

Next-generation IP Network Standardization and Japan's Next Generation IP Network Promotion

Ichiro Inoue[†]

Abstract

ITU-T and other standardization groups are currently working to standardize NGN (Next Generation Networks). In Japan, the Next Generation IP Network Promotion Forum has been organized to address this issue (IP: Internet protocol). Comprising academic, commercial, and government organizations, the forum is developing strategic proposals aimed at achieving standardization.

1. Introduction

ITU-T (International Telecommunication Union Telecommunication Standardization Sector) and other standardization groups are currently working to standardize NGN (Next Generation Networks). ITU-T created a focus group (FGNGN), which led to a global standardization initiative. IETF (Internet Engineering Task Force) and other bodies have been working on specifications for NGN-related protocols, which were incorporated into the first set of ITU-T recommendations. In Japan, establishing fundamental technologies and leading the standardization strategically are key factors in achieving the targets of the e-Japan and u-Japan strategies, as well as keeping Japan's competitiveness. Thus, focusing on strategic areas and promoting activities is critical and requires close collaboration among Japanese academic, commercial, and governmental organizations.

2. International standardization status

A large number of international bodies are working to establish NGN standardization. In ETSI (European Telecommunication Standard Institute), mobile communications companies and groups (such as 3GPP) are studying suitable technologies for both fixed and mobile communications, based on the IMS (IP multimedia subsystem) standard, which defines the IP-

based control system (IP: Internet protocol). While determining the IP for communication networks, IMS furthermore utilizes SIP (session initiation protocol) from the de facto standardization body IETF. In response to this, the international standardization body ITU-T, with the goal of establishing international NGN standards that will be applicable worldwide, established FGNGN in June 2004. This FG carried out concentrated studies through November 2005. As a result of vigorous debate among many groups, companies, and countries (1166 participants, 1206 written contributions), it established a large number of draft recommendations that stressed general NGN principles.

ITU-T Recommendation Y.2001 (General Overview of NGN) defines NGN in the following manner: *With the aim of offering telecommunication services, NGN is (1) “able to make use of multiple broadband, QoS-enabled transport technologies”, (2) “a packet-based network”, and (3) its “service-related functions are independent from underlying transport-related technologies”. Furthermore, (4) “it enables unfettered access for users to networks and to competing service providers”, and (5) “it supports generalized mobility which will allow consistent and ubiquitous provision of services to users”* (numbers in parentheses are the author's). Separation of services and transport can be the most important factor for achieving items (1)–(3). With respect to the transport stratum that governs transmission functions, IP and other packet networks are being hypothesized, with needed broadband, QoS-enabled functions being added to them (QoS: quality of service). A ser-

[†] NTT Network Service Systems Laboratories
Musashino-shi, 180-8585 Japan
E-mail: Inoue.ichiro@lab.ntt.co.jp

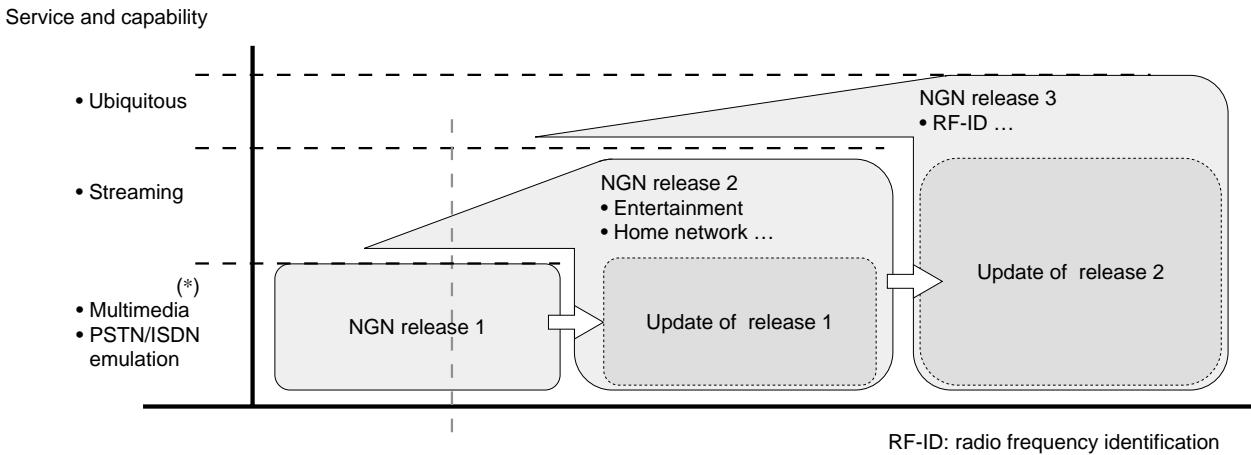


Fig. 1. ITU-T's release plan for NGN.

vice stratum that can achieve a variety of control functions for services such as telephony (basic and additional services) and WWW data and video signal transmission and stipulate the session control function common to them (based on the IETF SIP protocol) was the focus of initial studies. This model allows flexible deployment of equipment, the independent development of new technologies, and a wide variety of business formations.

Measures for achieving items (4) and (5) are premised on architectures stipulated by the user-network interface (UNI), network-network interface (NNI), and application programming interfaces (APIs) that prescribe the boundaries between users and NGN, NGN and terrestrial networks, and NGN and applications and that prescribe functional architectures based on IMS.

3. Achievements of ITU-T (FGNGN) and Japan's contributions

The FG's studies included ones on NGN architecture, SIP server stipulations, methods for achieving QoS, PSTN/ISDN (public switched telephone network, integrated services digital network) evolution, and security. To accelerate the pace of research, sub-committees were established to cover each of seven major topics. One sub-committee was jointly chaired by Naotaka Morita of NTT (who is also serving as vice-chair for SG 13). The study results obtained, along with the previously mentioned recommendations on architectures and general principles, were released *en bloc* for the step-by-step achievement of services and capabilities. Release 1 pertained to the advanced studies of multimedia (realtime voice,

image, multimedia meetings, data communications, etc.), PSTN/ISDN emulation and simulation, and other topics (e.g., VPN (virtual private network) and emergency communications), as shown in Fig. 1.

The FG concluded its studies in November 2005 and decided to convene a joint meeting of a number of standing ITU-T study groups (SGs), working parties (WPs), and Questions* so that the study results could be quickly presented as a recommendation in ITU-T, which is referred to as the NGN-GSI (Global Standardization Initiative). This was done to accelerate studies of a control protocol method for Release 1 and studies for Release 2 and later releases.

4. Studies of next-generation networks in Japan

The activities of the Next-generation Infrastructure Research Group, spurred through the initiative of the Ministry of Internal Affairs and Communications (MIAC), can be cited as one example of NGN studies in Japan. This group, established in February 2004, issued reports in three phases comprehensively dealing with R&D in Japan, the advancement of systems, conditions, and standardization, and the issues pertaining to them.

The Phase 3 report defined three key points: (1) with the major aim of 'Taking the lead as the world's foremost ICT (information and communication technology) nation by the year 2010' established as a principle of u-Japan policy, next-generation IP networks should be fully functional by 2010, and necessary surrounding preparations should be made well

* Question is a small group within an SG and WP.

before 2010, (2) an action plan should be established and implemented to include the advancement of compatible interfaces, studies of system aspects, measures to achieve international standardization, and the advancement of R&D, and (3) appropriate locations should be established for discussions among concerned parties.

5. Next Generation IP Network Promotion Forum

A voluntary group called the Next Generation IP Network Promotion Forum was established in December 2005, bringing together participating members from academic, commercial, and government organizations. To address the issues described in **Fig. 2**, the forum organized a committee to study interoperability and technical conditions, another committee to study means of promoting R&D and standardization, and a third one to formulate public relations and promotions. Of these, the R&D and standardization committee is studying ways to coordinate strategies and measures to achieve further advancements in technology with R&D that will enable ITU-T and other bodies to contribute to medium- and long-term ITU-T standardization. Participants include research bodies, universities, entrepreneurs, and vendors. Professor Koichi Asatani of Kogakuin University is serving as its chair. Specific issues are being studied in a highly efficient manner by a strategic studies working group (WG). This group is led by Professor Asatani and has three sub-leaders, one person each from NTT, KDDI, and

NICT.

The forum has been carrying out studies at a rapid pace since its establishment and expects to issue its first report in mid-2006. In conjunction with this, the R&D and standardization committee has also been diligently pursuing studies on its selected topics—the advancement of standardization and R&D—so that it can report its initial study results on ways to achieve such advancement.

ITU-T standardization in Japan is being supported in many ways. The ITU-T section of MIAC's info-communications council deliberates and approves standardization proposals to be submitted to ITU-T. In addition, TTC (Telecommunication Technology Committee), the body that sets Japanese telecommunications standards, is carrying out upstream activity aimed at the efficient development of proposals for submission to ITU-T. This has included the establishment of a special committee to handle key topics. Its members study related topics, exchange opinions, and prepare standardization proposals.

The forum's R&D and standardization committee is trying to identify medium- and long-range strategic topics and developing ideas that will serve as the basis for proposals. It is also studying measures to achieve further advances in technology and selecting fundamental R&D topics required for this purpose.

6. Concluding remarks

In the midst of full-scale studies on NGN by ITU and other organizations, a great many business activities have been carried out in Japan to achieve rapid

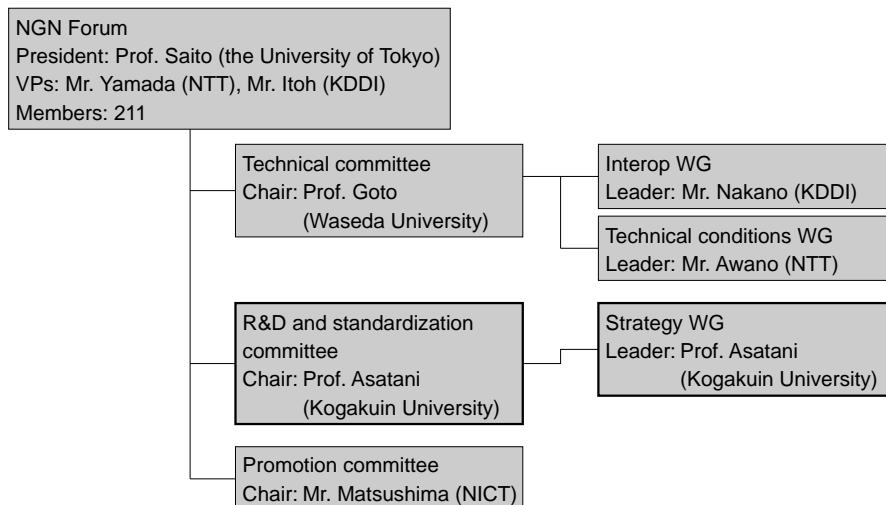


Fig. 2. Organization of the Next-generation IP Network Forum (as of Feb. 24, 2006).

development of NGN services and enhance Japan's competitive strength as the world leader in broadband technology. Based on this background, the Next Generation IP Network Promotion Forum was established, at approximately the same time that the NGN-GSI was instituted in ITU. It was determined that the forum should take the role of moving forward with strategic medium- and long-term development of next-generation networks. NTT intends to play an important role in these activities and continue to contribute towards making NGN a reality in Japan.

References

- [1] ITU-T Y.2001 Report.
- [2] Promotion Forum for Next-generation IP Networks: <http://www3.nict.go.jp/kk/e423/ipforum/>



Ichiro Inoue

Senior Research Engineer, Supervisor, NTT Network Service System Laboratories.

He received the B.E. and M.E. degrees in electrical engineering from the University of Tokyo, Tokyo, in 1988 and 1990, respectively. He joined NTT the same year. Since then, his research interests have included telecommunication protocols such as IP and ATM. He has been active in standardization such as ISO/ISC (as a national committee member), ITU-T, and IETF. He was a visiting researcher at Columbia University, USA, in 1995. He is a member of IEEE and the Institute of Electronics, Information and Communication Engineers. He is serving as a sub-leader of the strategic studies WG of Japan's Next Generation IP Network Promotion Forum's R&D and standardization committee.