

1 Testbed Networks in NICT

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Network verification and experiments are important elements of study in a range of network-related fields. However, these activities sometimes face difficulties in implementation within the networks providing commercial services. As a result, efforts are now being devoted to the establishment of a number of networks dedicated to research and development. It is hoped that these networks, which can be compared to the test courses used by automobile manufacturers, will respond to the need for dedicated test environments, forming an essential pillar of future network studies and investigations in a wide range of information and communications fields.

Network testbeds are gaining increasing recognition abroad too—with public research institutes and universities managing and using these testbeds for advanced technology research, at the same time developing human resources in the field.

We at NICT operate the JGNII circuits connecting the domestic networks, USA, Thailand and Singapore, and the APII circuits connecting Korea and Hong Kong. The largest of these circuits, the R&D testbed network known as JGN II, has enabled studies on advanced networking technologies in areas such as transmission and quantum communication using Layer 3 and Layer 2 IP networks, GMPLS technology, and dark fiber technologies. Researches are also underway to develop applications by using these networks. As the JGNII has 63 access points in Japan, this enables verification experiments involving regional IT development and the like, thus allowing use for a wide range of experiments at various stages.

Although the JGNII project has only been operating since 2004, its predecessor, JGN

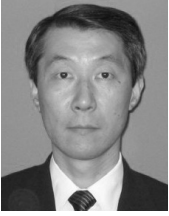
(1999–2003) has also become a vehicle for a number of networking and application researches based on high-speed networks.

The features of the JGNII are:

- (1) Handling external interfaces up to 10 Gbps through a high-speed backbone of up to 20 Gbps;
- (2) Enabling a wide range of applications by means of interconnection not only with its own domestic and foreign circuits but also with the external R&D networks both in Japan and in other countries;
- (3) Providing a practical experimental environment through 63 domestic and 3 foreign access points;
- (4) Being available to utilize dark fibers in various environments;
- (5) Enabling to perform experiments through advanced GMPLS and OXC equipment;
- (6) Enabling research under reliability conditions that match actual operational conditions, on a stable R&D platform.

Such features are attracting researchers both in Japan and other countries, especially due to the large scale of the network and its advanced technologies.

These R&D networks in NICT are utilized not only for various R&D projects led by NICT researchers but also in joint projects involving external researchers from the industry, academia, and government. This special issue presents a compilation of the results of all aspects of networking research, from physical layers to applications. We hope that these testbed networks will be utilized effectively in the industry, academia, and government, and contribute to a more prosperous worldwide community through the development of an ICT-based societal infrastructure.



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