

NGN Trial Use and Test Site in Phuket, Thailand by National Telecommunications Commission (NTC) and Chula UniSearch

Supavadee Aramvith, Chaodit Aswakul, Chaichachet Saivichit,
Prasit Prapinmongkolkarn, and Atiwat Aimdilokwong

Department of Electrical Engineering, Faculty of Engineering, Chulalongkorn University,
Bangkok Thailand
supavadee.a@chula.ac.th
National Telecommunication Commission, Thailand
prasit@ntc.or.th

Abstract. National Telecommunication Commission of Thailand has initiated the pilot project which involved the trial and testbed of Next Generation Networks (NGNs) technology in Phuket, Thailand. This project consists of many new technologies implementation in the real environment. In order to implement the NGN technology successfully, we need to be able to summarize the outcomes of these deployment and prepare for improvement in the future. This project also extends the test to the communities in Phuket such as E- Learning applications.

Keyword: Next Generation Networks, NGN, Testbed, E-Learning.

1 Introduction

National Telecommunication Commission (NTC) has long been committed to perform its duty as Thailand's Telecommunication Regulator. Apart from regulating the telecommunication industry in Thailand, NTC has also contributed to various activities involving academics, society and people to tighten the digital divide in Thailand. One of the projects initiated by the NTC is the Next Generation Network Migration Study project which is commissioned to UniSearch of Chulalongkorn University to study the approach and feasibility of deploying NGN in Thailand. After the project has been completed, The commissioner Prasit Prapinmongkolkarn who has overseen this project since the beginning has a vision that this would be a big stepping stone of Thailand Telecommunication. He, then initiated the idea of the NGN Trial and Testbed Project in Thailand.

The NTC has contracted Chula UniSearch, a consulting arm of Chulalongkorn University (CU), led by Dr. Supavadee Aramvith and Dr. Chaodit Aswakul, to operate the project which is participated by CAT Telecom, Samart Telecom, AIS, NEC, Rohde&Schwarz, FORTH and ADC Communications. NGN technologies such as 3G, Wi-Max, VoIP, SIP server/Soft switch, VoD and FTTH are evaluated in the project along with many applications like Tele-Health, Tele- Medicine, Tele-Education, e-Government, NGN Classroom, Mobile TV and Mobile Banking.

NTC On Feb 3rd 2009, the NTC officially opened the Next Generation Network (NGN) trial use and test site in Phuket. The main objective of this project is to study and evaluate the impact and benefits of the migration from legacy networks to NGN which can accommodate a variety of new services. Over 130 distinguished guests from the local administration, academics, healthcare services, as well as executives of telecom operators attended the opening ceremony of the NGN test site presided by General Choochart Promphrasid, the Chairman of NTC.

2 Telecommunications over Next Generation Networks

NGN is a packet switched IP-network that is capable of providing many new converged QoS (quality of service) assured services that users can have access to whether they are stationary or on the move. Convergence is at the core of NGN which delivers data, voice and multimedia applications on the same core network.

The test involved the following technologies and services.

1. High Speed Internet over WiMAX
2. Video Conference over FTTx
3. Voice over Internet Protocols (VoIP)
4. E-Learning

The tests were also concerned with compatibility and interoperability issues in this project between different versions of WiMAX and also between WiMAX and 3G CDMA 1X EVDO or 3G WCDMA 1800 MHz In-band Migration from GSM. In addition, the users' opinions and acceptance of NGN based applications such as VOIP, video streaming and e-learning at two middle schools etc. are also evaluated. Evaluations as well as technical data from this project will be beneficial and valuable to a telecom regulatory agency like NTC for its decision on regulatory policy and framework for NGN and NGN converged services. The NTC would be most happy to share this valuable experience as part of the implementation of the World Summit of the Information Society (WSIS).

3 Test Results

NEC brought their NGN IMS CORE to participate in the project. The Video on Demand (VoD) and Voice over IP (VoIP) on NGN IMS Core were tested. Users' satisfaction level data were then collected. For comparison, the VoD in both standard definition (SD) and high definition (HD) was tested with and without QoS control. The users were very satisfied with VoD with QoS control and VoIP however they evaluated that the quality of VoD without QoS control was quite poor.

FORTH and ADC Communications participated in the project with FTTH, one of the NGN wired access technologies. The throughput and link budget of GEAPON technology was evaluated. Interoperability and compatibility were tested using equipments such as optical fiber, splitter module, optical line terminal (OLT) and optical network unit (ONU) from different manufacturers.

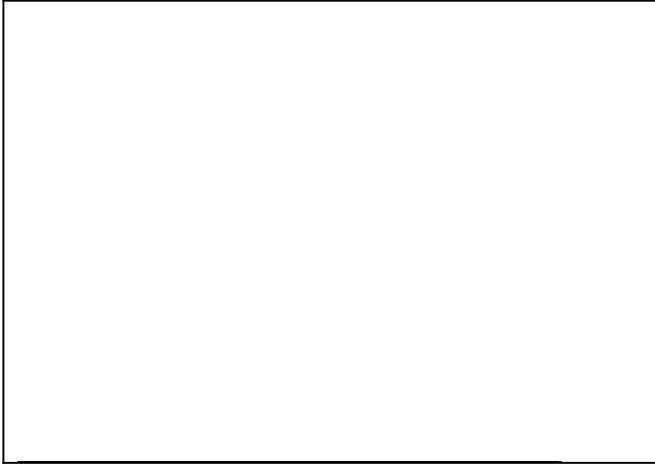


Fig. 1. IMS/NGN Testbed overview in the Project

The equipments from different manufacturers worked together very well and there were no compatibility issues whatsoever. With the OLT and ONU used, the power budget was about 30 dB and this should translate to a maximum distance of 80 km of the G.652D fiber without using any splitter. However the actual tests revealed that the maximum distance was limited to about 20 km due to the dispersion of G.652D fiber at a wavelength of 1,490 nm.

Compatibility tests were conducted between other NGN access technologies as well such as between WiMAX and 3G CDMA 1X EVDO. Applications like VoIP, web browsing, FTP and video chat were tested on a notebook equipped with both WiMAX CPE (customer premise equipment) and CDMA 1X EVDO CPE. Users would drive- test these applications as they roamed in and out between WiMAX and CDMA 1X EVDO served areas. The results indicate that a notebook can switch services automatically from WiMAX to CDMA 1X EVDO and vice versa depending on the availability of the signal at the moment. However, all applications tested were disrupted and would not continue the operation. The least affected is the web browsing application because users can click the refresh button on the web page and continue on.

WiMAX, with three base stations operating at a frequency of 2.5 – 2.6 GHz, was also drive-tested to find out the distance that a base station could cover and the download/upload speed. Within the Phuket area, the distance on average from the base station to the CPE is about 2 km maximum but the distance covered was measured at almost 4 km for a line of sight operation or no obstructions in between. However, without having to adjust CPE's antenna orientation every time for optimal reception, the effective distance on average is about 500m in Phuket.

E-learning classrooms and workshops was conducted with ADSL and will be conducted again using NGN access technologies such as WiMAX and FTTH (GEPON). The results will be a comparison of quality of picture and students' satisfaction level data between a base-line case (with old access technologies) and an NGN case.

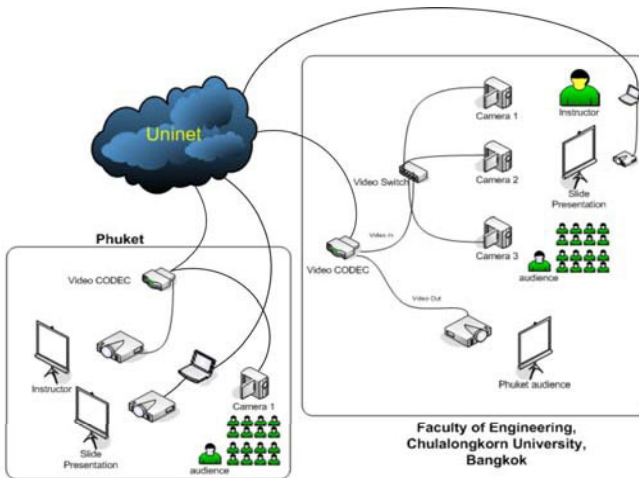


Fig. 2. E-Learning Classroom.

4 Conclusion

At the end of the project, several conclusions have been put together and proposed to the NTC. These suggestions from the study have led to several urgent issues that need commitment from the NTC, for example, the format and standards of NGN technology to be deployed in Thailand. This requires attention from the regulation body; NTC and operators alike. The migration process requires high investment in terms of people, knowledge, technology and capital. The NTC has to take its role as a regulator as well as an influencer to create a momentum for changes. Furthermore, universal service obligation is one of the issues that could very much be enhanced from the deployment of NGN. Many services could be enabled with the technology. Eventually, the technology and services will be expanded to cover the underprivileged part of Thailand for the benefit of all of our citizens.

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