

# Chapter 6

## Policy-Based Wide Area Network Management System

### BACKGROUND

In the current Internet systems, there are many problems due to the weak point by use of anonymity of network communication (e.g. Personal information leak and crimes using the Internet systems). Mass media sometimes report news of information leak in big companies. Since TCP/IP protocol used in Internet systems does not have the user identification information for communication data normally, it is difficult to detect immediately the user who performs the abovementioned acts. Many solutions and technologies to manage Internet systems which are based on TCP/IP have been devised, namely DNS, Routing protocols, firewall (F/W), and NAPT/NAT. However, they are created to manage specific parts of the Internet systems and have no purpose of solving the problems that have been described so far.

The PBNM may be a solution. However, it is a scheme to manage the whole LAN through communication control in increments of the user. It cannot be applied to the Internet systems. It is often used in the scene of campus network management. In the campus network, network management becomes quite complicated frequently. Considering that a network administrative department manages only a small portion of the wide needs of the campus network, there are some problems in user support tasks. For example, if some mail boxes on one server machine are divided and relocated to some different server machines, it becomes necessary for some users to change the setting of the client. Most of the users in the campus network are students. As they do not check their e-mail frequently, it becomes hard work for the system

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administrator to make them aware of the settings change. This administrative operation is executed by means of the Web pages and/or posters. For the system administrator, it is difficult to support each student in terms of time and workload. The PBNM manages the whole LAN. When the PBNM is introduced to the network, it becomes easy for the system administrator to solve this kind of problem. In addition, in relation to personal information leak, the PBNM becomes the best solution to manage the whole LAN by making anonymous communication non-anonymous. Thus, it becomes possible for the system administrator to identify the user who steals personal information and commits a crime swiftly and easily. Therefore, by applying the PBNM to the network, the policy-based Internet system management is analyzed.

In the existing PBNM there are two types of schemes. The first is the scheme to manage the whole LAN by locating communication control mechanisms on the network course between network servers and clients. The second is the scheme of managing the whole LAN by locating communication control mechanisms on the clients. It is difficult to practically apply the first scheme to Internet system management. This is because a communication control mechanism needs to be located on the network course between network servers and clients necessarily. Since the second scheme locates communication control mechanisms as the software on each client, it becomes possible to apply the second scheme to Internet system management by devising the installing mechanism so that users can install the software to the client easily.

A second scheme that the authors have studied theoretically is the DACS Scheme, as explained before. The basic principle and security function of the DACS Scheme. Then, a DACS system was implemented in order to realize what had been theoretically developed. By applying the DACS Scheme to Internet systems, the authors realized the policy-based Internet system management. In this chapter, the encrypting mechanism which is suitable for the wDACS system is outlined (Odagiri, Shimizu, & Ishii, 2014b; Odagiri, Shimizu, Takizawa, & Ishii, 2012).

## **WDACS SYSTEM**

This chapter details the content of the wDACS system. The configuration of the wDACS system is illustrated in Figure 1.

First, as a precondition, as private IP addresses are assigned to all servers and clients which exist on the network from LAN1 to LAN<sub>n</sub>, the mechanisms of NAT/NAPT are necessary for the communications which are sent from each LAN to the outside. In this case, the mechanisms of NAT/NAPT are

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