourcing service that NEC is currently providing in Hong Kong.

2. Beginning of the Age of Universal Competition

NGN will offer services that are seamless and ubiquitous from the viewpoint of users (individuals and enterprises) by removing the barriers that exist between fixed and mobile communications and broadcasting, including those of; 1) terminals; 2) networks; 3) services and applications, and; 4) businesses. This new market will generate an environment of universal competition in the business domain, for example in the finance, media and distribution businesses as shown in **Fig. 1**. It is therefore expected that the creation of new services will be a very active market. NGN is a new communications infrastructure that is designed to support this new age of universal competition.

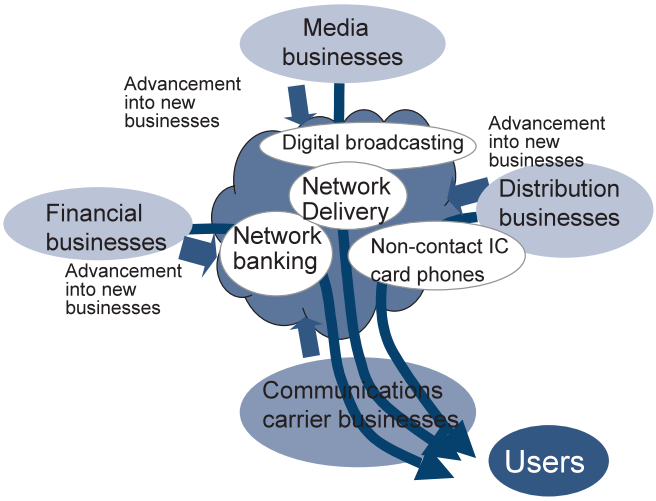


Fig. 1 The beginning of universal competition - toward NGN.

3. Themes for NGN

As shown in **Fig. 2**, NGN is composed of the NGN service platform providing various services and the NGN transport based on the IPv6 (Internet Protocol Version 6). The IPv6 is a communication protocol established to improve the current standard Internet protocol IPv4 for use in the next-generation internet that features an extension of IP addresses and improved security and priority control functions. As it uses IP

addresses with 128 bits, it is uniquely capable of assigning as many as 2^{128} IP addresses. This means that it can connect wide-ranging devices supporting social infrastructures such as home electric appliances, automobiles and other means of traffic and logistics systems as well as PCs and cellular phone terminals so that many new kinds of services can be created. In addition, NGN offers a bearer-free and barrier-free seamless network environment for mobile devices, offices and households by means of its various means of access, including optical cable, wireless connection and CATV. As a result, very fine network control functions are required in order to achieve satisfactory QoS (Quality of Service) controls for multimedia use. These would include voice, data and images, high security, and congestion controls at a similar level to fixed phones as well as a function for the prevention of malicious traffic penetration. Also, the NGN service platform is required to provide diverse functions including authentication of subscribers and terminals, maintenance and management of databases, and flexible bill processing, covering time-based, data usage-based and content-based billing. Consequently, it is essential to use a multi-vendor environment composed of highly specialized vendors for the construction and operation of NGN. Communications carriers should establish and maintain a system for performing negotiations and coordination with multiple vendors at all stages from the development of the service to the construction, operation and maintenance of the network.

In addition, traditional communications services such as the telephone, ISDN, mobile communications (2G, 3G), Internet connection and leased line services should also continue to be provided for a long period into the future. This implies that the construction and operation of networks will be further complicated and impose a huge burden on the communications carriers.

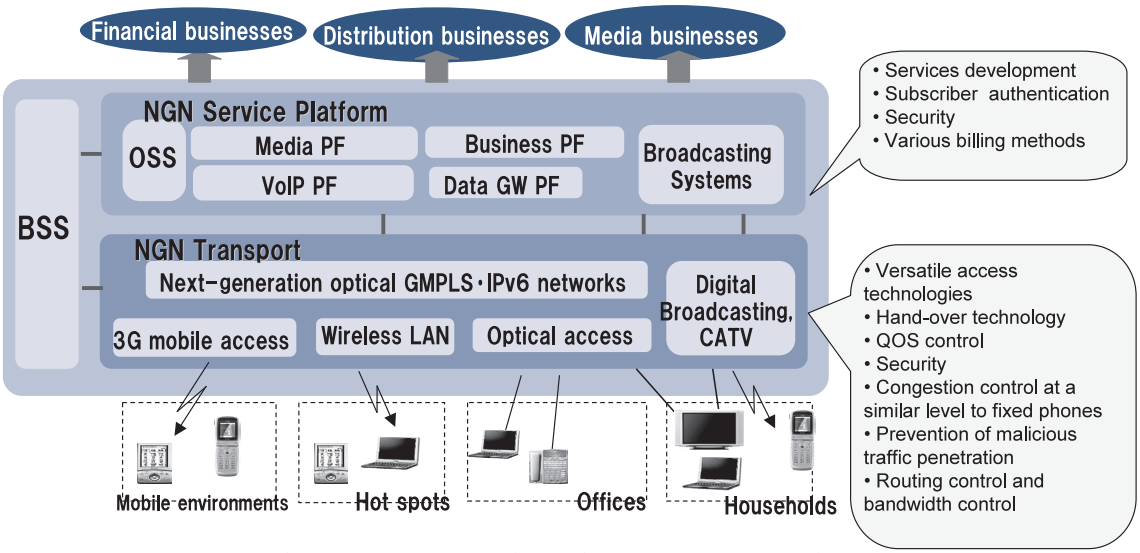
4. Network Operations Costs

For communications carriers who attempt to expand business with NGN, it will be the key for surviving the age of universal competition to identify user needs more accurately and provide high value-added services more quickly.

For this purpose, the investment of capital in the development and management of new communications services, marketing and brand strategies, alliances with the M&A (Mergers & Acquisitions) of other companies and the Customer Relationship Management (CRM), which has become a major management topic, as well as in the construction and operation of networks.

Fig. 3 shows the cost structure of a typical communications based business model. It assumes that the networking and IT-related expenses will occupy 65% of the combined OPEX (Operating Expenditure) and CAPEX (Capital Expenditure).

Fig. 4 shows the estimated employees configuration. Operat-



VoIP(Voice over IP) BSS(Business Support System) OSS(Operation Support System)
GMPLS(Generalized Multi-Protocol Label Switching)

Fig. 2 Configuration of NGN.

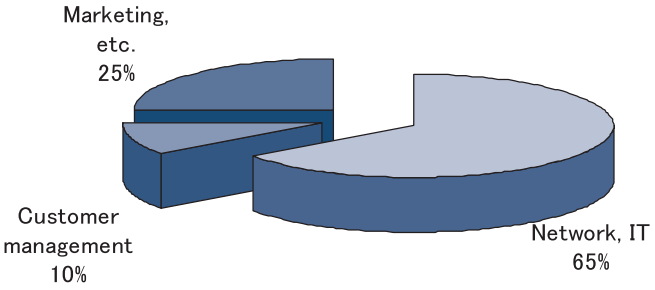


Fig. 3 Cost structure of a model communication carrier.

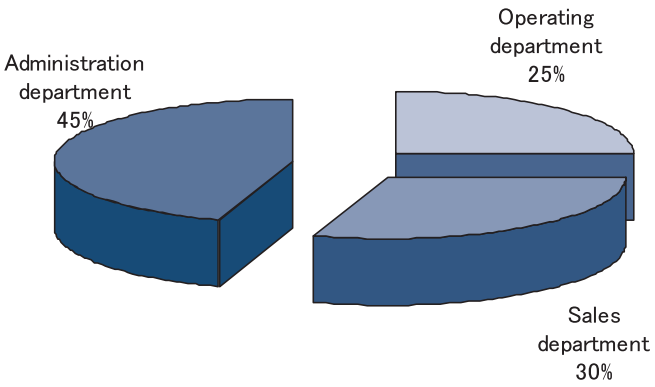


Fig. 4 Employees of a model communication carrier.

ing department personnel are expected to occupy about 25% of the total workforce and a further improvement in the network operation job efficiency is critical in consideration of the balance between the projected increase in network operation-related jobs and the required investment in operating costs.

5. Network Managed Services

To assist the communications carriers in dealing with such management issues, we provide an ongoing network managed service in order to provide a wide range of support for their work. We have already achieved many remarkable results in the installation and adjustment of equipment during delivery and in follow up maintenance . To add to these services , we are currently building a service menu to provide various services covering eight different areas as shown in **Fig. 5,** from the overall planning/design of the network and consulting to actual operations and education/training[1].

Among these services, the optimization of the radio area of the W-CDMA network based on our original technology has acquired the highest of reputations with communications carriers both inside and outside Japan. This is because it has resulted in significant contributions to their service area expansions and connection quality improvements[2].

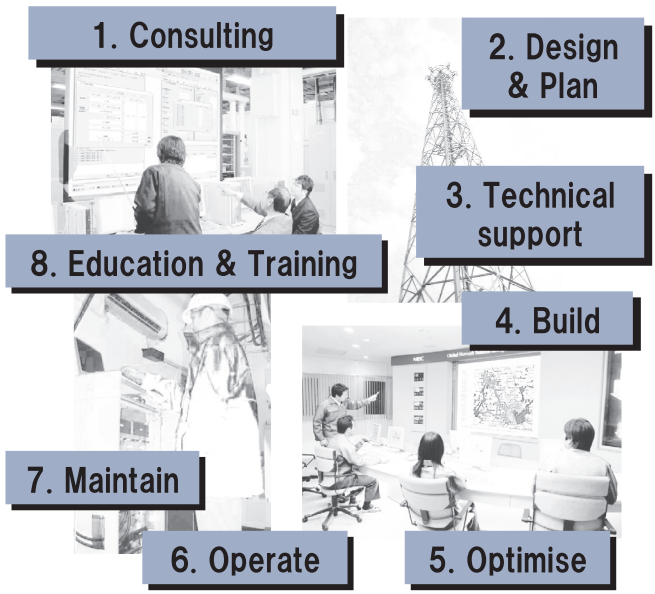


Fig. 5 Service menu.

6. Outsourcing

Changes in the communications market and the intensification of competition toward NGN are causing changes also in the business models of the communications carriers. One of these changes is the outsourcing of network operation jobs. These jobs extend over a wide range including 24-hour/365-day surveillance, quick isolation/release in case of faults and the confirmation of interconnections between carriers and multiple vendors and end-to-end service confirmations. All of these continuously entail important costs. Such jobs have previously been done by communications carriers, but the new strategy that is recently attracting attention is that communications network operation jobs are outsourced (entrusted) to skilled vendors, etc. and the carriers are able to concentrate on searching out ways to distinguish themselves in other areas.

An outsourcing target vendor is required to be capable of providing total solutions and end-to-end solutions in addition to technical skills, and NEC is capable of meeting with a wide range of outsourcing needs thanks to; 1) a high capability in providing general solutions covering the fields related to terminals, communication infrastructures, applications development, network

construction and system integration; 2) high reliability technologies for ensuring carrier grade quality for 24-hour/365-day uninterrupted operations; 3) achievements in the construction of advanced business models for W-CDMA, i-mode gateway and proxy billing models.

In December 2004, NEC established a new company "NEC Telecommunications (Hong Kong) Ltd." as an outsourcing destination firm for cellular phone network operations. This company is operating the following jobs for 2G (GSM) and 3G (W-CDMA) mobile networks in Hong Kong[3].

- Equipment planning and network design.
- Cell design and acquisition /management of antenna sites.
- Recovery from failures, and fault escalation.
- Surveillance of network quality and compilation of papers.
- Prevention of congestion based on traffic monitoring surveillance/analysis.
- Development and introduction of operation support tools.
- Management and backup of network configuration.
- Management of installation/repair work.
- Maintenance of offices/equipment and power supply facilities.

The company has much technical experience from the network design of a high-traffic environment in densely populated areas of Hong Kong and also from the provision of indoor solutions for buildings and underground shopping centers (**Fig. 6**). When receiving an outsourcing order, NEC concludes an SLA (Service Level Agreement) with each customer in order to define the contents and quality of the provided outsourcing service objectively and rigorously. NEC anticipates that these jobs will lead to an expansion in the receipt of orders for communications infrastructures projects in mainland China in the future.

Fig. 6 Example of indoor antenna installation.

7. Conclusion

NGN is expected to provide a foundation for the deployment of advanced communications as well as for various IT and Internet-related businesses. On the other hand, increases in the CAPEX and OPEX of networks will be a serious problem in the future, but this problem can be solved effectively by means of network managed services or by outsourcing services provided by the vendors. At NEC, we are determined to support our customers in every aspect of their endeavors with the help of our technological expertise, and a rich experience that has been gained both inside and outside of Japan.

*i-mode is a registered trademark of NTT DoCoMo, Inc.

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