



Sanbolic Inc.

Case Study
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Mathematical Sciences Education and Research System (MSERS) at Graduate School of Mathematical Sciences, University of Tokyo

System Objective:

Valuable video pictures of each lecture are made always to be visible via Internet. Editing video data and Distributing video streaming over IP in Broadband network era.

System Profile:

Graduate School of Mathematical Sciences as the institute wishes to make the archival video data of valuable lectures and seminars held in the institute and also to make the video visible and audible intuitively. Also, the system should be the innovative to be applicable to the educational research of Mathematical Science. Due to the system consultation by Totsu Sangyo, Inc, a reputable dealer for Sony, Inc. "Education system for Mathematical Science" has been designed effectively and shortened the video production process. This system is a kind of streaming distribution system consists of three major sections, taking video picture, editing, and distribution.



Class Room

Student can take a lecture as live scene or archived mode via World Wide Web at the remote site beyond university territory. Also, this system can encourage the student who has enthusiasm to learn the subject out of his curriculum or to study the details of lecture afterwards.

1. Taking the Video Picture.

Video camera system is consisting of multiple video cameras and microphones installed at three lectures rooms. The video camera operation is centralized in control room and the operation dose not bothers anybody in the lecture room. Also, few operators can control cameras and microphones in the multiple lecture rooms



Analogue Video Capture

2. Video Editing

Video editing is implemented by two sets of "DV Station MP2" which is Totsu Sangyo's original system. The storage system, Voyager Enhance Array VUA-501T 126GB, manufactured by Eurologic Systems Inc. Ireland, connected to both systems by 1Gb Fibre Channel enables the systems to digitize video data and to edit the video at any time and quickly. Also, in order to



Digitizing and Editing

keep the bandwidth and integrity of storage bus, a FC 8 port switch is installed in the midst of SAN network. Both DV Stations share and edit the video data in the shared storage. The privilege of the read/write access by two workstations to the shared storage is managed by Kayo SAN volume management software, developed by SANbolic, MA, U.S. Kayo control the shared volumes and avoids the collision in volume sharing operation.



Shared Storage and Server

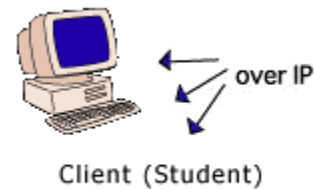
3. Distribution

Distribution System consists of two PC systems. One is a PC capturing data, "RVcapture-1001t" to upload edited video data to streaming server and the other is Real Video server "RVserver-1002t". RVserver can support both live streaming and on-demand streaming request. Lecture data can be archived in the server and accessed on demand basis as well as streaming as a live video and audio sent to capture PC from DV Station. Once the streaming data have been stored in the Real server. Every PC, Real player installed, can assess the server to take the lecture. The shared storage connected to workstations via Fibre Channel interface.

Two video editing system, DV station MP2, are connected to an array storage system. Both workstations mount the volumes in storage locally. Each workstation can access these volumes by permitted read/write access privilege.

4. The Merit of the Storage Sharing

In MSERS, the video data is taken with analogue format. The data recorded in videotape is loaded into VCR connected to DV workstation to convert into digital data and to store it.



To digitize the lecture analogue picture data, it takes the same period as the lecture last with 3.5MB per second transfer rate. In order to edit the video-data taken by four cameras each in three lecture rooms on the non-linear video editing system, it takes huge amount of time to digitize. In the system, two workstations are sharing these jobs, digitizing and editing by sharing a storage. Therefore, these workstations can be either writer or reader and switched the role each other in timely manner. It is the efficient solution for the system administrator to eliminate the editing period and enhance the quality of the system by this volume sharing storage system.