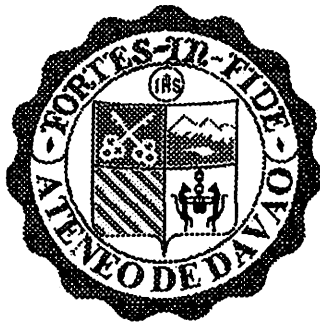


**A TERMINAL CONTROL SYSTEM FOR CLASSROOM
MANAGEMENT USING VIRTUAL NETWORK COMPUTING
PROTOCOL**



By

Ricky John S. Babao

Cheryl Mae P. Insong

Princess E. Panes

**SCHOOL OF ARTS AND SCIENCES
ATENEODE DAVAO UNIVERSITY**

MARCH 2009

**A TERMINAL CONTROL SYSTEM FOR CLASSROOM MANAGEMENT
USING VIRTUAL NETWORK COMPUTING PROTOCOL**

An Independent Study

Presented to

The Faculty of the Computer Studies Division

Ateneo de Davao University

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science in Information Technology

By

Ricky John S. Babao

Cheryl Mae P. Insong

Princess E. Panes

SCHOOL OF ARTS AND SCIENCES

ATENEO DE DAVAO UNIVERSITY

MARCH 2009

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background of the Study	1
1.2 Technology Application Context (IT)	2
1.3 Objectives of the Study	3
1.4 Significance of the Study	4
1.5 Scope and Limitations of the Study	5
1.6 Definition of Terms	5

2 REVIEW OF RELATED LITERATURE AND WORKS

2.1 Implementing a Terminal Control System for a Classroom Instruction by Jannice Madraga Llanes, 2005 Masters in Information Technology graduate	8
2.2 XClass: Multimedia Teaching + Classroom Control System	9
2.3 LanSchool v7.0	10

3 PROJECT DESIGN AND METHODOLOGY

3.1 Operational Framework	13
3.1.1. Terminal Control System Architecture	13
3.1.1.1 Server (Teacher):	13
3.1.1.2 Clients (Student):	14
3.1.2 Feature Descriptions	
3.1.2.1 Shutdown/Disconnect Client/s	14
3.1.2.2 Thumbnail and Zoom View and Client Desktop Access	16
3.1.2.3 Client-Server Chat Application with Video Conferencing, Voice Conferencing, and File-Sharing	17
3.1.2.4 Record Log-in/Log-out Details	18
3.2 Methodology	
3.2.1 Review of literature on Star Networks and Terminal Control Systems	18
3.2.2 Interview Networking Experts	19
3.2.3 Design of Terminal Control System	19
3.2.4 Terminal Control System software evaluation and selection	19
3.2.5 Implementation of terminal control system	20

3.2.6 Testing	20
4 TECHNOLOGY BACKGROUND	
4.1 Discussion of Technology	21
4.1.1 Definition of Terminal Control System	21
4.1.2 The “Windows 2003 Server-Based” Architecture	21
4.1.3. Terminal Services Processes and Interactions	23
4.1.4. Terminal Services Licensing Service	26
5 RESULTS AND DISCUSSION	
5.1 First Module	29
5.1.1 How Shutdown Client Computers Feature Works	30
5.1.2 How File Sharing Feature Works	31
5.1.2.1 Server Code	35
5.1.2.2 Client Code	36
5.1.3 How Instant Messaging Feature Works	37
5.1.3.1 Server Code	37
5.1.3.2 Client Code	40
5.1.4 How Disconnect Internet Connection Feature Works	41
5.2 Second Module	42
5.2.1 How Video and Voice conferencing Works	42
5.3 Third Module	45
5.3.1 How Attendance: Log-in and Log-out Works	45
5.4 Fourth Module	47
5.4.1 How Desktop Capture, Zoom Capability, Thumbnail Views Work	47
5.5 Fifth Module	49
5.5.1 How Automatic Group Arrangement Works	49
6 CONCLUSION AND RECOMMENDATIONS	
6.1 Conclusion	51
6.2 Recommendations	51
BIBLIOGRAPHY	52
APPENDIX A (USER GUIDE)	53
APPENDIX B (RELEVANT SOURCE CODES)	67

ABSTRACT

As the time goes on, students tend to find more and more ways to join activities that will distract them from the task at hand such as games, chatting, etc. In the concepts used in the current terminal control systems such as the Virtual Network Computing (VNC) and Windows Terminal Control System Architecture, the common components are the server, the client and the standard protocol for the server-client communication. This study discusses the methodology for the development of a Terminal Control System using the concepts available to improve the control of the teacher or laboratory assistant over the class and student activities in the computer laboratory.

Keywords:

Virtual Network Computing, Server, Client

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Computer laboratories are very important especially to a Computer Studies student. Unfortunately, some students abuse it by playing games, or cheating and sharing codes via meebo.com or other chat messaging services. To control this unhealthy scenario, the group was able to create an enhanced version of the "Terminal Control System" by a Masters in Information Technology Graduate of the year 2005, Jannice Madraga Llanes. She proposed many recommendations which includes the following: apply and run the system in all computer laboratory rooms; develop the system that has the capability to capture animated images and send them to the workstations; develop the ability to shutdown or disconnect the client/s' computer whenever the instructor directs them for shutdown or disconnection; transmit computer display image (power point, web pages, etc.) to an individual station or to entire class; view an individual or entire class computer workstation in thumbnail or zoom format; and use her study as reference in developing more sophisticated Terminal Control Systems (TCS).The group aimed to control the student's activity in the laboratory and focus more on the assigned task.

1.2 Technology Application Context (IT)

A technology being used widely for networking applications is the Virtual Network Computing. The VNC concept includes the need for a server, client and standard protocol to be able to create a server-client application used in terminal control systems.

VNC allows a single desktop to be accessed from several places simultaneously, thus supporting application sharing in the style of computer-supported cooperative work (CSCW).

The Virtual Networking Computing (VNC) system is a thin client system. Like all such systems, it reduces the amount of state maintained at the user's terminal. VNC viewers are exceedingly thin because they store no unrecoverable state at the endpoint. This contrasts with systems like X Windows, and allows arbitrary disconnection and reconnection of the client with no effect on the session at the server. Since the client can reconnect at a different location.

The technology underlying the VNC system is a simple protocol, the VNC protocol for remote access to graphical user interfaces. It works at the frame buffer level and therefore applies to all operating systems, windowing systems, and applications—indeed to any device with some form of communications link. The protocol will operate over any reliable transport such as TCP/IP. The endpoint with which the user interacts (that is, the display and/or input devices) is called the VNC client or viewer. The endpoint where changes to the frame buffer originate (that is, the windowing system and applications) is known as the VNC server.

1.3 Objectives of the Study

The general objective of this research is to develop a terminal control system with the concepts used in Virtual Network Computing.

The specific objectives are:

- **To be able to meet the recommendations cited by the Masters in Information Technology graduate, Jannice Madraga Llanes which include; applying and running the system in all computer laboratory rooms; developing the system that has the capability to capture animated images and send them to the workstations; developing the ability to shutdown or disconnect the client/s' computer whenever the instructor directs them for shutdown or disconnection; able to transmit computer display image (power point, web pages, etc.) to an individual station or to entire class; viewing of an individual or entire class computer workstation in thumbnail or zoom format; and using her study as reference in developing more sophisticated Terminal Control Systems (TCS).**
- **To be able to add some other features besides the recommendations given:**
 - **To be able to help in monitoring the student attendance with the use of a log-in/log-out mechanism**
 - **To be able to conduct a Video Conferencing, One-On-One Voice Conferencing**
 - **To be able to apply an automatic group arrangement, for group activities by using the Automatic group arrangement feature.**

- To be able to learn C# programming language
- To understand the Video-On-Demand concept
- To be able to understand the concept behind VOIP (Voice Over Internet Protocol)
- To be able to identify concepts on Remote Desktop
- To understand the basic and complex concepts used in Virtual Network Computing
- To be able to aid the students and teachers in group-related activities

1.4 Significance of the Study

This study is significant for all computer laboratory assistants and teachers for making sure that students are focused on their assigned tasks. Through a Virtual Network Computing approach that will enable the server to have control over the hosts or clients involved, it will lessen the work of the teacher or laboratory assistant in monitoring the class activities. Some forms of cheating will also be prevented such as using the Internet for plagiarism because features like blocking the internet connection will be provided. Communication between the teacher and students will also be made possible through the video conferencing feature. The teacher will have lesser difficulty in monitoring class attendance with the use of the automated log-in/log-out mechanism. In addition, group-related tasks will be done with less difficulty because there will be an automatic group arrangement capability.

1.5 Scope and Limitations of the Study

The study focused generally on the concepts used in the Virtual Network Computing and Windows-based Terminal Control System Architecture. A new Terminal Control System approach was implemented by the group using the concepts studied.

The study was implemented in the Ateneo de Davao University Computer Laboratory. Reliable tests were conducted in order to evaluate the new terminal control system and the study was limited within the scope of the specified domain.

1.6 Definition of Terms

Star Networks -A communications network in which all terminals are connected to a central computer, controller or hub.

(<http://www.answers.com/Star+Networks?cat=technology>)

- A star network design is uses a connection which is linked through devices such as a hub with Unshielded Twisted Pair (UTP) Ethernet. Compared to a bus network topology, a star network generally requires more cable, but a failure in any star network cable will only take down one computer's network access and not the entire LAN. (If the hub fails, however, the entire network also fails.)

- In line with this discussion follows advantages and disadvantages of using a star network topology. Its advantages are: it is easy to install and to make connection, it prevents disruptions to the network also in removing devices, and it has the ability to easily detect errors. However, it also has its disadvantages which are: it needs more cable length than a linear network topology, if the hub fails, then the connected hosts or server gets to fail also, and it may be more expensive since it requires more cable wires.

(<http://www.edrawsoft.com/Network-Topologies.php>)

Local Area Network - A system that links together electronic office equipment, such as computers and word processors, and forms a network within an office or building.

(<http://www.answers.com/LAN?cat=technology>)

Terminal - A device, often equipped with a keyboard and a video display, through which data or information can be entered or displayed.

(<http://www.answers.com/Terminal?cat=biz-fin>)

Terminal Server -is a specialized computer which aggregates multiple communication channels together.

(<http://www.answers.com/Terminal+Server?cat=technology>)

Terminal Control System – A system having a main control device, terminal devices controlled by the main control device, and communication lines for connecting the main control device and each of the terminal devices in a manner they can communicate bidirectionally.

(<http://www.wipo.int/pctdb/en/wo.jsp?wo=2006011433>)