Preface
Special Issue on the Next-Generation IP Network

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The rapid growth of the Internet information society is dramatically changing the information technology (IT) infrastructure. We at Fujitsu view these changes as signs of opportunity and, in response, we have set ourselves the goal of becoming the world's number-one Internet solution provider, Internet platform provider, and Internet user. We are now conducting intensive R&D to not only achieve these goals, but also to direct the course of these changes and realize a vision for the coming information society.

This special issue of the Fujitsu Science and Technology Journal summarizes Fujitsu's vision, R&D direction, and key technologies for the next-generation IP network of the IT social infrastructure.

Without doubt, the dominant traffic of the next-generation network will be IP data, which means that the network should efficiently support IP data transport and Internet services. It should also be noted that the Internet itself is evolving and changing character. The next-generation IP network must therefore be able to sustain huge increases in the volume of IP data traffic, which is already growing faster than semiconductor technology can keep up with. The network must also support new IP trends such as the increasing demand for quality of service (QoS) and make it easy to deliver new services. Considerable changes in network architecture and technology will be needed to make this kind of network a reality.

One of the possibilities, which we refer to as the Virtual-Server-View network paradigm, is to make a total network look like a single server. The key technologies of this paradigm include a simple and reliable high-capacity data forwarding network and an advanced edge node that offers intelligent services coupled with high-performance servers. For the data forwarding network, photonic network technology will play

a key roll by providing a huge capacity with wavelength division multiplexing (WDM) technology and solving the electrical switching bottleneck problem by wavelength routing. Seamless connection with Ethernets will also be provided. Our basic platform for building a photonic network which offers these features is the FLASHWAVE-OADX series. As one of the world's leading companies in photonic network technology, Fujitsu is looking forward to making some very significant contributions in this field.

The base machine for the intelligent nodes of the new network is the recently developed Fujitsu GeoStream. This machine can handle high-speed IP packets, can provide carrier-class reliability and rich network functions such as traffic engineering and server load balancing, and can efficiently cooperate with high-end servers. By coupling it with high-end network servers and advanced middleware, both of which are also topics of intensive R&D at Fujitsu, GeoStream can provide the features needed for easy deployment of new services. We are currently working hard to enrich the intelligence of GeoStream so that it becomes the world's most advanced edge node.

Another important issue is terminal mobility. Advances in the mobile phone service infrastructure during the past decade have made wireless communication a major network access method, and terminal mobility has become one of the main requirements for realizing a ubiquitous computer environment. This trend will become more pronounced due to the introduction of the 3rd Generation (3G) mobile communication service, which offers a 10-fold to 100-fold increase in capacity with better transmission quality and uses the IPv6 protocol so that users can enjoy a wider address space and better security. Seeing the importance of mobility, Fujitsu has proposed a fixed/mobile convergence network vision which treats fixed-line terminals as mobile terminals having zero mobility. Here again, GeoStream will become a base platform for the nodes of this network.

By combining our expertise in photonic network technology, carrier-class intelligent nodes, and high-performance servers, we are preparing the next-generation IP network and will provide useful and attractive network solutions for both network operators and end users.

This is an ideal time to publish this special issue, and I hope that its contents will provide readers with helpful information about our vision and the technologies we are developing to realize it.