

Title	ホームネットワーク環境における異種データリンク接続のQoS保証に関する研究
Author(s)	児玉, 泰伸
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A QoS guaranteed connection system for heterogeneous datalink in the home network

Yasunobu Kodama (1010021)

School of Information Science,
Japan Advanced Institute of Science and Technology

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Recently, Ethernet and Wi-Fi, Powerline communication, coaxial cable communication have begun to be used in the home network. Network AV equipment has been an increase in traffic on the home network. In addition, increase in the use of IP telephony and IPTV, needs of QoS (Quality of Services) is increased in the home network. In consequence, a lack of network resources occurs in the home network, which requires appropriate allocation of network resources. The datalink to configure the network has been determined each QoS guaranteed connection. However, connection that have been guaranteed has not been fulfilled in over multiple datalink.

In this study, we propose a method for QoS guaranteed connection of the datalink layer for end-to-end communication between devices in the home network that is used multiple types of datalink. This realization, the takeover of QoS guaranteed connection and information of bridging between datalink used in the home network, and the signaling for use in setting the pass between end-to-end is required.

This is needed to manage and control the QoS of all of the network datalink. Furthermore, it requires the management and control of end-to-end connection based on the detection of topology for path settings. These are network-based control. In order to deal with the application, it is necessary to work with application control.

First, carried out a survey on QoS guaranteed connection used in each datalink, made correspondence table creation. Furthermore, we researched UPnP (Universal Plug and Play) technology for automatic identification of devices on the network, UPnP QoS to guarantee QoS using UPnP technology, and DLNA (Digital Living Network Alliance) for dealing with the media using the home network. From these studies, we proposed a technique for dynamic QoS control from time to time by the DMC (Digital Media Controller) as defined in the DLNA.

Next, we took a survey of equipment to use as a bridge for our proposed a technique . And we have devised an experimental system for the study of the usefulness of the proposed technique. In addition, we have created a program for controlling QoS of the bridge by UPnP in the experimental system. And we create the DMC to set QoS.

In the experimental system using these program, we measured the load of computers to set QoS. In addition, we were verified the usefulness of the proposed method.

A result of verification by the experimental system, QoS configuration process gave rise to the differences in the method of setting. Wired LAN settings in the serial communication takes 250.2 ms to process configuration, the maximum amount of traffic at that time was about 5000 bytes/sec. Wireless LAN settings in the web interface takes 1576.0 ms to process configuration, the maximum amount of traffic at that time was about 18000 bytes/sec. In addition, QoS setting of the proposed method was about 13.2 seconds is required as compared with the case do not use the settings. Effect using the proposed method are three-second delay has improved. However, if other users had been playing the media in the network, to exit the playback problem has occurred. This problem is dependent on the device to play back, in order to realize the proposed method will require support of a bridge or DMR.

As future work, this study is only to control the priority, so it is necessary to control the parameter. In addition, this study is a case that only Ethernet and IEEE802.11g/n are used. it is necessary to verify this method using other datalink.