FUTURE CONTRAPTION NETWORKS

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Abstract

Future Contraption Networks have an important impact on vacant communications knowledge. FCN allows the union of several different types of designs to run on the like network; consist of tone, data and record and other new medium claims. This research examines the current state of FCN development.

Index Terms: *constituent, Next Generation Network, Telecommunication, Market, FCN*

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1. INTRODUCTION

Future Contraption Networks have an important impact on vacant communications knowledge. FCN allows the union of several different types of designs to run on the like network; consist of tone, data and record and other new medium claims. This research examines the current state of FCN development. A Next Generation Network (NGN) is a packet-based network able to provide Telecommunication Services to users and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent of the underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users [1]. The above definition divides the NGN in two parts, namely the Core and the Access NGN. The Core NGN is essentially the transport or backbone network, and uses digital technology to connect telephone calls and other network traffic more efficiently than traditional networks. Access NGNs involve an upgrading of the local loop to broadband, either through DSL technology or by deploying fiber into the loop for part, or all of the connection. Building a core NGN does not directly influence these access technologies [2]. NGN puts together a cost-effective and comprehensive network with the security, information capacity, advanced delivery options.

2. ARCHITECTURE OF NGN

The NGN is covering a variety of network types from wired to wireless, and from telecommunication to computer and it will transfer a variety of different services over a common and open network infrastructure. NGN is one network platform able of supporting all traffic types while smooth the progress of service innovation as uncovered in Fig 1.

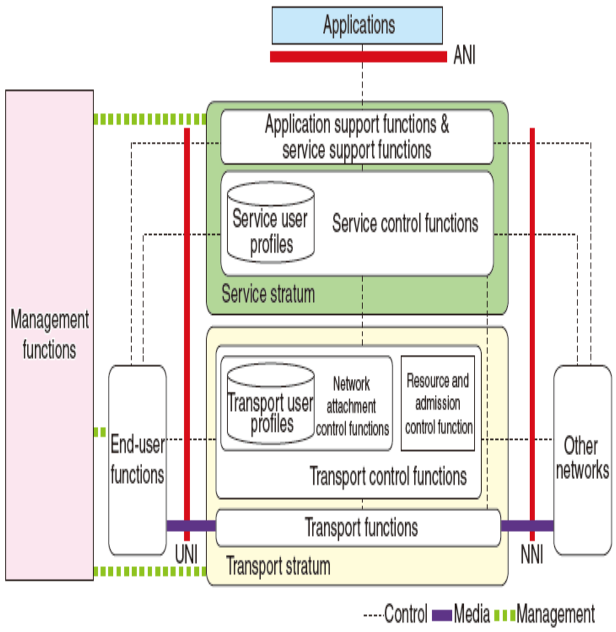

Figure 1: NGN architecture overview at ITU-T.

As network convergence can provide a variety of benefits, a great number of network operators have started to deploy NGN networks to support their businesses [3]. “A key critical success factor of NGN implementation is focused telecommunications industry attention on NGN service concepts and how these concepts can be realized in an NGN environment" [4]. NGN promises a grand image of our future networks, for users, benefits provided by an NGN include more attractive services, more convenient access, higher quality, and cheaper prices. For network carriers or service providers it can provide benefits including lower costs, easier management, more profitable services and quicker response to market changes. However, as the transition to the pure NGN infrastructure is a long term process (this may last for decades until all users are transferred to the NGN and all legacies are obsolete), at its early stages when the NGN and conventional networks are coexisting, the impacts of the NGN transition may not be known to users, and some issues like the inter-communication problems among different networks may cause obstacles preventing users moving to the new experiences. [5]

3. NEXT GENERATION CORE NETWORKS

The next generation core networks are defined on the basis of their underlying technological "components" that include as mentioned in the ITU definition – packet-based networks, with the service layer separated by the transport layer, which transforms them into a platform of converged infrastructure for a range of previously distinct networks and related services. These features may have an impact on traditional business models and market structure, as well as on regulation:

3.1 IP-based network

Next generation core networks generally cover the migration from multiple legacy core networks to IP-based networks for the provision of all services. This means that all information is transmitted via packets. Packets can take different routes to the same destination, and therefore do not require the establishment of an end-to-end dedicated path as is the case for PSTN-based communications.

3.2 Packet-based, multi-purpose

While traditionally separate networks are used to provide voice, data and video applications, each requiring separate access devices, with NGN different kinds of applications can be transformed into packets, labeled accordingly and delivered simultaneously over a number of different transport technologies, allowing a shift from single-purpose networks (one network, one service), to multi-purpose networks (one network, many services). Interworking between the NGN and existing networks such as PSTN, ISDN, cable, and mobile networks can be provided by means of media gateways.

3.3 Separation of transport and service layer

This constitutes the key common factor between NGN and convergence, bringing about the radical change in relationship between network "layers" (transport infrastructure, transport services and control, content services and applications). In next generation networks service-related functions are independent from underlying transport-related technologies. The uncoupling of applications and networks allow applications to be defined directly at the service level and provided seamlessly over different platforms, allowing for market entry by multiple service providers on a non-discriminatory basis.

Source: Keith Knightson, Industry Canada, ITU NGN Architecture, presentation at the "ITU-IETF Workshop on NGN", May 2005, Geneva. These features may foster the development and provision of new services and constitute a new opportunity for innovation, allowing different market players to create value at the separate functional levels of access, transport, control and services [6].

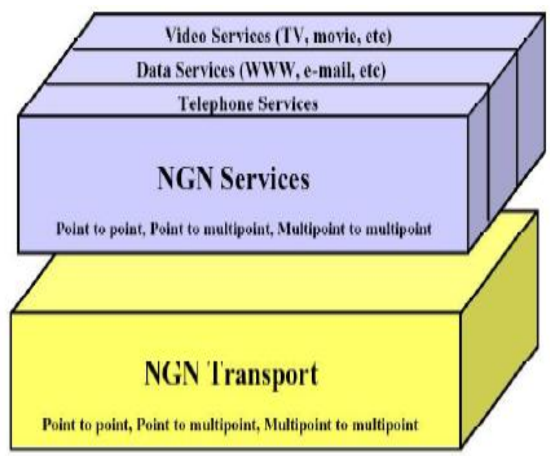

Figure 2: Separation of functional planes

4. STANDARDIZATION TRENDS OF NGN

Standardization of the NGN began at the NGN Workshop held by ITU-T in July 2003 (Geneva). Following this, Recommendation Y.2001 "General overview of NGN" and Recommendation Y.2011 "General principles and general reference model for Next Generation Networks" were approved in June 2004, and 13 documents prescribing the outline section of NGN release 1 began the approval procedure for becoming recommendations at the SG13 meeting held in July 2006 (Table 1). A characteristic feature of the NGN specified by Supplement 1 to Y.2000-series "NGN release 1 scope" and Y.2201 "NGN release 1 requirement" is the use of the IP Multimedia Subsystem (IMS) established by the 3rd Generation Partnership Project (3GPP). The IMS is being adopted by the Internet Engineering Task Force (IETF) as a base protocol for the session initiation protocol (SIP) specified by a series of RFCs (requests for comments), including RFC3261. The IMS specifications add security and quality-control requirements and specify how they can be combined with the above SIP related RFC documents that are now being standardized in the IETF.

Moreover, at the TISPAN (Telecommunications and Internet converged Services and Protocols for Advanced Networking) project launched by the European Telecommunications Standards Institute (ETSI), about 60 documents for the NGN release 1 specifications series centered on IMS provisions for the fixed network had been nearly completed as of the February 2006 meeting of the project. Meanwhile, in Japan, an NGN Architecture Experts Committee was established in April 2005 at the Telecommunication Technology Committee (TTC). To date, several standards and technical reports regarding the NGN and interface specifications have been issued by TTC. These include TR-1014 "Overview of the NGN Architecture" and TR-9024 "Technical Report on Basic Call Interface for SIP Terminals Connecting with NGN" (Table 2). [7].

TABLE I. ITU-T NGN RELEASES 1 RECOMMENDATION SERIES.

Category	ITU-T NGN release 1 documents
Principles (references)	•Y.2001: General overview of NGN •Y.2011: General principles and general reference model for NGNs
Scope of NGN release 1	•Supplement 1 to Y.2000-series: NGN release 1 scope •Y.2091: Terms and definitions for NGNs
Requirements	•Y.2201: NGN release 1 requirements •Q.1706: Mobility management requirements for NGN
Overall architecture	•Y.2012: Functional requirements and architecture of the NGN
Implementation example	•Supplement 1 to Y.2012: Session/border control (S/BC) functions
Service control functions	•Y.2021: IMS for NGNs •Y.2031: PSTN/ISDN emulation architecture •Y.2271: Call server based PSTN/ISDN emulation
Admission control section	•Y.2111: Resource and admission control functions in NGNs •Y.2171: Admission control priority levels in NGNs
Evolution scenario to NGN; aspects to consider	•Y.2261: PSTN/ISDN evolution to NGN
Security	•Y.2701: Security requirements for NGN release 1

PSTN: public switched telephone network
ISDN: integrated services digital network

TABLE II. MAIN NGN-RELATED STANDARDS AND TECHNICAL REPORTS AT TTC.

Category	TTC Recommendation
NGN architecture specifications	JT-Y.2001: General overview of NGN JT-Y.2011: General principles and general reference model for NGNs TR-1014: Overview of the NGN architecture
NGN interface specifications	TR-9022: Technical report on network-asserted user identity information transfer through NGN TR-9023: Guidelines for the architecture of the NGN technical specifications for SIP in TTC TR-9024: Technical report on basic call interface for SIP terminals connecting with NGN

5. DIFFERENCES BETWEEN NGNS IN DEVELOPED AND DEVELOPING MARKETS

While there are commonalities between NGNs evolving in highly developed ICT markets and NGNs in less developed markets, like many other aspects of the ICT sector in these markets, there are many differences affecting regulatory, financial and operational issues. The most obvious of which are linked to questions of access and affordability. Developed markets generally boast high levels of PSTN, mobile, Internet and broadband penetration, while less developed markets generally have low penetration indicators and the presence of more mobile than fixed line networks. It is trite, but worth restating that in order for consumers to begin to reap the benefits of NGN services, greater attention needs to be paid to creating competitive environments. This pertains to both traditional fixed and mobile voice, which with NGN-related standards such as SIP, will seamlessly interface with each other in a wider IP based environment [8]. Other major differences in the NGN evolutionary path between developed and developing countries will be the pace and manner NGN assumes. One similarity is that full NGN evolution takes time and will not occur rapidly, with predictions of 2012 -2020 as the period in which most operators in developed countries will see NGN migration come to fruition. Convergence is driving new demand for the *variety* of service offerings that can now be delivered and while so doing, is blurring pre-existing boundaries between fixed, mobile and data networks. This means that the end user can request a range of services, regardless of the access technology used. This requires a "meta-infrastructure" beyond the existing, subordinated networks – a core network for all the access networks [9]. It is envisaged that developed countries, with already existing and evolved fixed line networks (predominantly fiber based) will more easily leverage existing fixed line networks for core and access NGN development. For example, British Telecom began its PSTN evolution in 2005 by deploying Multi Service Access Node (MSAN) devices to its edge network. The replacement of circuit switches by Soft Switches started in 2005 and it is anticipated that 50% of all BTs circuit switches will have been replaced by 2007. Verizon has also adopted the Soft Switch technology to upgrade already existing circuit exchanges in its local networks [10].

On the contrary, where fixed line network development is not as evolved and considering the prevalence of mobile networks in relation to fixed in developing countries, it is arguable that NGN in developing countries will more likely be leveraged off existing 2G mobile networks, suggesting that they will be wireless. This is made possible through the IP Multimedia Subsystem (IMS). Generally, the core NGN will tend to be a fixed network, with the possibility of interconnection with a mobile network. However, both fixed and mobile are converging towards a unique type of core NGN architecture for fixed and mobile networks: the IMS (IP Multimedia Subsystem). Most cellular mobile operators in Africa have 2G GSM networks. Some of these networks are being transformed into intermediary generation networks (2.5G) like GPRS (General Packet Radio Service). Outside of countries like South Africa, who have fully fledged third generation mobile networks (3G), it is difficult to predict the pace at which such transformation will take place. In any case, the evolution of second generation networks into 3G through 2.5G constitutes multi-faceted challenges for operators in this constantly changing environment. In essence, this suggests that developing countries may have less existing infrastructure to leverage in the evolution to NGNs. While the NGN migration path is likely to differ between developed and developing countries, and within developed and developing countries themselves, this does not however mean that developing countries are going to have to build out fixed, fiber networks to achieve full NGN migration [8]. The salient driver behind this migration is to reduce the costs of building and operating a number of separate networks. As fixed line voice service revenue continues to decline, network evolution consolidating existing legacy equipment regardless of the infrastructure, is a priority issue for operators. This will enable operators to optimize network resources by carrying a variety of services on a converged multi-service IP network, and by using node devices with higher processing and service interfacing capabilities to optimize the network structure. This will in turn enable the cost-efficient provision of innovative services. It is important to note however that there is no “one size fits all” network solution that can apply to all operators, as each has its own network scale and topology. One view argues that operators with large scale networks tend to adopt the smooth migration policy to upgrade their networks seamlessly, while operators with small scale networks tend to build new IP networks and migrate current services to the new networks [10]. More critically for policy makers and regulators is the question whether to regulate IP network development or allow an evolutionary approach for IP networks. And where a decision is taken to regulate rather than evolve, what aspects of NGN migration should be regulated? On the one hand, deployment requires significant capital investment and oversight by regulators to ensure that investments are protected. On the other hand, it can be argued that opening access to all market segments will induce appropriate risk assessed investment and result in competition which should then be accompanied by regulatory forbearance except in the case of market failure. In many developed countries, this goal has prompted a preceding discussion on the benefits of *ex post* (after the fact) versus *ex ante* (before the fact) regulation. Some countries, like Canada are starting to move towards a framework in which *ex post* regulation begins to play a bigger role than *ex ante* regulation based on verified complaints of significant market power (SMP). This would see greater reliance placed on a country’s competition authority rather than the sector regulator [11]. However, these developments tend to reflect more mature telecommunications markets which have seen a longer or faster period of market liberalization than is the case in most developing countries. Nonetheless, an underlying remaining requirement for the development of competition, and a clear requirement of the combined WTO GATS Agreements, is a clear, transparent and non discriminatory *ex ante* framework to promote competition that at the same time, reflects the needs of convergence and integrated services [12].

6. CONCLUSION

NGN is one network platform able of supporting all traffic types while smooth the progress of service innovation. The convergence of the Internet, Mobile, TV, and telecom networks are the main challenge for ICT industries and they will be to find opportunities among the variety services and business models. The convergence of services, applications and networks will characterize the future of the telecommunication industry; and the network companies will update their existing network infrastructure towards an NGN platform.

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BIOGRAPHIES

Dr. Srinivasa Rao Angajala was born on 1964 and received Ph.D from University of Allahabad in 2008 and M.S(CSE) from Donetsk State Technical University, Ukraine in 1992. At present he is working as a Principal & Professor in CSE Dept. in Khader Memorial College of Engineering and Technology, Devarakonda, Nalgonda District, Andhra Pradesh. He wrote 5 books and published by Vikas Publications, New Delhi for various Universities in India. He is active member of IEEE, CSI, ISTE, IACSIT, CSTA, IWA and IAENG and also attended no. of National and International Conferences.