New Technology Reports

Special Articles on Seamless Mobile Communication Technology

Research Activities at DoCoMo USA Labs
—A new paradigm of mobile communication—

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The advent of a new generation of technology is always accompanied by a functional leap forward, which is accomplished by the combination of the evolution of existing technology, the application of new technology, and the development of a suitable business model to bring this technology to the market. For example, the latest mobile communication networks achieved a functional leap that, for the first time, enabled mobile terminals to access Internet services through the development of packet networks and the creation of new business models such as i-mode. In order to create new business models, it is essential to establish an incubation background of new technical advances.

However, the fusion of mobile communication networks with the Internet is still only at its early stages, and a seamless integration between the two has yet to be achieved. Roughly speaking, the functions that can be offered by current mobile communication networks are still just a subset of the functions available on the Internet as a whole. At DoCoMo Communications Laboratories USA, Inc. (hereinafter referred to as DoCoMo USA Labs), our aim is to develop a new paradigm of mobile communication by preserving the inherent capabilities of the Internet and accomplishing a functional leap forward by evolving new technologies that surpass the Internet's current capabilities, such as mobility, advanced security, real-time services, and high-quality media transfer. Our goal is to make our next generation of mobile communication networks a superset of the Internet in functionality. For this goal, it is essential to establish constituent technologies to support networks and client terminals with an integrated service platform.

Our approach toward technological evolution can be summarized as follows. With regard to the evolution of network technology, aimed at enhancing the reliability and added value of existing mobile communication networks without losing the flexibility of the Internet, we are studying Fourth-Generation (4G) mobile IP architecture and the access network technology to implement this architecture.

With regard to the evolution of technology for terminals aimed at introducing multimedia services by accelerating the evolution of secure, flexible and highly productive platforms, we are studying platform technology that supports the dynamic adaptation of middleware functions in which mobile operating systems are incorporated into mobile terminals. As a result, terminals will eventually constitute individual network nodes and will become integrated as part of the mobile communication platform.

With regard to key technologies, our studies are aimed at developing crypto and security technology to allow personal information to be utilized securely across large-scale networks in order to accelerate the development of personal services, and innovative high-performance media coding and high-order nonlinear signal processing technologies to facilitate high-quality media communication in order to hasten the arrival of multimedia services.