(Press release)

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Nippon Telegraph and Telephone Corporation
NTT Facilities, Inc.
NTT Advanced Technology Corporation

NTT's iDC Shielded Vault makes possible the building of a room highly shielded from electromagnetic interference
--Launch of a highly reliable electromagnetic security solution for data centers--

Nippon Telegraph and Telephone Corporation (hereafter referred to as NTT; headquartered in Chiyoda-ku, Tokyo, Japan; President: Norio Wada) has developed technology for constructing a room that can be shielded against electromagnetic interference, attack and information leakage, thus providing a high level of electromagnetic security for servers and other devices used in data centers. Using this technology, NTT Facilities, Inc. (hereafter referred to as NTT-F; headquartered in Minato-ku, Tokyo; President: Ryuji Nunotani) has made the "iDC Shielded Vault" to the product, which can be built quickly and economically. (Figure 1)

The iDC Shielded Vault is one of the results of R&D in the field of environment and energy that is being successfully turned into a commercial product through the Comprehensive Producer Function effort (*1), which was started by NTT in July 2003, and NTT-F has made the product using this result.

In cooperation with NTT-F and NTT Advanced Technology Corporation (hereafter referred to as NTT-AT; headquartered in Shinjuku-ku, Tokyo; President: Hiroshi Ishikawa), which has the know-how of electromagnetic security evaluation, the iDC Shielded Vault has now become ready for marketing as an electromagnetic security solution in October 2004 through cooperation among NTT Group companies (*2).

Introduction of this product
The iDC Shielded Vault makes it possible to add an electromagnetic shielding capability easily and economically to devices in data centers which require a high level of security. The vault is a versatile 19-inch cabinet rack with an anti-seismic structure. It can be used in a wide range of applications: adding an electromagnetic shielding feature to an existing data center to protect important data for PKI (*3) or for financial or e-commerce transactions; building a data center or a server room to store customer data; and building a server room in an office or a production plant where the electromagnetic environment is of poor quality (Figure 2).

History of development
Advances in our information society have increased the importance of data stored in a data center or a server room. As a result, there is an increased emphasis on data security. In addition to data encryption and other information security measures (cyber security measures) and room entry management and crime prevention (physical security measures), electromagnetic security measures are important to protect electronic devices from eavesdropping or electromagnetic attacks.

The theft of important information obtained from electromagnetic leakage from servers installed in data centers and electromagnetic wave attacks, which destroy or cause malfunctions of systems by transmitting strong electromagnetic waves from the area around a data center, are now considered important security issues, as shown by TEMPEST (*4). Work has begun to develop international standards to address these problems. For example, at the Telecommunication Standardization Sector of the International Telecommunication Union (ITU-T), Recommendation X.1051 (Information Security Management System - Requirements for Telecommunications) defines the requirements for electromagnetic security to protect devices from strong electromagnetic waves. At the International Electrotechnical Commission (IEC), work is ongoing to specify protection against attacks by high power electromagnetic (HPEM) waves (such as 61000-1-5). This will also be adopted as a Japanese Industrial Standard (JIS) standard. ITU-T plans to adopt a similar recommendation by the end of 2006.

In Japan, the danger of information leakage due to the leakage of electromagnetic waves is pointed out in the "Implementation specification for measures to ensure security and reliability of information communication networks". In 2000, the sentence, "measures shall be taken to mask leaking electromagnetic waves", was added to the specification.

Even before the arrival of a ubiquitous communication society, there is already a higher probability of mobile phones and other wireless devices being used near important servers. This raises a concern that unintended, careless electromagnetic compatibility (EMC) (*5) problems may increase. This is why an electromagnetic shield is considered an important electromagnetic wave security measure. However, a conventional electromagnetic shield has several disadvantages. It is costly and time consuming to build, taking several months or longer. It also lacks adjustability, thus making it difficult to fit it into an existing building or on double flooring.

To offer a solution to these problems, NTT, which has been studying technology for evaluating and ensuring EMC for 20 years, embarked on the development of a technology for electromagnetic interference security in 2000. NTT has applied its long-cultivated technologies for ensuring EMC and evaluating electromagnetic interference security to develop the "iDC Shielded Vault technology", which enables an electromagnetic shielded room that meets the rigorous security requirements of a data center to be built easily and economically. Using this technology, a prototype "iDC Shielded Vault" has been completed.

Features of iDC Shielded Vault

The vault is a versatile 19-inch cabinet rack, having an anti-seismic structure, which can easily fit into a data center or server room. Simple metal panel bonding technology is used to prevent electromagnetic interference, even through small gaps. The technology also makes it possible to build a lightweight and economical electromagnetic shielded room that can withstand a tremor of 6+ on the Japanese seismic scale. The electromagnetic shielding performance is 50dB or more (capable of attenuating electromagnetic interference by 99.6% or more) (Figure 3). In some cases, an electromagnetic shielded room can be built in only one day. The size of the room can be easily increased or decreased to suit the number of racks, which may vary as a result of changes in the number of devices used by customers. Since there is a double-door entrance room, the electromagnetic shielding is unaffected even when racks are opened. This means that electromagnetic security is preserved even during maintenance work. Furthermore, a lock can be added to enable the room to be used as

a security cabin (private office).

Technical features
The main features of this technology are as follows:
(1) Technology for building a shielded security room
The vault is pre-fabricated with an anti-seismic structure. It can be expanded rack by rack. The use of double doors ensures good shielding performance even during maintenance work.

(2) Electromagnetic shield panel bonding technology
The simple construction method of bonding metal panels to prevent electromagnetic leakage dramatically reduces material and construction costs.

(3) Honeycomb mesh shielding technology
Honeycomb mesh shielding preserves the electromagnetic shield, even at ventilation openings. This means that the shielded room can house devices that generate considerable heat.

(4) Power supply filtering technology
NTT's study of lightning monitoring technology has resulted in a low-cost power supply filter using a transformer with reduced stray capacitance. This has made possible a highly reliable, large-capacity power supply of 40A or more at 100V AC.

Future development
The electromagnetic shielding structure technology adopted in the iDC Shielded Vault can be directly applied for building a small electromagnetic shielded room. The room can be an economical alternative to the specially designed electromagnetic shielded rooms used by research centers and R&D departments that develop wireless devices. It can also be used as a ubiquitous-communication-ready office where a large number of wireless devices will be used. The Comprehensive Producer Function will be used to explore various applications of electromagnetic security technology including those mentioned above.

Glossary
*1 Comprehensive Producer Function
This is an initiative by NTT to innovate R&D management to overcome the "Valley of Death", which lies between R&D activities and the conversion of their results into business applications. A Producer is appointed to take charge of converting R&D results into commercial products or services in cooperation with various parties both within and outside the NTT Group.

*2 Cooperation among NTT Group companies
In cooperation with NTT-F and NTT-AT, Nippon Telegraph and Telephone East Corporation (headquartered in Shinjuku-ku, Tokyo; President: Satoshi Miura), Nippon Telegraph and Telephone West Corporation (headquartered in Chuo-ku, Osaka-shi, Osaka; President: Shunzo Morishita), NTT Communications Corporation (headquartered in Chiyoda-ku, Tokyo; President: Masanobu Suzuki) can provide a highly reliable, electromagnetic security solution for data centers.

*3 PKI (Public Key Infrastructure)
PKI ensures secure electronic communication using digital signature and encryption against threats such as spoofing, eavesdropping, and falsification, which are not uncommon in inter-enterprise transactions over the Internet.

*4 TEMPEST
A project code name used by the National Security Agency (NSA) in the U.S.A. for an information intercepting technology, which reproduces a display image by demodulating weak electromagnetic waves radiated from electronic devices.

*5 Electromagnetic compatibility (EMC)
The ability of a device to function normally in an electromagnetic environment in conjunction with other devices or systems and also not to cause more than a certain level of electromagnetic interference to these devices or systems.

Figure 1 Photograph showing the appearance of the iDC Shielded Vault (prototype).
Figure 2 Product image.
Figure 3 Shield performance.

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