

A Collaboration Support System for Environmental Protection using Networks between Japan and ROC

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1 Introduction

A support system to collaborate education and research activities on environment protection using networks between Japan and ROC is discussed. The system provides distance learning for education and an electronic conference for research activities, where it consists of video conference systems and a private database and its information retrieval engine. As a most primitive video conference system, we have proposed NetCon for a research support system using the Internet [1]*, which we call a low grade system in this paper. The NetCon can accomplish video conference with low cost devices and with a low running cost, however, we have to tolerate low quality of service (QoS) and have to adapt it to use with carefully. While, we can also construct high performance system such as used for commercial purposes with a high cost, which we call a high grade system. In this paper, we discuss a method for choosing a system configuration for the collaboration support system from a view-point of functional specifications and the performance.

2 Collaboration Support System

The collaboration support system consists of:

- (1) A video conference system
- (2) A private database and its information retrieval engine

2.1 Video conference system

The video conference system plays an important role in the support system for both education and research activities. At the present technologies, we can construct various grade systems as shown in Table 2.1. In this table, (A) is the most low grade type which we have used for the research support system [1][2][3], where MS NetMeeting has been applied. While (E) is one of the most high grade type, hence an initial cost is high. All of these systems are now in operating for distance learning mainly for that of cross-culture in Waseda University. (B),(C) and (D) are medium grade types, and we properly choose them dependent on the purpose. As for the collaboration support system, the following points are important to decide the functions and performance.

* According to our paper presented at the 2004 JASMIN Fall Conference [2], [1] is revised into [3], where experimental results on the CODEC delay time are added.

- (1) The CODEC delay time is small.
- (2) A power point (ppt) file sharing is acceptable or a view camera for OHP is applicable.
- (3) The global IP is required for network security.
- (4) Multi-user per conference is applicable.

In the case of education, multi-user system is necessarily realized. While, in the case of research activities, a small delay time is highly recommended. As a result, it is better to choose (C) or (D) to apply into the collaboration system.

2.2 Private database and its information retrieval engine

Teaching materials are collected as database for the purpose of referencing in different classes. They would be used effectively for education in distance learning. While, unpublished papers, books, intermediate data for their own research areas construct database so that they can be effectively referred in their discussion. For this purpose, information retrieval engines are installed in the PC's. Documents would be written in Japanese, Chinese and English, engines should be corresponded to multiple languages. There are three types of information retrieval engines, (a) Key-word based engine based on the Boolean model, (b) Concept search engine based on the vector space model, and (c) Full text search engine. These engines complement each other to retrieve database.

2.3 Activities for collaboration system

The collaboration system is used for

- (1) Distance learning between Waseda University (Environment Engineering Course) and universities in Taiwan[†].
- (2) Discussions by researchers on environment protection between Waseda University (Environment Research Center) and Environment Protection Administration, Taiwan, ROC.

A most of all activities would take place by using English as the formal language.

[†]On demand classes will also be opened.

Table 2.1 Comparison of Video Conference System

	(A)	(B)	(C)	(D)	(E)
	Net Meeting (Per Client)	BizMate (1:Server 48Client)	ViaVideo (Per Unit)	ViewStation (Per Unit)	Specilized Video Conference System
Client Requirement					
Price	Freeware	\$8,000	\$1,500	\$10,000	\$100,000
Codec	Microsoft Standard	luded in Bizmate Web Cli	Specialized Software	Build in to Hardware	Order-Made
Unit Specification					
Network	LAN	LAN	LAN	LAN & ISDN	LAN & ISDN
Protocol	H323	Specilized	H323	H320.323	H320.323
Bandwidth	Middium	narrow	64-384k	128-512K	384k以上
IP Addressing	DHCP Acceptable	DHCP Acceptable	Fixed IP	Fixed Global IP	N/A
System Specification					
Main Unit	Personal Computer	Personal Computer	Personal Computer	Specilized Unit	N/A
Visual Input Device	Web Camera (USB)	Web Camera (USB)	Build in Camera	Build in Camera	Specialized Camera
Visual Output Device	CRT/LCD Monitor	CRT/LCD Monitor	CRT/LCD Monitor	TV	Video Projector
Sound I/O	Headset	Headset	Headset	Specialized Microphone TV Speacker	Microphone Speaker
Remote Control	N/A	N/A	N/A	Remote Controller	Remote Controller
Optional Device				OHP	OHP
PowerPoint File Sharing	Software Buildin	Software Buildin	N/A	Optional Equipment Required	Optional Equipment Required
User Account	Required	Required	Required		
Visual Output method	PC monitor	PC monitor	PC monitor	composit	composit
Sound I/O method	C Connected Heads	PC Connected Headset	Build in microphone with PC Connected Speaker or PC Connected Headset	Specialized Microphone and Speaker	Desktop Microphone
Number of User per Unit	1user	1user	1user	10 user or more	50 user or more
Operating Unit	PC	PC	PC	Specialized Remote Controller	Control Panel
Function					
text chat	○	○	×	×	
White board	○	○	×	×	
File Transfer	○	○	×	×	
Application Sharing	○	○	×	×	
Server					
Specilized Server	×	○		MCU	
Max number of participant (Per Conference)	Max 8	16	16	16	16

3 Concluding Remarks

Because of both the QoS and an initial and running costs, medium grade system configurations are recommended for the video conference of the collaboration support system, which are applicable to education and research activities at present. Future developments in information technologies will give us more high grade and more comfortable systems in their functions and performance with a low cost.

References

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