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A research on the resource management system in consideration of interconnecting video networks

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Recently, progress of network technology became remarkable, and broadband network can be utilized easily. Various applications which utilize this kind of network effectively has been proposed, and there is video data transfer as typical ones. In order to transfer the video data, broadband network is necessary, and there are a viewphone and a video conference as a typical application. QoS guarantee technology is also being researched, and the data which is considered as a kind of data which must have real time characteristic like video data can have been transfered effectively.

Because of this kind of technical background, it has become possible to construct a video network which is specialized in video data transfer. The devices which is connected to video network transmits or receives video data. And the video data is transferred through the network which forms the video network. These video networks are formed based on several technology which differs according to scale and purpose of the video network. If a video network is based on the narrow band network, picture quality may be low but data compression ratio is high. In the case of video network of broadband, the video format whose picture quality is high is used. The video network which support guaranteed transfering made possible by QoS guarantee technology offers effective service for sending video data.

Video network has not been considered a interconnect between video network because video networks are just specialized on their purpose. In this research, the Video Internetworking Architecture, the system which interconnects video networks mutually is proposed.

In Video Internetworking Architecture, video devices is abstracted and assigned a address called node address. The system placed on between different video networks is called Video Gateway. This system perform signaling with the video device located on both sides, and convert the video format to appropriate one. The function offered by Video Gateways make it possible to transmit video data from a video network to another one, even though the methods to transmit video data used in both of them differ.

The resource management system which is called Resource Manager exists in each video network. This system manages device information and connection information etc.. Resource Managers located on adjacent video network exchange information about connection with other video networks, and inspect the topology how video networks are connected in the system. Each video network is assigned a address which is called network address in order to identify the video network.

In this system the video device which is connected to video network is abstracted and handled. More than one system called Device Controller , which abstract video devices, exist in each video network. Abstracted video device is called Virtual Video Node, identified by node address. Device Controller send signaling request to video devices and also monitors the attachment of them to the video network. Device Controller registers the Virtual Video Node created to the Resource Manager. Connect request is received from the Resource Manager by Device Controller.

The information which Resource Manager manages is device information and connection information and session information. Device information is information of device controllers, virtual video nodes, and video gateways. Connection information is connection status between the video equipment inside local video network. Session is a kind of pipe for video data formed through multiple video networks. Session is a set of connection on each video network, and session information is session status.

To implement this system, DVTS and JAIST VideoLAN is used as base

networks. These video networks transfer DV data, and devices which has the interface of IEEE1394 and capability sending or receiving DV data can be video devices. One hand DVTS transfers the video data through IP network, on the other hand, JAIST VideoLAN employ ATM network for transfering video data. In this implementation, unsigned-64bit-long-integer is used as node address, and unsigned-16bit-long-integer is used as a network address.

With DVTS the video device is connected to PC which has IEEE1394 interface and dvsend is executed by the PC for transmitting data. A command, dvrecv, executed by receiver PC get DV data sent by dvsend. The Device Controller is implemented on PC which executes DVTS command.

In JAIST VideoLAN system, there are a equipment called terminal system which is a bridge between ATM and IEEE1394. Then, the Device Controller is implemented on PC outside as the process which transmits commands to the terminal system. Two DV-NTSC converters which are connected to DVTS and JAIST VideoLAN are used to construct a Video Gateway, and verify some operations.

The video internetworking which can send and receive the video data between the video device assigned node address and network address which do not depend on video network and abstracted can be implemented. When there are video devices in the different video network, the resource manager selects path and it make it possible to connect each other using the path through several video networks.