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# 1 Special Issue on Traceable and Secure Networks

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## 1 Network security research at the National Institute of Information and Communications Technology

Our lifestyles have never been more dependent on information and telecommunication networks. While we greatly enjoy the benefits of these networks, various security-related issues associated with their use have now recently become a topic of wide concern. To address such problems, the National Institute of Information and Communications Technology (NICT) is conducting research under two approaches.

The first approach is driven by research and development within the Information Security Research Center. This research center is the part of the “ICT for security and safety” research area which has been defined as a part of NICT’s new 5-year mid-term research plan, to cope with such issues. We are intended to be the leader of research and development in establishing safe and secure life of people through info-communication technologies.

Research and development at the Information Security Research Center progresses under two broad concepts. One is the implementation of tractable networks by combining technology for countering malicious software — including viruses, time-and-space-independent traceback technology, and cryptographic technology for protecting information. The second concept is ICT-based disaster prevention and reduction, which enables to take ICT beyond daily convenience to help save lives and property in emergencies.

The second approach involves research and development of security technologies under commissioned research. To promote more effective research and development, this approach takes advantage of the facilities and research and development skills found in private companies and other organizations. NICT determines project themes through deliberations by an evaluation committee, calls for project proposals, selects the best proposals through further deliberation by the committee, and entrusts the implementation of the accepted projects to the private companies or universities that proposed them.

An example of a commissioned research project is seen in research and development for Internet traceback technologies, which began in 2005 as one of a number of network-security research and development projects. This project involves research and development toward the application of traceback technology to the practical operating environment of the Internet. Research plans are scheduled up to 2009. This project has already produced a number of achievements by 2008. The research plans and results are not described in this issue. Please access the website of the Commissioned Research Promotion Group of the Collaborative Research Department at NICT for detailed plans and results of this research project.

## 2 Research on traceable network technologies

On these researches in the Information Security Research Center, traceable network

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technologies are considered one of the most promising candidates for ensuring the security of information and telecommunications by tracing back the origin of transmissions, regardless of time and location, as discussed above. The Traceable Network Group in charge of this research has been pursuing its research during the approximately two years since its establishment.

This special issue introduces the latest achievements and technical trends at NICT regarding traceable network technology, the key to ensuring safety and security in an open network society.

In the background of this research, use of open-type networks has advanced in non-specialists, and thus technologies for identifying the causes of problems and preventing recurrences based on the assumption that accidents will occur are increasing in importance as technologies to complement conventional security approaches based on preventive measures. In addition, as networks become faster and applications become more complex, real-time response to accidents by human operators is approaching its limit. It is urgent that we

automate monitoring and analysis and that we construct systematized techniques for retrospective analysis.

The Traceable Network Group has gathered together the latest achievements in each of the diverse fields of information science, fusing theoretical, methodological, and systemic research activities, aiming to provide solutions to the fundamental problems in this realm. The subsequent sections first report on the research objectives, research strategies, and theory behind techniques used in traceable networks. Specialists in each of the technologies then report their results in the fields of: cryptography theory, machine-learning theory, parallel-inference technology, parallel-computing technology, virtual-computer technology, and virtual-network technology.

With the responsibility and mission brought by being the sole research unit within government agencies that explicitly handle safety and security in and by info-communication technologies, we would like to steadily conduct our research and development activities for the day that ICT not only means convenience, but also safety and security.



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