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Implementation the Application Oriented IP Packet Control

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The number of users increased and the demands for the network were diversified with the development of the Internet. In order to satisfy the user requirements, the new protocols: SCTP and RTP, and the extended functions of new network: NAT and NAPT, have been added for the Internet. And the network connection topology of computer has been diversified to multi-home in which a computer has two or more connectivities and gains mobility by means of wireless network. Similarly, environment around the network was significantly changed. The change in network environment affects the application functions using network. Optimal network of each application is different according to various functions to be offered.

On the other hand, IP packet routing on the Internet uses the destination IP address and it is widely used by End-node and back-boned router. Therefore, using routing based on destination IP address is impossible to switch the network at each application and using routing based on except destination IP address makes switching the network also difficult.

Considering the above-mentioned problem, IP packet control based on each application is more suitable than IP packet control based on the destination IP address. In operating system used by each End-host, there is no method like this IP packet control based on each application. It is too hard to make IP packet control based on the destination address flexible. Particularly in the End-host of multi-home environment, to switch the network at each application is difficult.

In order to cover this problem, in our research, we propose a new system which can switch the network at each application. IP packet control according to the User-Policy at the End-host is possible in our proposed system.

To clarify the problem, we deal with the End-host of multi-home environment as a specific case from which we discuss to control IP packets according to the User-Policy at the End-host. Firstly, we describe User-Policy and IP packet control at the End-host and the concerning features of the multi-home. Then the elements of User-Policy are also mentioned. Next, to control IP packets according to User-Policy, problem points determine at the End-host. However the End-host of multi-home environment has some problems. We analyze an appropriate solution to solve these problems by existing technology. From the

problems and demands, control items required for IP packet control according to User-Policy are described and applying them presents the possibility of IP packet control. And for this possibility, in this paper, we examine the control model by existing technology. We examine two IP packet control models. One of them is based on IP address and the other is based on IP packet header. In the model based on IP address, Routing Table and Extended Routing Table are examined. In the model based on IP packet header, a packet filter and other related things are examined.

Then we propose the new solutions by discussing the concrete case and the result from examining the existing technology. In this paper, we propose two solutions: IP packet control based on Port and that based on the full-rule. IP packet control based on Port is called PISelect and that based on full-rule is called APOC. The architectures of two proposal techniques are different. PISelect is reusing existing Routing module and it keeps the compatibility with existing applications. APOC has two approaches. We design to control IP packet by following User-Policy rather than PISelect and to control IP packet on the single point in operating system. For this reason, a system which implements only one of two techniques (PISelect and APOC) doesn't completely satisfy the requirements to have unified control structure. As the outline of the operation of the these proposed techniques, PISelect is to control IP packets by the Port Table consisting of port number and alias address with the interfaces. PISelect selects an interface from the port table and it makes IP packet control according to the User-Policy possible. And APOC doesn't use Routing Table from Operating System because APOC provides similar functions as Routing Table and it controls IP packet by using PCB information. Using APOC makes IP packet control according to the User-Policy possible.

The functions of existing technique are compared with those of proposed one. The result from this comparison shows that the existing technique is impossible or unnatural implementation whereas proposed technique makes IP packet control according to User-Policy possible. However, APOC causes compatibility problems. Finally an approach is discussed about these problems.