

SRI LANKA INSTITUTE OF INFORMATION TECHNOLOGY



In partial fulfillment of the requirements for the Special Honours
Degree of Bachelor of Science in Information Technology

Distributed Lecturing and Examination System (DLES)

PROJECT MEMBERS

M.F.F. Faraj	- DCN/07/C3/0619
Y.L.A Weerasinghe	- DCN/07/C3/0642
T.I. Senevirathna	- DCN/07/C4/0816
R.M.A.I.K. Amunugama	- DCN/07/C4/0752
D.U Edirisooriya	- DCN/07/C3/0582

Declaration

We do hereby declare that all that the submitted Mid Review Document for the subject Comprehensive Design and Analysis Projects is our own creation. The diagrams, research results, source codes and all other documented components were developed by us and we have cited clearly any references we have made.

Project Title : Distributed Lecturing and Examination System (DLES)

Project ID: PDCN-27

Group Members:

Student ID	Student Name	Signature
DCN/07/C3/0619	M.F.F. Faraj	
DCN/07/C3/0642	Y.L.A Weerasinghe	
DCN/07/C4/0816	T.I. Senevirathna	
DCN/07/C4/0752	R.M.A.I.K. Amunugama	
DCN/07/C3/0582	D.U Edirisooriya	

Date of Submission: 01.09.2010

Project Sponsor: Not Applicable.

Supervised by:

.....

Dr. Malitha Wijesundara

Acknowledgement

- We are heartily thankful to our supervisor, Dr.Malitha Wijesundara, whose encouragement, guidance and support from the initial to the final level enabled us to successfully complete our project.
- Our deep sense of gratitude to lecturer in charge of this course module (CDAP), Mr. Jayantha Amararachichi for the guidance and strength offered throughout the whole stages of our project.
- We would also thank our Institution and dear friends without whom this project would have been a distant reality. We also extend our heartfelt thanks to our parents and family members.
- Lastly, we offer our regards to all of those who supported us in any respect during the completion of this project

Abstract

The modern educational system has its large number of inventions, innovative methods in order to meet the rapid demand and modernity of time. As a result of the extensive research that we carried out on the field of modern education system, it was realized by us that a system with all the online education features built in one single module is difficult to find. In order to satisfy this necessity we decided to build an online Distributed Lecturing and Examination System. The aim of this project is to create an environment that will help to approximate the shared and supportive environment of a real-world class. This would provide users with some common ground regardless of their geographic distance from each other.

As the name implies, the features like Real time lecture conducting/viewing, downloading lecture materials, Real time white board viewing, Previewing lecture slides, Recording and storing lecture videos, Viewing the lecturer/student, Lecturer and student interaction and Online examination center with real time monitoring will be embedded with this system. In order to achieve these objectives, open source software's such as php, java script, MySQL, Action Script and flash with Real Time Messaging Protocol will be in use.

By this project our concern is to create a new leap in online education culture.

Contents

1	Introduction	2
1.1	Background	2
1.2	Problem to be addressed	3
1.3	Research questions	5
2	Statement of the work	6
2.1	Product perspective	6
2.2	literature survey	8
3	Methodology	13
3.1	System Processes	14
3.1.1	Streaming and Storage	16
3.1.2	Objectives of the Project	16
3.2	Technical objective	17
3.3	System Implementation	19
3.3.1	Database	19
3.3.2	Real time streaming / publishing application.	22
3.3.3	Multimedia streaming application.	23
3.3.4	Whiteboard content transmission application.	23
3.3.5	File Server (Java Based Bunchi Server)	25
4	Specific requirements	26
4.1	External interfaces	26

4.1.1	User interfaces	27
5	Research constraints	32

List of Figures

2.1	Product Comparison	9
2.2	eLecta Live	9
2.3	Wimba Classroom 6.0	10
3.1	System Flow Diagram	14
3.2	Network Diagram	15
3.3	Database Architecture	19
3.4	database package	20
3.5	database handler	21
3.6	Real time streaming / publishing application	22
3.7	Multimedia streaming application.	23
3.8	whiteboard application.	24
3.9	whiteboard content distribution.	24
3.10	File Server Architecture.	25
4.1	User login interface	27
4.2	Registering with DLES	28
4.3	Changing the DLES Password	28
4.4	Main User Interface	29
4.5	File sharing Window	30
4.6	Public/Private Text Chat	30
4.7	Smart board	31
5.1	desktop caputing application	33

5.2	webcam application	33
5.3	whiteboard transmitter	34

Definitions, Acronyms, and Abbreviations

- **SRS:** Software Requirement Specification
- **DLES:** Distributed Lecturing and Examination System
- **OS:** operating system
- **DB:** Databases
- **PHP:** Personal Home Page
- **RAM:** Random Access Memory
- **HTTP:** Hyper Text Transfer Protocol
- **RTMP:** Real Time Messaging Protocol
- **HTML:** HyperText Markup Language
- **SQL:** Structured Query Language
- **UDAI:** Unique Domain authentication ID

Chapter 1

Introduction

1.1 Background

Technology is always about building Bridges, Bridges that could take us where we never reached before. It has all ways improved the pattern of our life, the extent of doing things whilst adding more value in forms of convenience and a touch innovation.

The concept of the Distributed Lecturing and Examination system (DLES) was the end result of a deep research and an analysis of various methods that could shift the level of Educational Systems and its qualities to a higher level than the prevailing. In modern days even locally we find most students (especially IT related) are provided or do possess sufficient privileges like PCs, Laptops, web cams and most importantly the Internet facility. Having this assumption we seek in to methods to compile these facilities and privileges, knowing there characteristics in depth. DLES could be defined as a compilation of existing concepts like virtual classroom, e-learning, educational networking and e-safe examination systems.

Internet based learning systems and educational systems are no strangers to the current community and has been utmost successful in complying and adopting to elevate the learning cultures. The unique attempt that we are focused is to provide a solution that includes all these features in a more advance manner, inspiring users the convenience of learning without

facing any hazard involved in Travelling, Time wastage and costs that do exist to date.

1.2 Problem to be addressed

In present as we continue on completing our academic studies with relation to IT we tend to seek for methods which can make life more convenient and smooth. Because of that eventually we are driven to seek innovative methods to make our higher studies a convenient one. Since modern days most of our students are equipped with internet, laptops, web cams and various inventions thanks to the technology. We thought about compiling these inventions to create a virtual environment which could be helpful to create a new era of comfortable learning culture. The bloom of the concept *SDistributed Learning and Examination System* was coupled up with the existing concepts like virtual class room, e-learning, educational networking and e-safe examination systems.

The concept of Virtual class room and Educational networking systems not been a stranger for the international market has been occupied to various cultures of learning among the world due to the convenience it provides to the education system. As a matter of fact the challenge for us is to create a system which has all the existing features in a more advanced manner and its own unique features as well. The core objective of this project is to inspire students a new perception of a learning culture which is more convenient to them in engaging day to day learning activities without facing any hazard involved in learning by traveling to a certain destination, wasting time and travel cost which are involved in current educational system.

In this project we hope to accomplish this target by creating a web based application which enables users to easily log in to the site and get all the required services. Once the Distributed Learning and Examination System is created, from the lectures point of view they can conduct a lecture easily from anywhere in the world by distributing the live video stream of the lecture among the students. At the same time all the students who are allocated to that particular class can watch that lecture and they can view any shared lecture material as power point presentations, word document etc at the same time as well. In this system

both the lecturer and the student can see the other participants in their virtual class room. Due to this effective feature, this system can be used for video conferencing by group of people too. As we are using the concept of educational networking, you can enjoy all the features available in a social network like face book but only for the educational purposes. Students may ask questions from the lecturer and also they can discuss them with their friends in the class room too.

The unique feature of this system is its own whiteboard system which enables the lecturer to use his computer terminal as a writing surface. At the same time all the students can see the content and it will be updated at the same time. This system is also capable of providing e-safe, more reliable examination system which can randomly select questions from a pool of questions and generate exams as required by the lecture. In order to provide high security to the system, lot of modern tools and techniques like sequentially monitor capturing methods will be in use. To develop this DLES system we are going to use open source software to reduce the cost factor. To design web pages we will use php and java script, for the client side application development we will use flash, Action script and RTML protocol and for the development of the database mysql will be in use.

As the end product we would be able to come up with a web based application which enables a privileged user to log in to the designed site will provide the services available within. As the name implies DLES is mainly a combination of two applications.

- Distributed lecturing system.
- Distributed examination system.

We think this is where the future of learning lies. There's nothing to install or manage, everything is hosted on secure web servers that lecturers and students can access from anywhere using only a standard Web browser. So now we can get ready to extend traditional classroom learning with this new and innovative §Distributed Learning and Examination SystemŒ.

1.3 Research questions

The speed of communication is one possible limitation. Working on a dial-up connection may adversely affect the sound quality of the voice applications. The setup allows for using "modem" connections, and even then records fairly well, but there may be additional sounds and background noises, which may make it difficult to hear. It is also important, whenever possible; to make sure students have access to headsets, so that any computer noises can be minimized on the recording.

Because any program that works with sound is a large system resource hog, there may be problems with interactions with other applications, especially when they are of the same type. It is advisable to test the application in the situation in which it is intended to be used to minimize the effect this will have on its use. Sometimes workarounds can be made to allow for the use of multiple applications, or (at least) give the ability to use one without the other.

Chapter 2

Statement of the work

2.1 Product perspective

A DLES is public online space that lectures can use to support student learning. It is accessible via the Internet, 24 hours a day, 7 days a week. Just like your face-to-face classroom.

The purpose of the DLES project is to provide a platform for educators to experiment with designing spaces for learning. A DLES is a learning environment created in the virtual space. The objectives of a DLES are to improve access to advanced educational experiences by allowing students and instructors to participate in remote learning communities using personal computers; and to improve the quality and effectiveness of education by using the computer to support a collaborative learning process. The explosion of the knowledge age has changed the context of what is learnt and how it is learnt Û the concept of DLES is a manifestation of this knowledge revolution.

Following are the system features we going to implement in Distributed Lecturing and Examination System (DLES)

- Real time lecture conducting/viewing
- Smartboard

- Application Sharing
- Flexible Content Area
- Presenter On-The-Fly
- Content Upload and Storage
- Technology Appropriate for Online Education
- Online examination system
- Robust, 24 x 7 Technical Support from DLES

Why Choose DLES

- **DLES is especially designed for online learning and training.**

Our target user segments are organizations and individuals delivering their educational services over the Internet. We know their specific requirements and constantly develop our products so that they have everything needed for the online collaboration part of their teaching process.

- **Live is adaptive and flexible**

DLES is flexible enough to fit to any specific business model. You do not need to change anything on your side to get started working with DLES.

- **DLES is cost effective**

Our product is totally free and anyone can register with our system without paying any amount of money.

- **Easy to work with DLES**

DLES is easy to start and easy to use service. Students and teachers from different parts of the world, speaking different languages use DLES in their daily activities without having any special technical knowledge.

- **Live Video Sessions**

Enhance lecture conducting and group discussions with live video conferencing even on lower bandwidths.

- **Session Recording and Playback**

Record the live lecture sessions in our system for later references. Publish that recordings on our website to attract new students or give individual playback permissions.

- **Instant Messaging and Session Comments**

Instant messaging / text chat is available for communication along with the audio. The lecture session creator can enable/disable the text messaging options.

- **Easily create and customize virtual classrooms**

- **Secure examination system**

2.2 literature survey

Background

As we continue on completing our academic studies with relation to IT we tend to seek for methods which can make life more convenient and smooth. Because of that eventually we are driven to seek innovative methods to make our higher studies a convenient one. Since modern days most of our students are equipped with internet, laptops, web cams and various inventions thanks to the technology, we thought about compiling these inventions to create a virtual environment which could be helpful to create a new era of comfortable learning culture. The bloom of the concept "Distributed Lecturing and Examination System" was coupled up with the existing concepts like virtual class room, e-learning, educational networking and e-safe examination systems.

As a result of the extensive research that we carried out on the field of modern education system, it was realized by us that a system with all the online education features built in one single module is difficult to find. To make this aim a success we have done several researches about the existing products in the global market to identify the drawbacks of them. It also gave us an opportunity to identify the functions that require more improvement in our system and to meet user needs as well as the end user requirements. By using the findings of this research we were able to give a clear comparison between existing products and the Distributed Lecturing and Examination system.

Literature Review

Products	Live sharing of lecture materials	Provide Real-time whiteboard	Provide examination system	Web based
eLecta Live	✓	✗	✗	✗
INTOWEB	✗	✗	✓	✓
Virtual Blackboard	✓	✓	✗	✓
DLES (our system)	✓	✓	✓	✓

Figure 2.1: Product Comparison

1. eLecta Live

eLecta Live is a Virtual Classroom Software and a Web Conferencing Solution for live classes, online meetings and webinars. It is available in different editions and configurations enhanced for online teaching, web conferencing and web collaboration. eLecta Live is available in several editions, a single web conference room, a personal web event center or an entire virtual school solution.

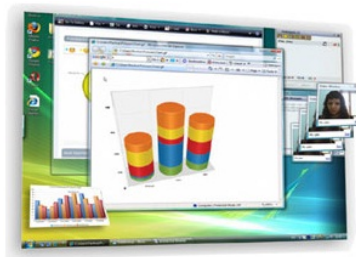


Figure 2.2: eLecta Live

Features of eLecta Live

- Crystal Clear Full Duplex Audio
- Shared Interactive Whiteboards
- PowerPoint, File and Image Broadcasting

- Rich Markup and Annotation Tools
- Share Your Screen and Applications
- Live Video Sessions
- Session Recording and Playback
- Instant Messaging and Session Comments

Drawbacks of the system

- It's a software product, therefore customers have to install it prior to use
- High cost
- No online examination system
- Different features are available with different editions. If you need a feature in a different edition have to buy the whole package.

2. Wimba Classroom 6.0

Wimba Classroom 6.0, cornerstone of the Wimba Collaboration Suite 6.0, is a live, virtual classroom environment with robust features that include audio, video, application sharing and content display, and MP4 capabilities. Its pedagogical design and ease-of-use ensures that educators and students engage as if they were meeting face-to-face. Advanced features such as polling, white boarding, presenter on-the-fly, resizable chat areas and participant lists, usage analytics tools, and MP3 or MP4 downloads enable further dynamic interaction between students and educators.

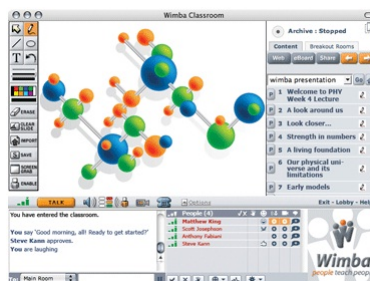


Figure 2.3: Wimba Classroom 6.0

Features of Wimba Classroom 6.0

- Break-Out Rooms
- Emoticons
- Public and Private Chat
- Follow-The-Speaker Video
- Multi-way Video and Audio (Voice over IP)
- Presenter On-The-Fly
- Polls, Quizzes Surveys
- Robust Electronic Whiteboard
- Application Sharing
- Flexible Content Area

Drawbacks of the system

- It's a software product, therefore customers have to install it prior to use
- Not an affordable solution
- No online examination system
- Different features are available with different editions. If you need a feature in a different edition have to buy the whole package.

3. Intoweb- Online Examination System

Intoweb Training offers a new unique approach to training. The training system is a web based Intranet driven solution allowing organizations to train up their employees in desktop skills. It provides training solutions, Examination systems and Demonstration solutions.

Features of Intoweb : Online Examination System

- Online examination questions can be categorized according to topic, types, etc. (libraries)
- The online examination system makes provision for difficulty levels of items.

- A test can be compiled with questions from different topics/libraries.
- A "serial number" is provided for each question according to topic, etc.
- The "serial number" can be used to search for and select questions.
- Questions can be converted to the databank from existing databanks.
- Questions can be converted from word processing files.
- Tests can be created on a random basis per student.
- Specific questions can be flagged to be included/excluded in a test.
- The online examination system is suitable for surveys.
- The online examination system can automatically add the marks allocated in each question to determine the total mark for the test.
- A printed paper and a memorandum can be compiled.
- Different papers (shuffle code) and memoranda can be compiled.
- Export question papers and memoranda to .txt or .doc file

Drawbacks of the system

No online lecturing, virtual classroom features available with this.

The concept of Virtual classroom and Educational networking systems, not been a stranger for the international market has been occupied to various cultures of learning among the world due to the convenience it provides to the education system. As a matter of fact the challenge for us is to create a system which has all the existing features in a more advanced manner and its own unique features as well. The core objective of this project is to inspire students a new perception of a learning culture which is more convenient to them in engaging day to day learning activities without facing any hazard involved in learning by traveling to a certain destination, wasting time and travel cost which are involved in current educational system.

Chapter 3

Methodology

Distributed Lecturing and Examination System is a web based, one of the most users friendly, all in one complete virtual classroom package. The system will be a solution to bridge the physical gap between lecturers and students around the world. At the same time, the system can be utilized for video broadcasting, conferencing and online examinations.

Distributed Lecturing and Examination System will be a web service which is going to be hosted on a server which contains 3 servers namely Web Server, Database Server and Java Server. Web service will be run on Apache and it would contain the PHP web applications of the system. MySQL will be used as the database server and Tomcat will be used as the Java server which runs RED5 media server, which would be used for media streaming. This structure could be distributed in between several different physical server computers depending on the growth of the system. The development of the system will basically lie on open source technologies. Client end will run Flash, HTML/JavaScript and would use web browser to access the system. Client will need a web camera, microphone and speakers (or a headset) in order to use the Online Lecturing System.

3.1 System Processes

There are 3 main types of users in the system. They are lecturers who conduct classes, students who attend the classes and the administrators of the system who perform system related tasks. Administrators have full access to the entire system while lecturers have medium level of privileges. Online students will have low level access.

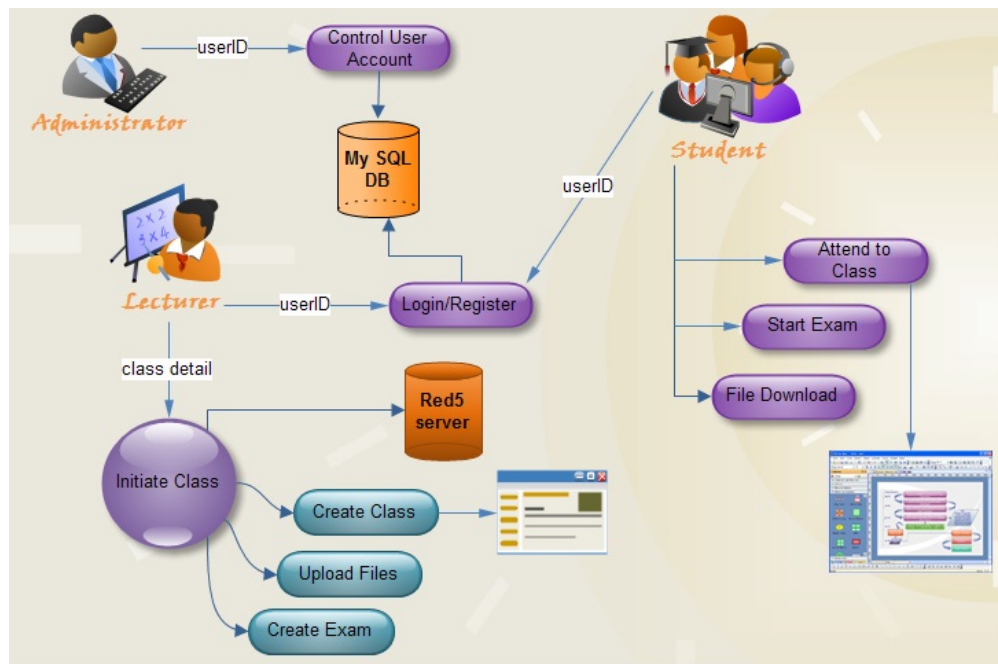


Figure 3.1: System Flow Diagram

All the users need to register with DLES Website first. Lecturer can create a class and students can send requests to join a class. All the users can view all the available classes on the system. Once the lecturer approves the student request, student is added to the class. Students can then view the online classroom. Lecturer can create session times and start the classes on time. Once the lecturer logs in during the session interval, he could start the class and students can view the lecturer and whiteboard real time. Each student can see other users in the class via webcams and access control would be designed appropriately. Online chatting, real time video, real time whiteboard will be some of the main features of the system along with real time sharing of lecture materials. At the same time the current

lecture slides screen would show the current slide of the current lecture. Lecture materials can also be published in the course web that will be integrated to the class. So any student can download the materials from the class course web at any time. At the same time, based on the server hard disk space the video and audio records of each class session will be stored for a certain period of time so that the students who missed the class can retrieve the class video and go through it.

Security implementation by means of Access Control Lists will be one of the key security features of the system. Each user will be provided with personal home page and the classes will include wikis and blogs. Examination Center will be one of the core products of the system which would ensure secure examinations. Exam Center will be integrated to the class room component so that lecturer can conduct exams.

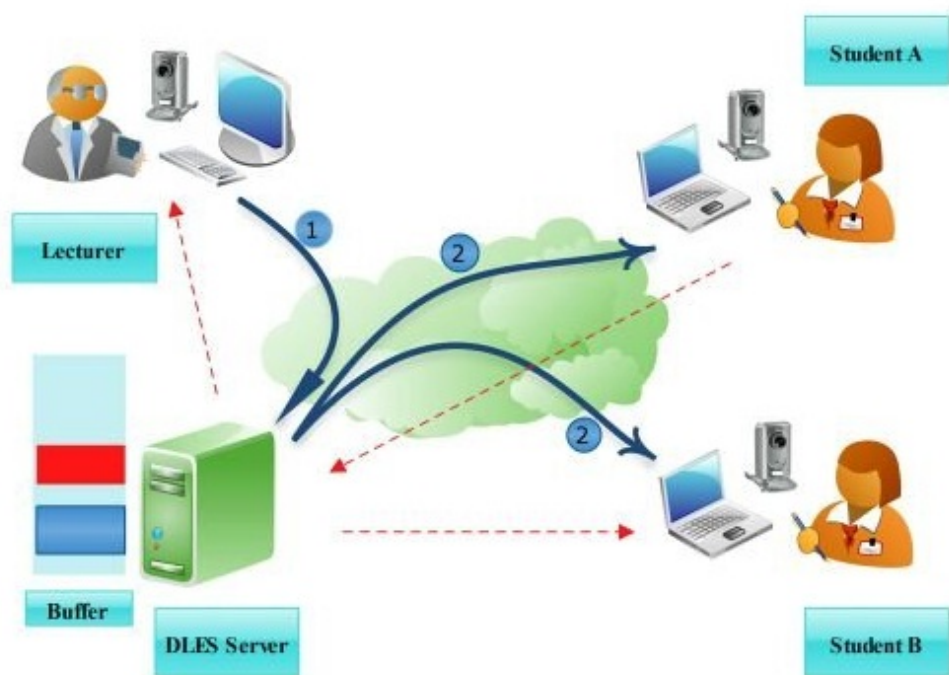


Figure 3.2: Network Diagram

3.1.1 Streaming and Storage

In order to achieve real time video and audio streaming, the contents transferred will be kept in the memory on the server. The server memory will process all the real time data obtained using RTMP (Real Time Messaging Protocol) and multicast those to appropriate agents other than the sender. The receivers include all the other members of the class. The recording of the audio and video would be performed and it would be stored on the DLES server storage. DLES server consists of several servers running but it could be distributed among many physical servers depending on the future demands. The permanent lecture materials will be stored on DLES server storage and the files can be shared during a classroom session. Real time whiteboard and lecture slides screen will also be transmitted using RTMP in no time. Students from one class can't peep into another without lecturer's authorization.

3.1.2 Objectives of the Project

Main objective of our project is to implement a user friendly web based Distributed Lecturing and Examination System. In order to achieve this we expect to successfully complete the following objectives;

- Real time lecture conducting/viewing

If a logged user needs to conduct a lecture he can advertise about his lecture in the web site and users who are interested in the subject can participate the lecture by sending a request to the lecturer. The lecturer can conduct the lecture in real time and the students can view it simultaneously.

- Downloading lecture materials

If the lecturer is using lecture materials such as presentations, tutorials, demo diagrams to support his lecture, these recourses can be uploaded to the site so that the students can download them.

- Real time whiteboard viewing

Lecturer can use a whiteboard to demonstrate the lecture. And this software whiteboard can be viewed by the students simultaneously.

- Previewing lecture slides

If the lecturer is using presentation slides, these can be viewed through the site. When the lecturer moves from slide to slide, student can view the current viewed slide by the lecturer.

- Recording and storing lecture videos

Lectures held in the past are recorded and provided through the site for the students in future use.

- Viewing the lecturer/student

Students can view the lecturer conducting the lecture and lecturer can view students as well as student can view the other students enrolled in the class under some restrictions.

- Lecturer and student interaction

Students can ask questions by typing the questions in a chat box and the lecturer receive them as pop up messages.

- Online examination center with real time monitoring

Lecturer can enter questions to our database and a question paper is generated from them under lecturer's instructions.

3.2 Technical objective

Project DLES has several research area's which have never been implemented in the past projects, but working out in this project as a total new concept. To achieve these new conceptual goals we are entitled to finish up these technical goals.

1. In the examination system we are trying to provide the security for denying the students doing fraud while attending the examinations. For this we are using the online monitoring system which works in two main areas.
 - (a) Monitoring the screen
 - (b) Monitoring the person

We install or run a small java application in the student client computer to retrieve the screen shots by time to time. This will let the lecturer or the supervisor know the actual desktop view of a student while he/she is doing the examination.

Then we activate the client camera and view the student while he/she is doing the exam. This will help the lecturer to know what the student is doing physically while he/she is attending the exam.

These two contents are stored automatically and let the lecturer review It later.

2. Online smart board content is transmitted letting the bandwidth used in minimal level. The change in pixels makes the data to transmit over the network to the server. In the idle state this content never transmitted.
3. Video and audio transmission is sampled and frame rate is set to minimize the network usage. This is done by controlling the frame rate and quality of the media content before its being transmitted.

The student client machine should have java runtime environment and flash runtime libraries to run the system in the web browser. The web browser should be java script enabled and cookies enabled. This should also support java and flash plug-in.

Client machine is recommended to have at least the memory of 256MB, VGA Display and decent processing power.

The server Machine should have installed Java, Flash and flex runtime. This should run Red5 Server, Apache server which has enabled PHP and some database server such as MySQL.

Server machine is recommended to have 4GB of RAM, 1TB of HDD and a dual core or equivalent processing power.

3.3 System Implementation

3.3.1 Database

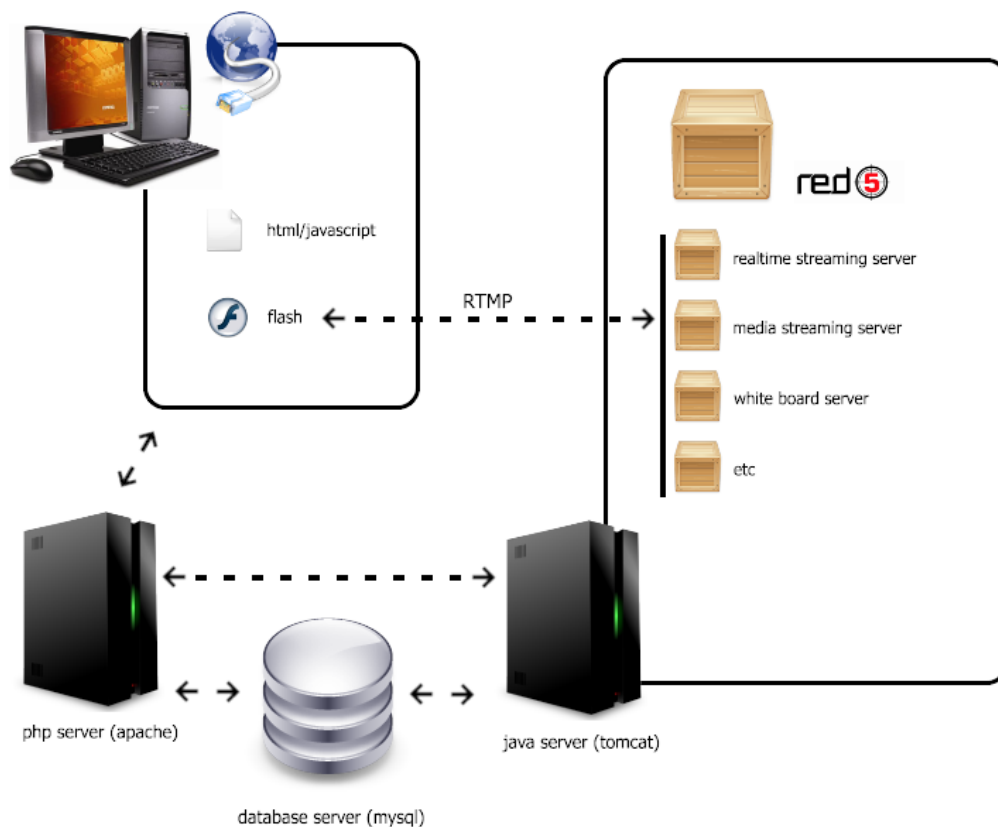


Figure 3.3: Database Architecture

The server machine consists of 3 main services:

- Database Server

The database server contains all the application data. MySQL is used as the database server. MySQL as the best open solution for the database, it gives the low memory

consumption and resource usage while in production.

database Classes/Objects

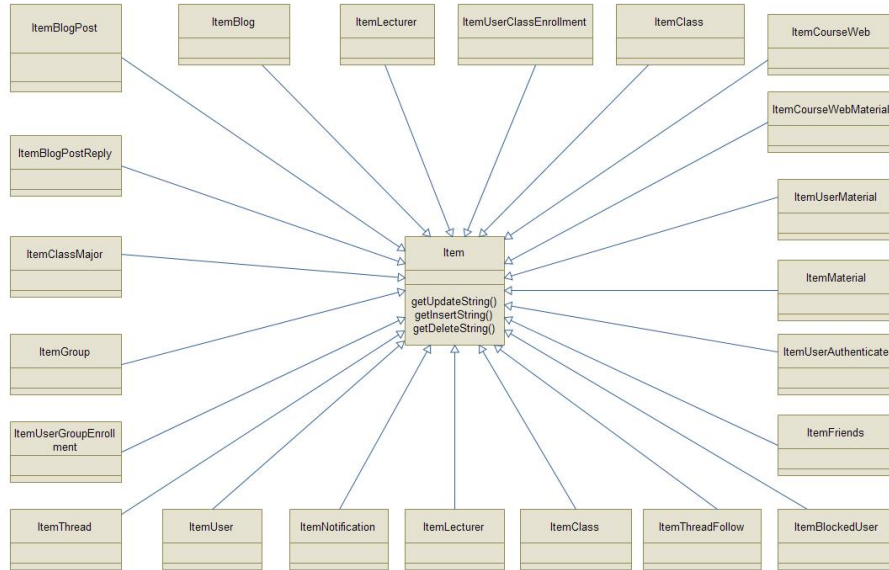


Figure 3.4: database package

Item: The base class which is used to created the classes that represent the database data objects entries.

ItemBlogPost, ItemBlogPostReply, ItemClassMajor, ItemGroup : Are the inherited classes from the Item class.

UserHandler : The class which is used to handle the user specific events like, Login, Register, Update Information and Search

Blog Hanlder : Use to handle blog related works, such as blog alter, blog posts alter and post reply alter

Material Handler : handles materials uploaded to the system

ThreadHandler : used to handle the chat and PM messages between the users

ClassHandler : Class room related things can be altered by this handler class

: this is used to handle the class major entries used to create the class ClassSessionHandler : When a class finishes the class session is updated and handled by this controller class

CourseWebHandler : Handles the course web manipulations ExamHandler : the class use to control and handle the Examination options and works FriendHandler : used to handle the Friend requests and responses

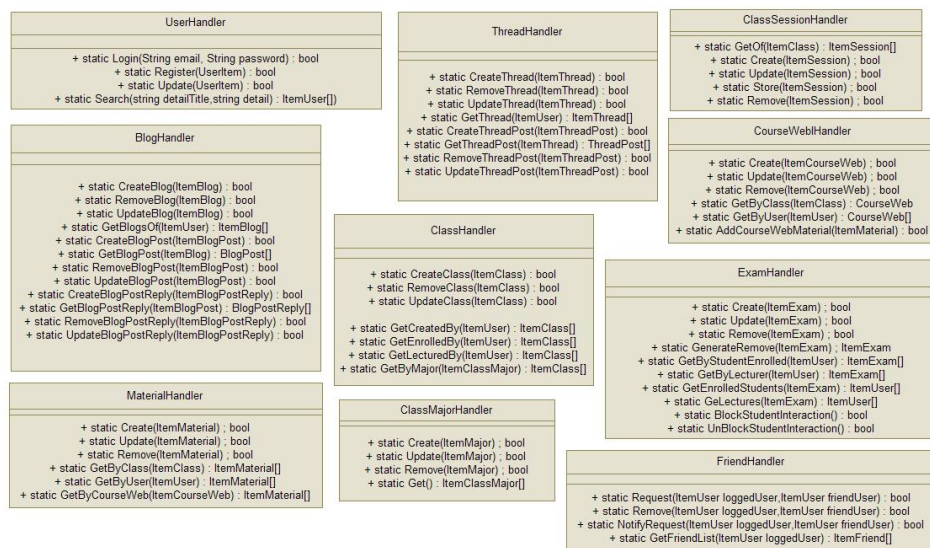


Figure 3.5: database handler

- Web server

Apache HTTP server along with PHP is used as the web server which contains the server side database handling and the client implementation to view the html and flash content. HTML is produced by the execution of the PHP codes deployed in the Apache server. The flash client interacts with the Red5 multimedia server application. Flash contents are used to develop cutting edge interactive applications such as real time video streaming, publishing, whiteboard content transferring, etc...

- Java Server

Open source apache tomcat server as the java server, serves the need of multimedia server which runs as an application deployed in the Tomcat. Red5 which was originally coded in java as a J2EE web application is the API and the RTMP server which is used to write our own server applications for multimedia handling.

Flash and RED5 uses RTMP as the media transmission protocol. The red5 applications written in order to work with the flash applications will be deployed in the java tomcat server along with the RED5 server.

3.3.2 Real time streaming / publishing application.



Figure 3.6: Real time streaming / publishing application

This application is used to transfer the content of the webcam directly to another host via the web browser's flash client, without any desktop application running in the client end.

The client which has the multimedia equipment such as Web Cam and microphone can transmit the real time data captured using flash. This content is buffered in the server and when another client subscribes, server sends that client the real-time multimedia content to

be viewed. Likewise the real-time conference or video transmission is achieved easily and conveniently.

3.3.3 Multimedia streaming application.

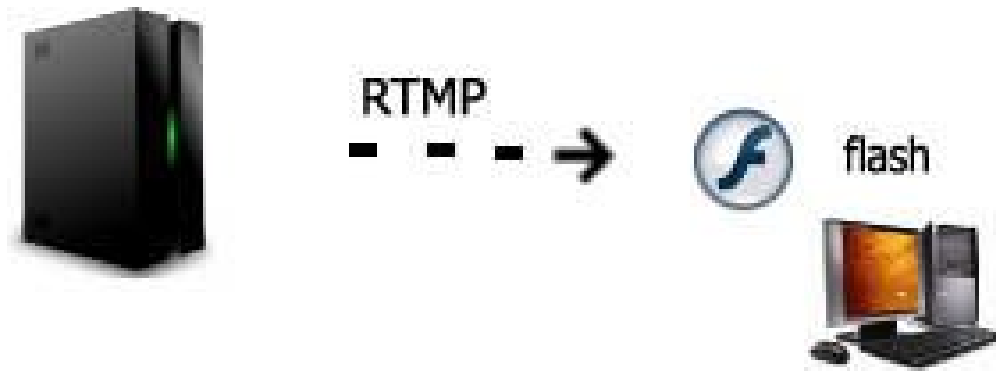


Figure 3.7: Multimedia streaming application.

The stored audio video content can be accessed by the client using a specific flash player which interacts with the RED5 server application and retrieves the stored multimedia content.

3.3.4 Whiteboard content transmission application.

Virtual online flash whiteboard known as the DLES smart board is the client side transmission application use to create the whiteboard content.

This flash application fetches the images periodically and transmits the whiteboard content to the server application written in RED5 API. This is same as the video transmission which was discussed earlier. But there the frame rate is much lower than the video transmission.

The client using the flash whiteboard content creator, which is the smart board application, can create the content of the white board, and on real-time, the content is published to the server, from which the content is distributed to the flash whiteboard viewer clients

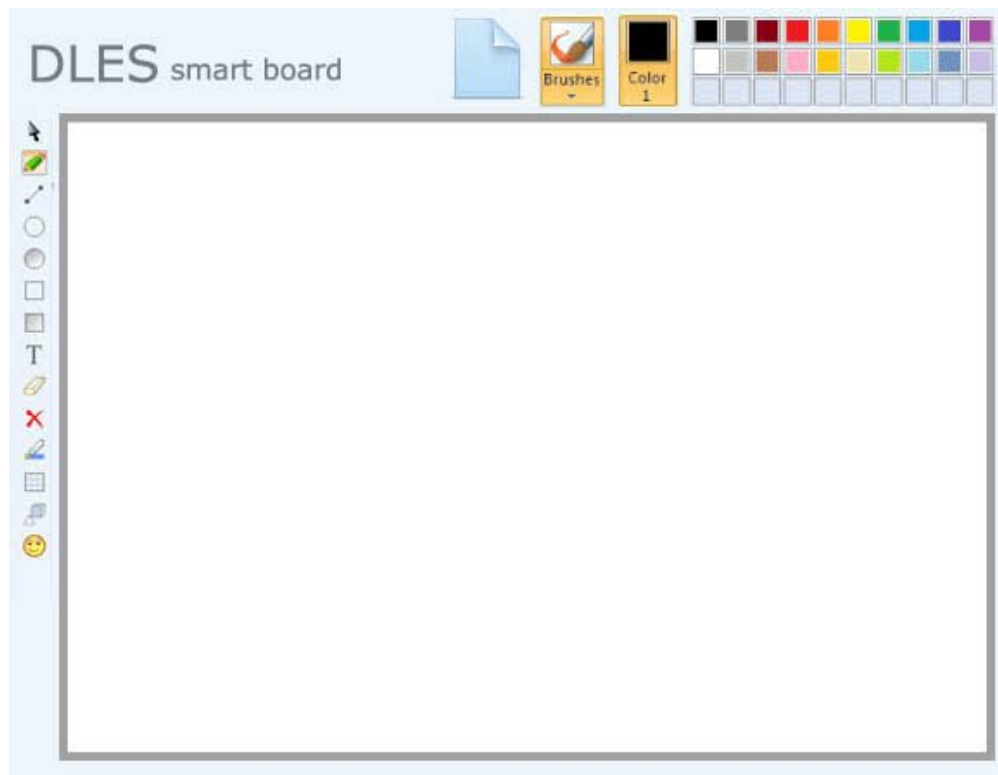


Figure 3.8: whiteboard application.

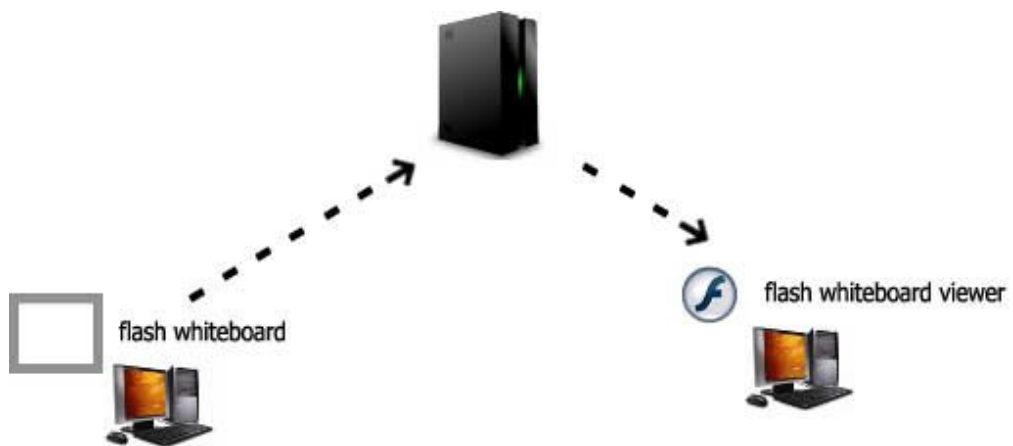


Figure 3.9: whiteboard content distribution.

connected.

3.3.5 File Server (Java Based Bunchi Server)

The data files in need of storing in the server are kept securely in the Java Based Bunchi Server (J2BS). This File server was fully coded from the scratch on behalf of the project DLES, and will be available to download as an open source project.

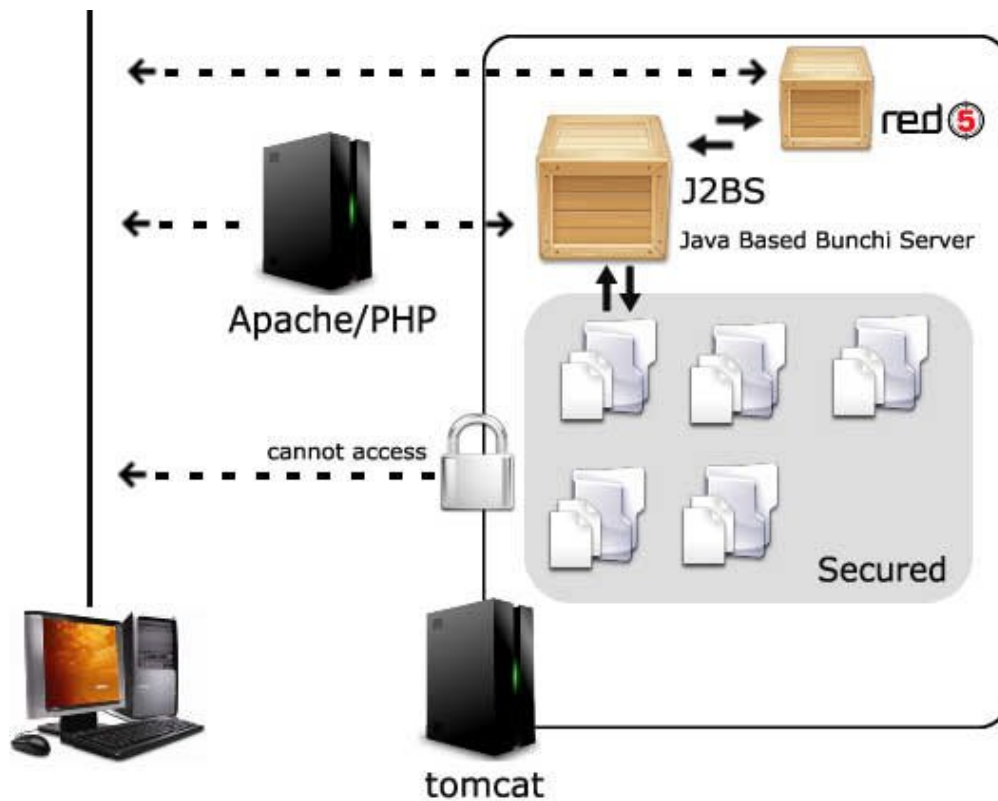


Figure 3.10: File Server Architecture.

J2BS runs in the Tomcat server as a servlet. The servlet interface enables the outsiders to download or upload a file to the server. Authentication can be enabled for securing the files.

Chapter 4

Specific requirements

4.1 External interfaces

In this section we provide details of our DLES external interfaces and provide an External Interface Diagram to aid in this description. Identify each external interface by name and provide a brief description of each interface.

Expected prototype external interfaces

1. User login interface
2. Registering with DLES
3. Changing the DLES Password
4. Main User Interface
5. Smartboard
6. Create class
7. Examination system

4.1.1 User interfaces

User login interface

The PHP login interface enables you to integrate user login with the content of our web site. The system offers full anti-hack protection as with the usual pop-up login method, and also includes support for the 'OpenCrypt Points System'.



Figure 4.1: User login interface

You can log into the DLES Web Interface by issuing the username and password to the above user login interface. Then our system will check whether the password is valid or not using the MySQL database. If you issue a valid username and password you will be redirect to our DLES system, otherwise it will generate an error message.

If you login with the "remember me" method DLES allows you to bypass this login screen. This option is, however, only recommended for people who have physically secure machines (for instance, on your machine at home or in your office).

If you do not have DLES account, you can simply register with our DLES Community by giving the required information.

Register with our system



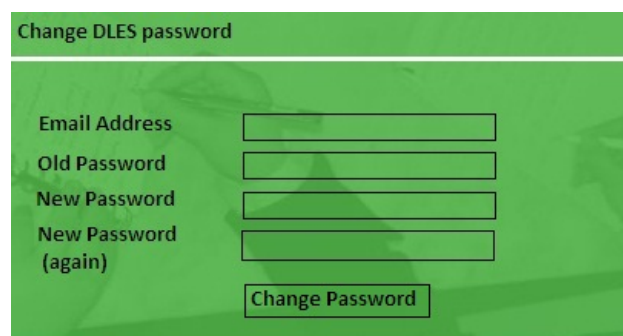
The registration form is divided into two panels. The left panel contains fields for 'email', 'first name', 'last name', 'date of birth', and 'gender' (with 'male' and 'female' checkboxes). A yellow 'next' button with a right-pointing arrow is at the bottom. A green arrow points from this 'next' button to the right panel. The right panel contains fields for 'password', 'password confirm', and 'community nickname'. Below these is a CAPTCHA section with the text 'submit the word you see below' and an image of a wooden pallet with the word 'income58' overlaid. A white input box is provided for the CAPTCHA answer, followed by another yellow 'next' button with a right-pointing arrow.

Figure 4.2: Registering with DLES

If you do not already have a personal username and password, you can use above interface to register with our DLES system.

You can enter your email and password. Then Confirm the password by entering it again, and then click the next button. When your password registration is accepted, a confirmation email will be sent to you. You will have to activate your password by responding to the email (or clicking the link it contains).

Changing the DLES Password



The 'Change DLES password' form has a title bar at the top. Below it, there are four input fields labeled 'Email Address', 'Old Password', 'New Password', and 'New Password (again)'. At the bottom of the form is a button labeled 'Change Password'.

Figure 4.3: Changing the DLES Password

To change your DLES password, click the [Change Password] button on the Login Screen. The Change DLES Password screen opens. Enter your email address, your current DLES password, the password you would like to change it to, and then click on the [Change

Password] button.

Main User Interface

Distributed Lecturing and Examination System is a web based, one of the most users friendly, all in one complete virtual classroom package. DLES classroom environment with robust features that include audio, video, application sharing and content display, and chatting facilities.

Its pedagogical design and ease-of-use ensures that educators and students engage as if they were meeting face-to-face. Advanced features such as whiteboarding, presenter on-the-fly, resizable chat areas and participant lists, content download enable further dynamic interaction between students and educators.

Following diagram shows the sample main user interface of the system.

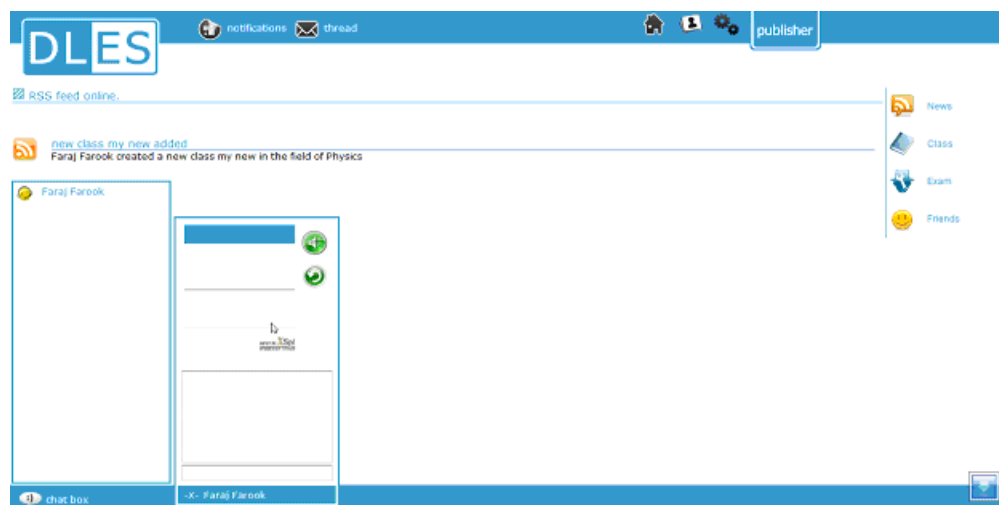


Figure 4.4: Main User Interface

File sharing Window



Figure 4.5: File sharing Window

Application Sharing allows you to share any document or files with other participants. By selecting the [metarils] quicklet we can upload or download any shared document.

Public/Private Text Chat

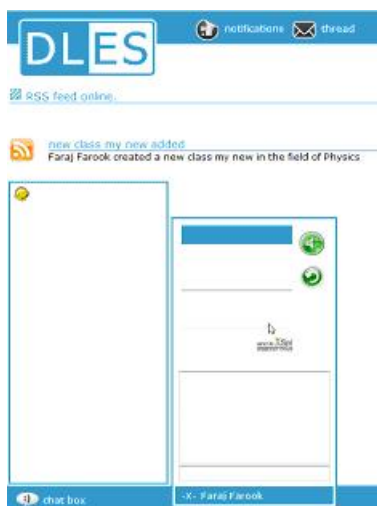


Figure 4.6: Public/Private Text Chat

Some students are more comfortable writing than speaking, and our chat messaging allows that student to communicate textually so they can participate with their more talkative classmates.

Smart board

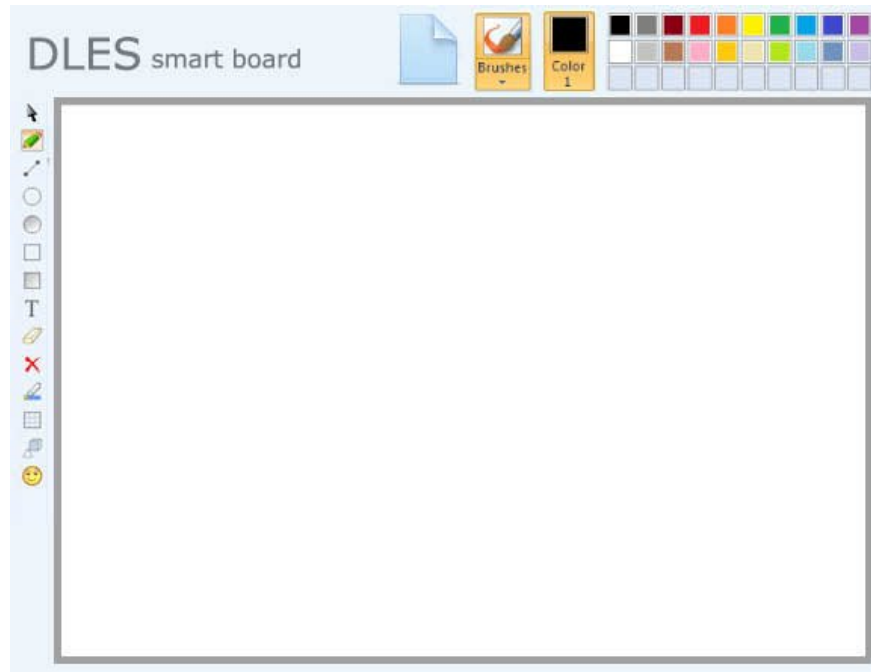


Figure 4.7: Smart board

The Smart board enables users in the DLES to present different types of information as they would on a blackboard in a classroom. Using the tools in the Whiteboard Tools palette, users can draw images, type text, and present equations.

Chapter 5

Research constraints

The speed of communication is one possible limitation. Working on a dial-up connection may adversely affect the sound quality of the voice applications. The setup allows for using "modem" connections, and even then records fairly well, but there may be additional sounds and background noises, which may make it difficult to hear. It is also important, whenever possible, to make sure students have access to headsets, so that any computer noises can be minimized on the recording.

Because any program that works with sound is a large system resource hog, there may be problems with interactions with other applications, especially when they are of the same type. It is advisable to test the application in the situation in which it is intended to be used to minimize the effect this will have on its use. Sometimes workarounds can be made to allow for the use of multiple applications, or (at least) give the ability to use one without the other.

1. Examination Security

(a) Screen content transmission

The small java application which runs in the student side client machine retrieves the desktop screenshots and transmits periodically to the server. This can be reviewed by the lecturer when he/she is marking the paper.

(b) Webcam Transmission

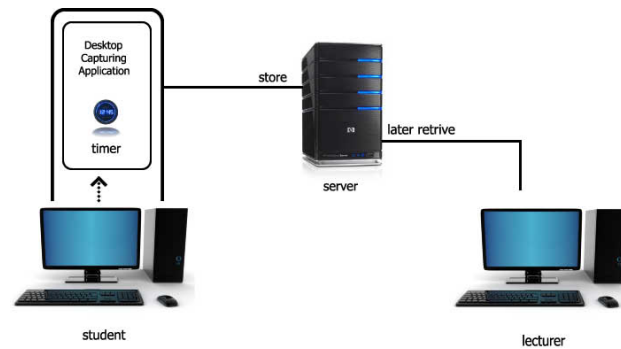


Figure 5.1: desktop caputing application

Webcam is accessed by the flash application which runs in the client host and transmit the content of the camera to the server continuously until the student finishes his/her examination. This can be reviewed by the lecturer when he/she is marking the examination paper.

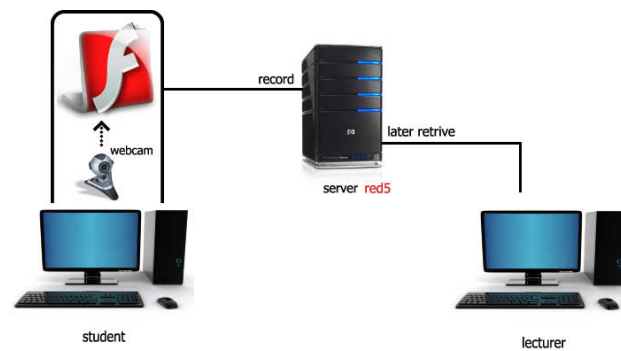


Figure 5.2: webcam application

2. Video/Smart Board Transmission

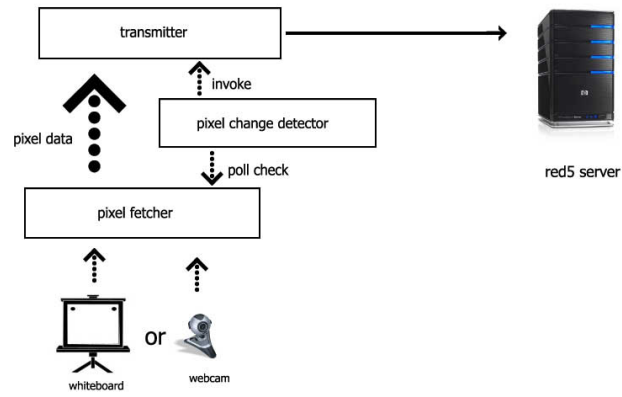


Figure 5.3: whiteboard transmitter

References

- [1] Paul Gregoire, Deploying Red5 to Tomcat, September 2007. [Online]. Available: <http://docs.huihoo.com/red5/Red5-War.pdf>
- [2] Adobe Systems Inc, "RTMP Specification License" April 2009.
- [3] N. Ansari, H. Liu, Y. Q. Shi and H. Zhao, "Dynamic Bandwidth Allocation for VBR Video Transmission", in Journal of Computing and Information Technology - CIT 11, Advanced Networking Laboratory, Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, USA , 2003
- [4] Paul Gregoire , "Deploying Red5 to Tomcat", September 2007
- [5] Steven Gong, Paul Gregoire, Daniel Rossi, "Red 5-Open Source Flash Documentation Reference book", Version 0.7.1
- [6] Paul DuBois, "MySQL", Fourth Edition, Addison-Wesley, September, 2008
- [7] Vivek chopra, Ben Galirath, Chanoch Wigger, "Professional Apache Tomcat" , John Wiley sons, Inc., 2005
- [8] ibm.com/developerWorks, Create dynamic sites with PHP & MySQL. [Online]. Available:<http://www.id.uzh.ch/dl/schulung/lehrtexte/php-mysql.pdf>