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Special Article on All-IP Mobile Networks —Towards the Integration of Mobiles with the Internet—

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Due to the expansion of the Internet which uses an open, simple technology called the Internet Protocol (IP), fixed telecom networks are urged to undergo radical review and are shifting towards IP-based networks. Looking at the mobile communication networks via i-mode service introduction, so-called mobile Internet access services have blossomed and taken root based on the effective combination of mobile communication networks with the Internet. As a result, various IP-based applications are introduced as mobile services, and a large volume of IP traffic is flowing into mobile communication networks. However, the existing mobile communication networks merely provide the function to access the Internet; both routing and mobility control are provided in a framework based on phone numbers independent of IP, which are not necessarily suitable for IP transfers. Considering that IP traffic will grow and peer-to-peer services will increase in the future as mobile multimedia services evolve and become ubiquitous, there is an urgent need for mobile communication networks to shift towards IP, that is, to establish new IP-based mobile networking technologies that fully harness the internetworking flexibility and cost effectiveness. Furthermore, it is not enough to merely shift communication networks towards IP; it is important to provide platform technologies to increase the added value of mobile services as well.

With this in the backdrop, the Network Laboratories has been evaluating the applicability of IP technologies to mobile communication networks based on the "All-IP experiment" as part of its research on Beyond IMT-2000 mobile communication networks. Moreover, for the new integration of carrier mobile communication networks with the Internet, we have proposed and studied the architecture of IP^2 (IP-based IMT network Platform), which involves the shifting of all networks to IP based on the absorption of their respective merits. Amid the trend towards openness referred to as IP, the major challenge is how to absorb the characteristics that should be demonstrated by carrier mobile communication networks. There is much room left for research, for example, on the guarantee of high-speed mobility and Quality of Service (QoS), assurance of reliability and security, etc., which have not been fully addressed by the Internet so far.

This special article reviews IP^2 from five angles: network architecture; transport technologies; mobility management; service platform; and standardization and technical harmonization.

The research is still in the stage of basic study. Nonetheless, we intend to accelerate the research towards the development of a new network by effectively absorbing IP technologies, which are progressing at a rapid pace.