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NiCT

Development of Practical IP Traceback Technology

Daisuke Miyamoto

Expert researcher, Traceable Secure Network Group, Information Security Research Center

He received his PhD degree in Engineering from Nara Institute of Science and Technology (NAIST), Japan in 2009. He also received M.Eng degree from NAIST in 2002, and B. Commerce degree from Kwansei Gakuin University in 2000. He is a researcher at NICT. His current interest is IP Traceback, Phishing, and Network Emulation Test bed.

Nature of the IP Traceback Technology

A variety of cyber attacks are active on the Internet. Particularly, operators of each Internet Services Provider (ISP) regard the Denial of Services (DoS) as the most serious attack of all. Source IP address spoofing is commonly used in DoS attack, causing the detection of an attack source to become difficult. Moreover, attacks of this type prevent victimized ISPs from taking any countermeasure, and thus give rise to such a problem that no viable measures against the attacks can be formulated unless users of the whole Internet systems take cooperative actions.

IP traceback technology facilitates tracing the transmission source of a specific packet. In an event of cyber terrorism attack, this technology allows the user to search for the true transmission source of a sender even if its address is camouflaged.

Mechanism of IP Traceback

In the IP traceback system, the user at a linked terminal unit first issues a tracking request for a packet that is assumed to be "an attack". A piece of packet data is encoded with a unidirectional hash function*1, and transferred to a traceback system within an autonomous system (AS) to which the user belongs.

The requested traceback system examines each packet to determine whether it is coming in from an external source or from its own system. When the issued packet is coming from a neighbor AS, the IPTBS queries a trace request to the AS.

By transferring a request query recursively, IPTBS identifies an actual AS where the attack source belongs.

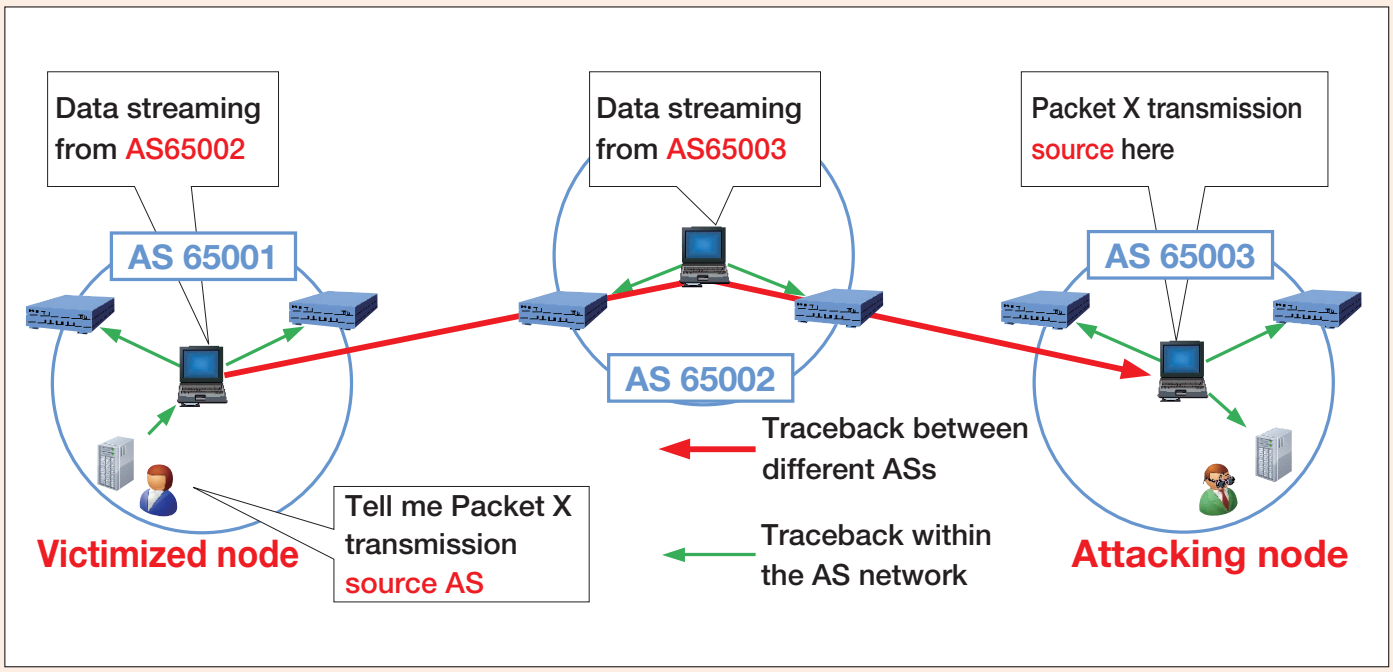


Figure 1●Mechanism of the IP Traceback Technology

Efforts for Market Deployment

With the aim of allowing the IP traceback technology to deploy on the Internet, the Traceable Network Group is working on three areas, namely, international standardization, verification tests, and open source systems.

For international standardization, we carry on the standardization activities regarding the data and their protocols exchanged between business operators for the entire countermeasures including the IP traceback technology against cyber attacks. Currently, we participate the Study Group 17 in the International Telecommunication Union Telecommunication Standardization Sector (ITU-T), and the Source Address Validation Improvements Working (SAVI WG)*3 Group in the Internet Engineering Task Force (IETF)*2.

Moreover, we performed a field test as a model case for IP Traceback deployment of deploying IP Traceback system. Our field test is designed to verify IP traceback technology in fiscal year 2009 by having collaboration of 15 ISPs located throughout Japan from Hokkaido to Okinawa. In this test, we succeed in the tracing a cyber attack with a spoofed source IP address. Note that the traceback test covering multiple ISPs has been the world's first trial.

Further, in order to accelerate the introduction of IP traceback technology, we developed “InterTrack” as a reference implementation*4 in open sources license. Anyone is allowed to make use of it for any purpose, regardless of whether it is a commercial or non-commercial application, by freely modifying it.

* Download source: http://intertrack.naist.jp/

Future Perspective

To encourage ISPs to introduce IP traceback systems, a variety of challenges including nontechnical issues must be considered. While the IP traceback technology is, by nature, designed to identify "who is communicating with whom", we often come across a query that this function may violate the "protection of confidentiality of communications". At the current stage, we continue consultation with judicial professionals so that we can perform IP traceback procedure as "legitimate business acts".

Furthermore, in order to operate the IP traceback system, we need to provide some arrangements to ensure that each ISP operator can grasp who the unit is connected to and/or which packet the system is tracing. At present, we work on the development of such operation support tools and the production and distribution of installation and operation manuals.

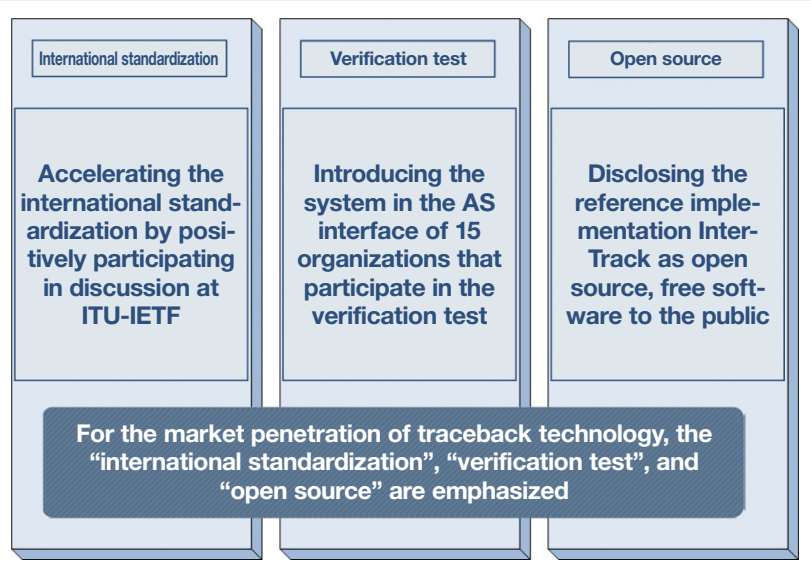


Figure 2●Efforts for Market Penetration

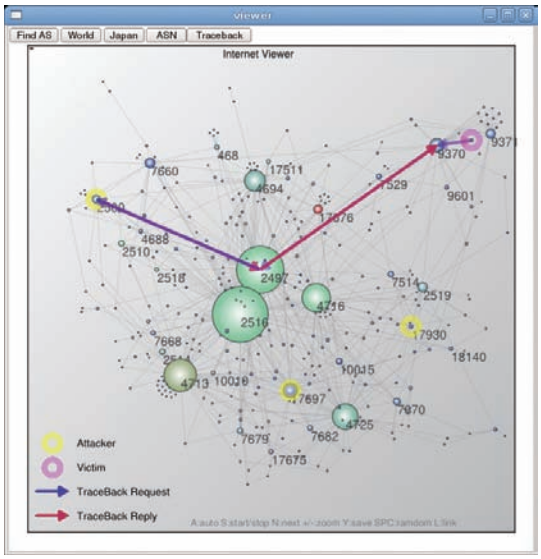


Figure 3●Visualization of IP Traceback

Terminology

∗1 Hash function
A function that converts a piece of data into a fixed-length string having such a characteristic that it gives extremely low probability of either inferring the original data from a string after conversion or outputting identical strings from different pieces of data.

∗2 IETF
The acronym of "Internet Engineering Task Force"

∗3 SAVI WG
SAVI is the acronym of "Source Address Validation Improvements".
A working group studying mechanisms for preventing a source address theft in a LAN environment

∗4 Reference implementation
This refers to a piece of software that has been created with the objective of verifying actual functions of a design or assisting another party to generate its own software by referring to the subject software. A reference implementation may take place not only in software, but also in hardware.

Security Information Exchange Framework

Toward Cybersecurity on a Global Scale

Takeshi Takahashi

Researcher, Traceable Secure Network Group, Information Security Research Center

He has received a PhD in Global Information and Telecommunication Studies from Waseda University Japan. He worked for the Institute of Communications Engineering of Tampere University of Technology in Finland as a researcher from 2002, for the Department of Global Information and Telecommunications Studies of Waseda University Japan as a researcher from 2004, for Roland Berger Ltd as a strategic consultant from 2006, and from 2009, is working for National Institute of Information and Communications Technology as a researcher. His research interests includes communication protocols, cybersecurity information, and multimedia techniques.

Background of the Research Activities

Global penetration of the Internet in recent years has accelerated the rapid evolution of cyber society. However, the security in cyber society—cybersecurity—still remains in the developing stage. While the threat on cybersecurity comes from beyond national borders, the countermeasures are currently taken by individual organizations. Typically, a malicious user can always attack computers on four corners of the world simply by hitting the return key; however, the countermeasures are implemented by individual organizations. The information exchange and sharing for such collaboration are still so inefficient that they require communication through e-mail, telephone calls, and/or meeting in person wasting time and human efforts.

One of the causes for generating such a situation is attributable to the lack of a globally common format and framework for exchanging cybersecurity information among organizations involved. To implement cybersecurity measures by collaborative efforts by organizations, the information exchange format and framework must be globally shared. Sharing them allows those concerned to enjoy the following two major advantages:

One of the advantages is the reduction of regional differences in cybersecurity information on a global scale. This assists those developing nations currently having scarce information on cybersecurity to acquire information and also substantially diminish such attacks that would abuse computers used in developing nations and damage objects in advanced nations.

The other advantage is the accelerated rationalization of cybersecurity operations. By advancing the automation of cybersecurity operations, the operators can work on the services that have so far been left untouched because of manpower shortage, and can concurrently avoid human errors.

Building the International Standards CYBEX（X.1500）

To build the above-mentioned information-sharing framework, we are currently working on the international standards for exchanging cybersecurity information between organizations, called CYBEX* (Recommendation ITU-T X.1500). The subject of CYBEX is the information exchange between cybersecurity organiza-

*CYBEX: Cybersecurity Information Exchange Framework

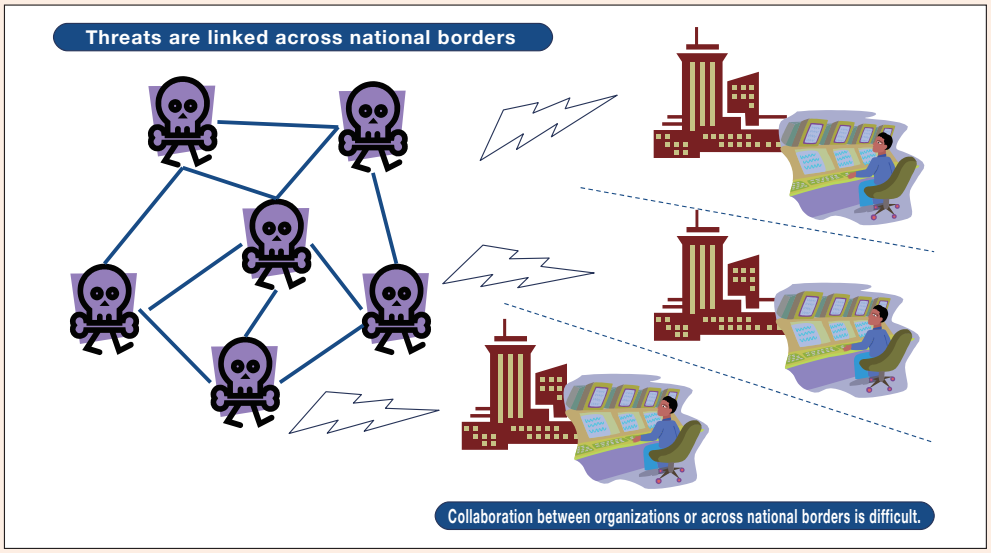


Figure 1●Measures Subordinate to Threats

tions. The approaches taken by cybersecurity organizations to acquire information and to make use of it are beyond the scope of CYBEX (Figure 2).

To realize the cybersecurity information exchange, the CYBEX specifies each of the information-rendering method, detecting and exchanging method, enquiry method, reliability-enhancing method, and transferring methods. Particularly in the information-rendering method and detecting and exchanging method, our ontological engineering studies described later play a significant role. Although CYBEX is still under development, we intend to materialize them into real standards in order to establish the approaches protecting the cyber society in Japan and the world.

Ontology as a Basis for Information Exchange

As one of the activities contributing to CYBEX, we have built an ontology of cybersecurity operational information (Figure 3). While the term ontology refers to a model of a world at a conceptual level, here we modeled cybersecurity operations extracted from actual present such operations. In Figure 2, three types of structured models are built, namely, cybersecurity operation domains, entities needed in each of the domain, and cybersecurity operational information needed for the entities' operations. During the process of building the ontology, we iterated intensive discussion with cybersecurity organizations including cybersecurity operation centers running cybersecurity operations in the United States, Japan, and Korea, and the knowledge of advanced cybersecurity nations is fully utilized and reflected to the ontology.

The ontology enables more structured and logical discussion for studying which player requires what sort of information, and what type of information is needed in a cybersecurity operation, and thus it serves as the basis for discussing information exchanged in CYBEX in a comprehensive manner. Although various movements for industrial standards have been known, they have often resulted in partially optimum and in becoming standards for specific purposes. Different from them, CYBEX aims at becoming a standard with a wide view of cybersecurity operations by conducting studies based on this ontology.

Toward Global Cybersecurity

We the NICT Traceable Network Group are studying the approaches and techniques required for sharing cybersecurity information as pieces of "knowledge". Besides those introduced here, we also carry on studies and development of approaches for effectively finding cybersecurity information existing in the world. We also contribute to the international standardization activities introduced here in order to turn the results of our studies into more effective forms for the present society. For more details, please visit our Web site, http://CYBEX.nict.go.jp/.

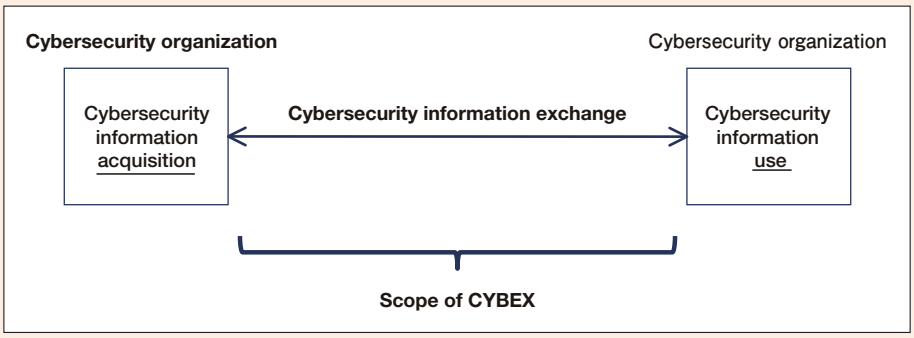


Figure 2●Scope of CYBEX

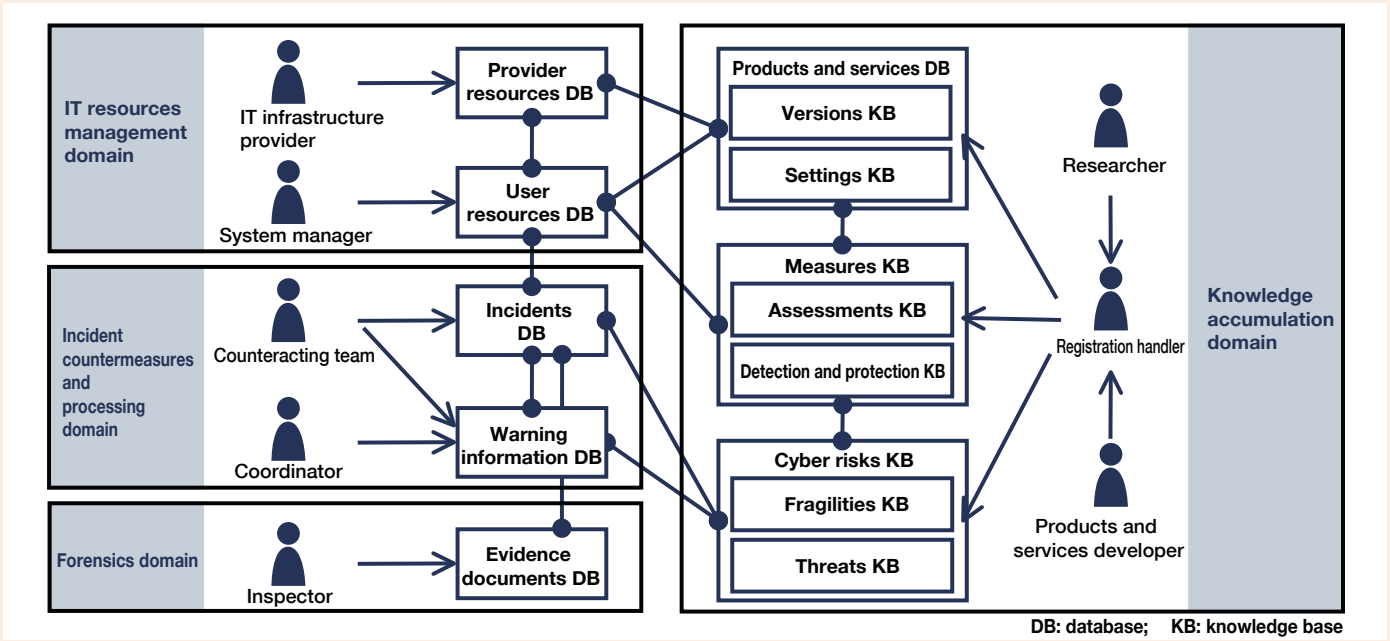


Figure 3●Ontology of Cybersecurity

Minimal-attacks/Malware Analysis Testbed

Know Your Enemies

Shinsuke Miwa

Senior Researcher, Traceable Secure Networks Group, Information Security Research Center

After completing a doctorate course, he first became an assistant at the Japan Advanced Institute of Science and Technology, and in 2001, entered the Communications Research Laboratory (current NICT). He specializes in the research of emergency communications and security testbeds. He is a PhD in Information Science.

Malware as a Continuous Threat

Although it has become infrequent that appearance of malware disturbs mass media, incidents such as a piece of malware constituting a direct or indirect cause of trouble still takes place. Today, different types of malware having a variety of functions such as Trojan horse, key logger, root-kit, and downloader are used in combination, and are constantly on alert of a user's momentary inadvertence to intrude the user's e-mail, Web site, USB flash memory, and other various infection paths.

Numbers of terminal units and users are on the increase at most organizations, and thus they are subjected to increasing number of malware attacks.

Proactive Measures and Afterward Measures

Countermeasures against malware can be classified into proactive measures and afterward measures. Most organizations invest in proactive measures: (1) even if a user is inadvertent, his or her system should not be infected, and (2) when malware invasion is the case, the damage caused by the malware can be avoided with the use of anti-malware tools.

In contrast, how can the afterward measures work? In the case of malware infection because of the user's inadvertence, what would be the best remedy? Or else, what should we do when malware has diffused through the internal network? Such a possibility can no way be denied.

Key Issues in the Present Afterward Measures

In many organizations, a large-scale worm pandemic through its internal network would be termed as a bitter experience and most probably be frozen. Users in general may put up with it, but can the security incident response team be allowed to freeze such a bitter experience for good and all?

A security incident response team is normally expected to make calm and exact decision based on experience and knowledge. Suppose a security incident response team member has never seen or touched a worm, mass mailer, root-kit, and the like, would you think he or she can make a calm and exact decision in an incident of abnormality? We thought that this point is a serious issue.

We are of the opinion that we should keep studying not only the proactive measures, but also the afterward measures.

Terminology

- **Malware:** A generic name of software with malicious intent of harmful actions.
- **Trojan horse:** A piece of malware in a file that is once stored in a computer, and then becomes active when the file is executed.
- **Worm:** A piece of malware, which being an independent piece of software by itself, requires no host file that is infected.
- **Key logger:** A program for recording keyboard inputs. It may be used as malware secretly installed to steal credit card numbers and passwords.
- **Root-kit:** An assortment of software tools used to illegally intrude a computer. There has been a case where a music CD containing a root-kit was sold in the market.
- **Downloader:** A piece of software used for downloading files. A certain type of malware caused other types of malware to be downloaded and exhibit different behaviors.
- **Computing cluster:** An aggregate of two or more computers.
- **VPN:** Acronym for Virtual Private Network. A type of network that turns a common network such as the Internet into a dedicated line, by encrypting pieces of data.
- **Mass mailer:** A program used for transmitting a large number of e-mails (particularly, spam mails directed to unspecified recipients) in a short period of time.

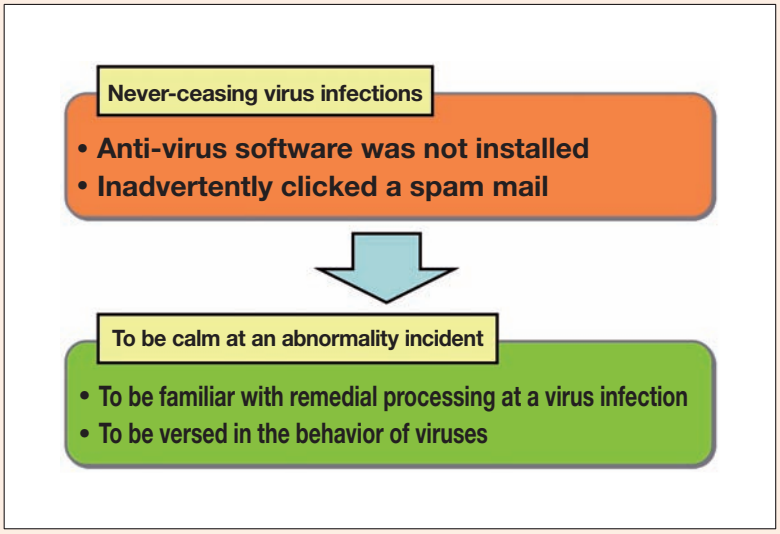


Figure 1●Need for Being Adept to Afterward Measures

Configuration of the Minimal-attacks/Malware Analysis Testbed

On the Minimal-attacks/Malware Analysis Testbed, a piece of actual malware is executed in an environment where an internal network of a company is reproduced and the behavior is analyzed from both aspects of host and network to allow the users to experience the countermeasures in a hands-on trial manner.

NICT has so far carried out research and development efforts on the Minimal-attacks/Malware Analysis Testbed, that composes the testbed configuration technology, network-simulating technology, specimen database-building technology, and experiment control technology. As a grand sum of these technologies, we have successfully reproduced attacks of malware and other vicious tools to conduct prompt analyses in a perfectly isolated environment.

Characteristics of the Minimal-attacks/Malware Analysis Testbed

In the Minimal-attacks/Malware Analysis Testbed, no virtual machine is used but actual PCs, and thus, a piece of malware that cannot be reproduced on an actual PC can be readily handled. Moreover, because the actual OS and applications can be used on the testbed, we can assure high precision of reproduction.

The user can observe the diffusing behavior and file rewriting process of the subject malware in the computing cluster constituting the Minimal-attacks/Malware Analysis Testbed, and then acquire the primary analysis results. Because the experiment can be controlled through VPN, the user can conduct the reproduction and analysis without physically reaching the facility.

Additionally, because more users can use the system in parallel and each user is isolated from any influence from others, he or she can perform a prompt analysis. At present, a reproducing operation is confirmed to be completed within 10 minutes after charging a specimen.

Toward Exact and Prompt Afterward Measures

Currently, the Minimal-attacks/Malware Analysis Testbed is subjected to an □ test, where a number of cooperative organizations are conducting tentative operation test. Concurrently, we have submitted the results of primary analysis of malware to a number of academic societies, thus contributing to their research and development studies for their own network security technologies.

NICT Traceable Secure Networks Group is now working on the development of a technology to promptly reproduce malware in an analyzing environment that is close to reality and evaluate remedial measures in order to implement secure afterward measures against every piece of diversifying malware. We believe that exact comprehension of phenomena allows us to implement secure afterward measures and further contribute to the prevention of recurrence.

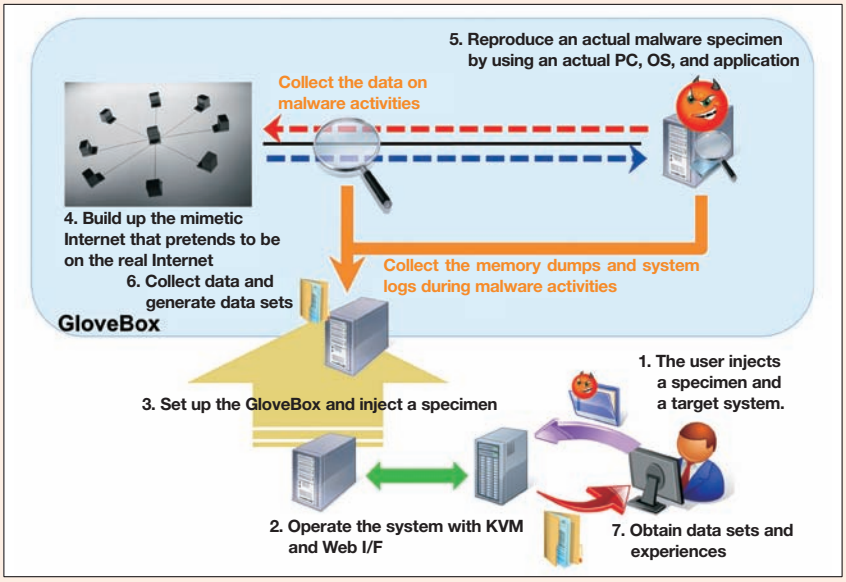


Figure 2●Configuration and Overview of the Minimal-attacks/Malware Analysis Testbed

Note: Results of primary analysis: primary data such as the main body of a malware program spread on the memory at the malware execution, associated data, and details of communications at the execution. The above-mentioned data include information that cannot be collected without actually executing the malware.

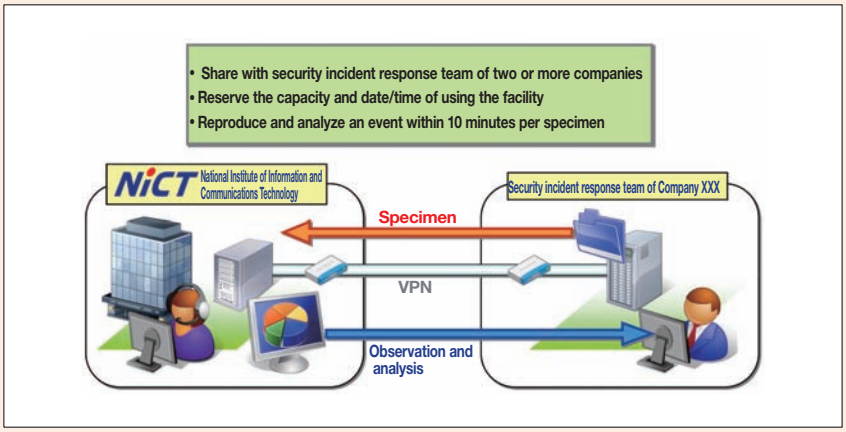


Figure 3●Concept of Using the Minimal-attacks/Malware Analysis Testbed

We are currently calling for our contract α monitors who will be asked to evaluate the conformance and performance of the Minimal-attacks/Malware Analysis Testbed (MAT2008).

Each contract □ monitor will be given an access account for MAT2008 and the □ version data set in accordance with the non-disclosure agreement, and allowed to conduct the hands-on training and experiments for tester's system evaluating by actually using the □ version of Minimal-attacks/Malware Analysis Testbed. Please note that a contract □ monitor will be asked to submit a few reporting documents. If you are interested, please contact the following:
Email: mat-request@starbed.org

Placing the Unit Enables Communications Innovative Information Interface

Creating Intellectual Living Space through Surface LAN

Bing Zhang

Senior Researcher, Medical ICT Group, New Generation Wireless Communications Research Center

After completing a doctorate course, She entered the Radio Research Laboratory, Ministry of Posts and Telecommunications (reorganized into the present NICT).
In 1995–1996, she received training as a doctorate researcher at Tennessee University.
Since 2000, she was dispatched to ATR Adaptive Communications Research Laboratories and returned to NICT in 2005. Then she was engaged in research activities on ubiquitous communications, multimedia communications, and communication quality management. She concurrently works as a guest researcher at the ATR Adaptive Communications Research Laboratories. She is a PhD in engineering.

Sheet Medium for Communication

With the progress of ubiquitous society and a variety of terminal units and realization of an environment where information appliances are connected by either wired or wireless systems, introduction of innovative communication systems that overcome challenges pertaining to wired or wireless systems is anticipated. We are carrying on research and development efforts for an innovative communication technology employing a sheet medium for communication, which has the advantages of both wired and wireless systems and compensates for disadvantages.

This technology enables the concurrent services of high-speed, broadband communications and power supply by using a 2D (two-dimensional) sheet as a communication medium. Characteristically, since such interfaces between human beings, machinery, and environment as the floor, walls, and cloths function as a network, a new form of communication and communication areas that are designated "Surface LAN" can be provided. Because this communications technology does not require wiring for each terminal and avoids diffusion of radio wave in the space, while permitting the high speed of wired communications, it assures both high security and convenience. Thus, its applications in a wide range of fields are expected.

Typically, the users can be liberated from complicated wiring on the conventional AV racks, and thus create a cable-free living space. Additionally, because the system does not interfere with radio wave in the space and can supply power, it can provide a public space that has not been available (Figure 1). Furthermore, by attaching a large number of minute sensors to a flexible communication medium, the system can collect data on human body movements and biological characteristics and consequently control health care and nursing devices.

Digital Scope System with Sheet Medium for Communication

We are working on the research and development of a batteryless communication panel that constitutes a new information interface that supports the intellectual collaborative operations performed by two or more human beings by making use of the 2D sheet as a communication medium. Its principal characteristic is such that just by placing a lightweight communication panel on the 2D interface, the sheet automatically detects the location and angles to enable the tranceiving/display of a large-size content and also supply power. Particularly, based on the precisely assumed positioning data (within 1 cm aimed at) of the communication panel, details of the position can be magnified and displayed, and thus the system can be applied as a digital scope to learning materials, catalogs, tourists guide, X-ray image of building, and various other purposes. For example, as shown in Figure 2, we have developed a digital scope system called "World Corridor". Along the "World Corridor", we can enjoy an around-the-world trip with family and friends while staying at home. Depending on the position where the communication panel is placed, the scenery image of the place on the map can be gradually magnified by zooming in; details of living creatures in the sightseeing spots can be visualized as shown in Figure 3.

Figure 1●Concept of Cable-Free Public Space in a Surface LAN

Figure 2●Terminal Unit Location and Direction-dependent Content System: "World Corridor"

Content Display System

As to the application of our sheet medium for communication, we also work on the research and development of a few content display systems for small-size displays in collaboration with a few manufacturers. On the back of a small-size electronic display, a coupler (a conversion device) for proximity communications is mounted to perform the communication from a content server to the small-size electronic display through the sheet medium for communication. The content display system that has been developed by us works in such a way that the proximity and/or nonproximity information exchanged between the two or more small-size displays placed on the sheet medium for communication is obtained, and the content is displayed in accordance with their interrelationships (Figure 4).

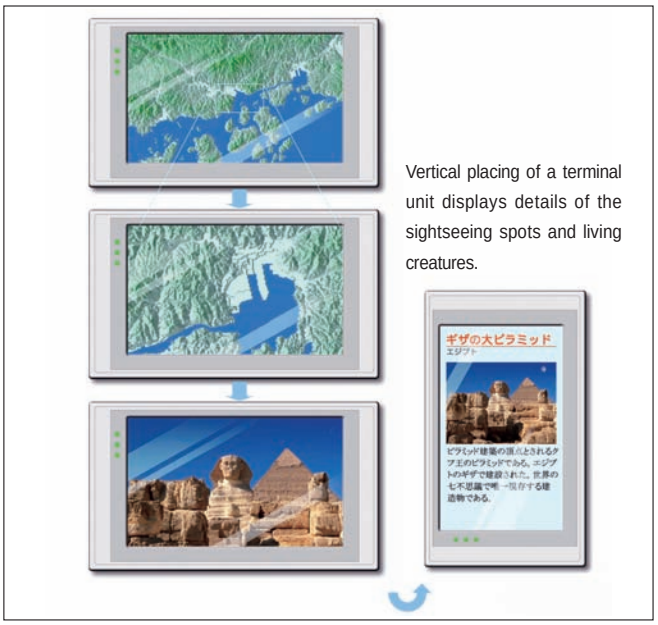


Figure 3●Visualization of the Interrelationships Between Panel Placement Location/Direction and Content Information

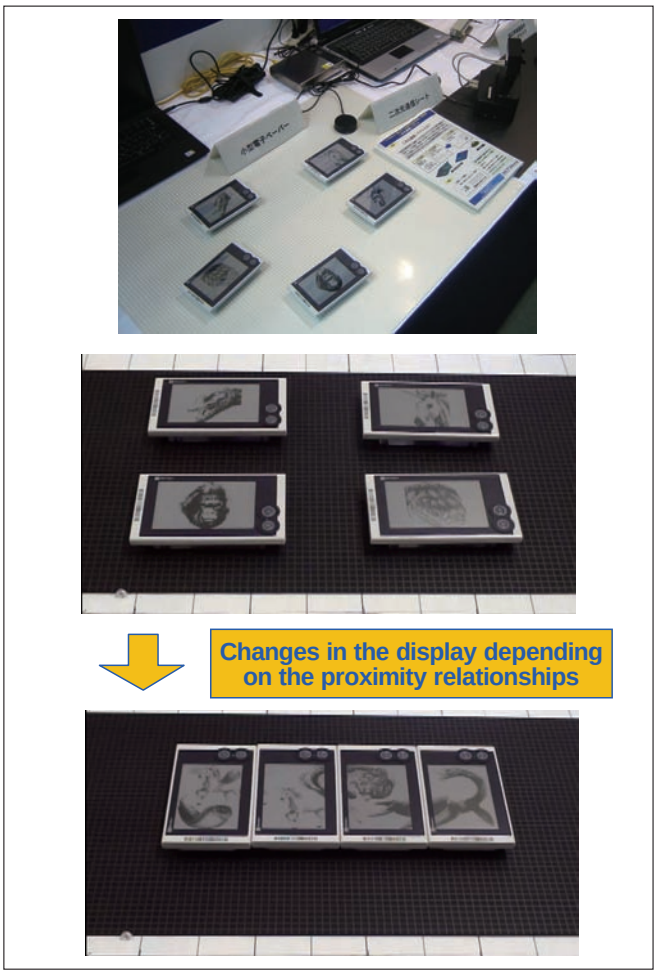


Figure 4●Content Display System Comprising Two or More Linked Small Displays

Contactless Power Transmission has Become Feasible.

For the power supply on the other hand, contactless power transmission is implemented by means of near-field communication, the behavior of which is shown in Figure 5. Against a small-size device, electromagnetic wave is propagated among the entire sheet that functions as a medium, and by allowing the proximity coupler to approach the medium surface, both communication and power transmission can be effected. However, to implement a high-efficiency contactless power transmission to a laptop PC of a few-watt capacity, it is required to concentrate the electromagnetic wave on a location where the terminal unit is placed, rather than evenly propagating the electromagnetic wave on the entire sheet. Currently, we are developing a system to converge the power on a place where a terminal unit is placed, by autonomously adjusting the Phase-Conjugation of Multiple Inputs, which we will adapt to a variety of applications to be developed.

Future Perspective

In recent years, the research and development of not only the communication technology using sheet media, but also the wireless power transmission coupled with near-field signal transmission has become remarkably active. Our research and development work includes the search for a variety of possibilities with the aim of exploiting the killer applications for the near-field signal transmission coupled with power transmission, which are expected to evolve substantially in the near future. Particularly, while verifying the possibility of the realization of ultrahigh-speed near-field communication for gigabit communications, we will ensure Japan's leading position in the new communication technology of proximity communication coupled with contactless power transmission, and we will energetically boost the international standardization activities.

Figure 5●Performance of Contactless Power Transmission to the Small Devices Including Loudspeakers, LED Lights, and Monitors that are Placed on Arbitrary Locations on a Sheet Medium for Communication

Prize Winners

Prize Winners ● **Kanako Wake** / Senior Researcher, Electromagnetic Compatibility Group, Applied Electromagnetic Research Center
● **Masao Taki** / Invited Advisor, Electromagnetic Compatibility Group, Applied Electromagnetic Research Center
● **Soichi Watanabe** / Research Manager, Electromagnetic Compatibility Group, Applied Electromagnetic Research Center

◎Joint Prize Winner : Nadege Varsier
Former Assistant Researcher, NICT (Currently at the Common Laboratory of Institute Telecom and Orange Labs, France)
◎DATE : September 16, 2009
◎NAME OF THE PRIZE : **IEICE Communications Society Best Letter Award**
◎DETAILS OF THE PRIZE :
Effect of Heterogeneity of Tissues on RF Energy Absorption in the Brain for Exposure Assessment in Epidemiological Studies on Mobile Phone Use and Brain Tumors
◎NAME OF THE AWARDING ORGANIZATION :
IEICE Communications Society

◎Comments by the Winner :


From Left: Souichi Watanabe, Kanako Wake

With the widespread of mobile phone, there are public concerns about possible biological effects of electromagnetic field from mobile phones. An international epidemiological case-control study called INTERHONE study had been conducted to investigate possible association between brain tumor incidence and the use of mobile phones. One of the key issues in such epidemiological study is the assessment of the exposure due to mobile phone use. As part of the above-mentioned epidemiological studies, we have evaluated the effect of the heterogeneity of brain tissues to the specific absorption rate (SAR) due to the use of mobile phone, and found that it was quite reasonable to use SAR measured for compliance testing to estimate SAR in the brain for epidemiological studies. We feel greatly honored to have been rewarded and extend our heartfelt appreciation to all the persons who have given valuable guidance to us.

Prize Winner ● **Roberto Lopez-Gulliver** / Expert researcher, Multimodal Communication Group, Universal Media Research Center

◎DATE : March 4, 2010
◎NAME OF THE PRIZE :
Galardon"Lic. Antonio Leano Alvarez del Castillo"
◎DETAILS OF THE PRIZE :
For his research contributions to the fields of Multiuser Interaction Environments and 3-D displays. (Distinguished Graduate Award. Category: Research)
◎NAME OF THE AWARDING ORGANIZATION :
Universidad Autonoma de Guadalajara (Mexico)

◎Comments by the Winner :

One of my research goals is to provide interactive virtual environments for multiple users utilizing natural and intuitive interfaces. Thus supporting face-to-face collaboration among a group of people. Towards this end, we have developed a number of prototypes, among them: a) a multi-touch internet image browsing system, and b) a graspable, glass-free, stereoscopic 3D display, called gCubik, that allows multiple users to share 3D images in a natural way. This award is a great incentive for us to keep contributing to the field of human computer interaction with our approach to multi-user shared 3D media and displays.

Prize Winner ● **Kentaro Torisawa** / Group Leader, Language Infrastructure Group, Knowledge Creating Communication Research Center

◎Joint Prize Winners :
Asuka Sumida (KDDI R&D Laboratories)
Naoki Yoshinaga (Institute of Industrial Science, the University of Tokyo)
◎DATE : March 10, 2010
◎NAME OF THE PRIZE : **2009 Best Paper Award of the Association for Natural Language Processing**
◎DETAILS OF THE PRIZE : Hyponymy Relation Acquisition from Hierarchical Layouts in Wikipedia
◎NAME OF THE AWARDING ORGANIZATION :
The Association for Natural Language Processing

◎Comments by the Winner :

The Best Paper Award is given each year to one article selected from a number of articles published in the Journal of Natural Language Processing. I received this honour together with a student and a post-doc fellow who were under my supervision when I was serving as an associate professor at the Japan Advanced Institute of Science and Technology. The article presented an automatic method for constructing a dictionary from Wikipedia. An implementation of the method has been released by NICT as a free software.

Prize Winners ● **Satoshi Nakamura** / Executive Director of Knowledge Creating Communication Research Center
● **Eiichiro Sumita** / Group Leader, Language Translation Group, Knowledge Creating Communication Research Center
● **Shigeki Matsuda** / Expert Researcher, Spoken Language Communication Group, Knowledge Creating Communication Research Center
● **Andrew Finch** / Expert Researcher, Language Translation Group, Knowledge Creating Communication Research Center

◎Joint Prize Winner : Toru Shimizu
Former NICT Research Expert, NICT (Currently at the KDDI Corporation)
◎DATE : April 13, 2010
◎NAME OF THE PRIZE : **Prizes for Science and Technology of the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (Development Category) in Fiscal 2009**
◎DETAILS OF THE PRIZE :
Development of multilingual automatic speech translation system
◎PRESENTER OF AWARD : Minister of Education, Culture, Sports, Science and Technology

◎Comments by the Winner :

From Left: Andrew Finch, Toru Shimizu, Satoshi Nakamura, Eiichiro Sumita, Shigeki Matsuda

The development of multilingual automatic speech translation systems has been recognized as a remarkable contribution to the development of the science and technology of Japan, and has thus been awarded this prize by the Minister of Education, Culture, Sports, Science and Technology. These systems are a result of the successful development of corpus-based speech translation technology based on the speech and text corpora and statistical models, which came about through years of studies on the speech translation. We would like to extend our heartfelt gratitude to each and every member of the MASTER project for his/her cooperation in this development. From now on,we will further exert my our full effort for the improvement of speech recognition, translation, and speech synthesis technologies to further implement speech translation.

Report on the 2010 Summer Science Camp

We held the 2010 Summer Science Camp* at the Kashima Space Research Center for three days from Wednesday, Aug.25 to Friday, Aug. 27, 2010. Featuring "Let us feel close – to the Space, the Earth and Radio Waves" , we had eight high school students (boys and girls, four each) from various parts of Japan (Figure 1).

On Day 1, after the opening ceremony, we held a hands-on training, under the guidance of the Senior Researcher Toshihiro Kubooka of the Space Communications Network Group, of determining the location of stationary satellites, by the relative location between fixed stars and the satellite, by using a star chart comparing the image of a stationary satellite in the peripheral area taken with an optical telescope (Figure 2).

On Day 2, the visitors climbed up to the top of 34-meter-high parabolic mirror. Under the guidance of Senior Researcher Shin-ichi Yamamoto of the Space Communications Network Group, on the theme "Satellite Communications are Yours", they experienced a satellite communication by using the Engineering Test Satellite VIII “Kiku No. 8 ”(Figure 3). Then, they had a lecture entitled "Try Radio Wave Astronomical Observation" given by Subleader Ryuichi Ichikawa of the Space-Time Standards Group. At night, a celestial observation meeting using an astronomical telescope was held to observe a number of stars and, furthermore, International Space Station, which impressed all the visitors. On the final day, they watched the radio wave emitted from the sun by using a BS antenna and a receiver built up by themselves (Figure 4).

The participants, who were nervous at first became finally relaxed and friendly with one another during the night meeting after the lecture, helped each other in the hands-on training on Day 2 and Day 3. Some of them said, "I am excited to have friends having common interests". Thus, each of them enjoyed a good and meaningful time during the summer vacation.

Figure 1●Participants and the Staff

Figure 2●Lecture on “The Life of a Stationary Satellite”

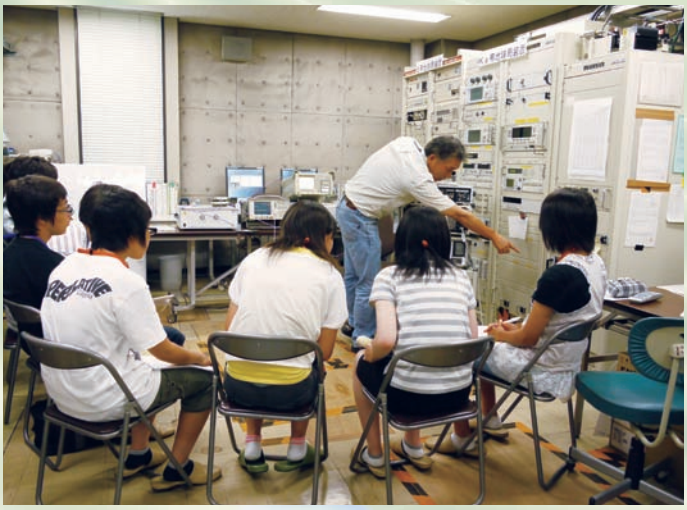


Figure 3●Experiment of Satellite Communication

Figure 4●Experiment of Radio Wave Observation

*Summer Science Camp is a special training, camping program which is designed for enhancing interests in science and technology among high school and technical college students. This is sponsored by Japan Science and Technology Agency and operated by Japan Science Foundation. Universities and public research organization offer their characteristic learning as lectures and practical to participants.

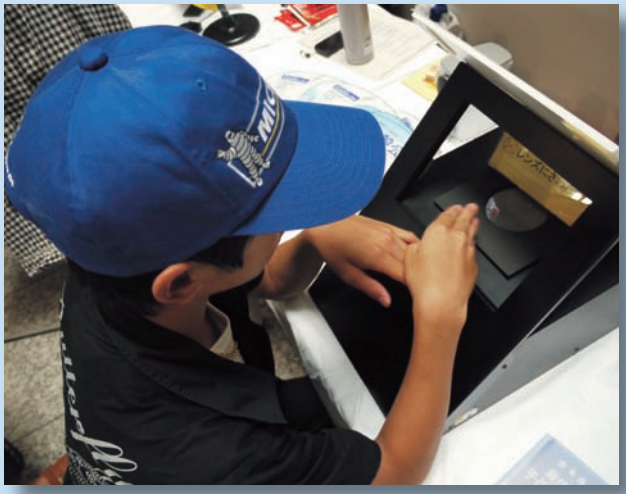
We Participated in the Events of "Children's Kasumigaseki Tour Day"

The "Children's Kasumigaseki Tour Day" is held anually to allow children to broaden their knowledge of society through watching working people. For this year, the prefecture, ministries, and agencies, 26 in all, held workplace observation tour and presentation on actual services on Wednesday 18th and Thursday 19th of August.

In each year, NICT takes part in the "Children's Kasumigaseki Tour Day 2010" organized by the Ministry of General Affairs. For this year, it held the exhibition of " Imagery in the Air with a Floating Touch Display" and issued the "Children's Tour Day Visiting Certificate"

The "Floating Touch Display" gives images (dandelions, a piano and some others) as if the real things are there in the blank air by using the optical devices developed by NICT, which can be manipulated with fingers. The children, who were unable to watch the image at first, looked overjoyed when they managedto play on the piano and wondered why the sound came out.

The "Children's Tour Day Visiting Certificate" gives the printed Japan Standard Time generated by NICT together with the headshot of each visitor. Not only children but also adults were enjoying taking pictures of each or those together with friends, brothers or sisters, and family members. Since this certificate bears a precise time printed and can even be mailed as a postcard, each visitor was very much pleased with it.



Visitors playing with theFfloating Touch Display

Visitors standing in a queue for the taking photographs on the "Children's Tour Day Visiting Certificate"

Information for Readers:

In the "Keihanna Information and Communications Research Fair 2010," the facilities of the research institute will be open to the public on Thursday, 4th through Saturday, 6th of November. Besides the facilities of the Okinawa Subtropic Measuring Technology Center will be disclosed to the public on November 23rd（Tuesday and National Holiday）. Visitors will be welcomed.

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