NETWORK SYSTEM MONITORING

PROJECT WORK DONE AT
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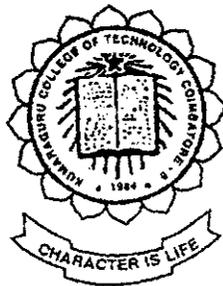
PROJECT REPORT ₽-799

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR AWARD OF THE DEGREE OF

MASTER OF COMPUTER APPLICATIONS

OF BHARATHIYAR UNIVERSITY, COIMBATORE.

SUBMITTED BY
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KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE-641006
MAY 2002

Department of Computer Science & Engineering

Kumaraguru College Of Technology

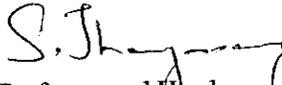(Affiliated to Bharathiyar University)

Coimbatore-641006

CERTIFICATE

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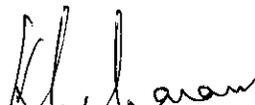
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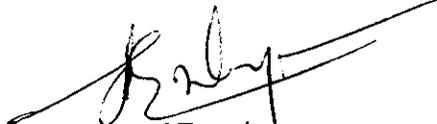
Done by

V.SAMPATHKUMAR

Submitted in partial fulfillment of the requirements for the award of the degree of
Master of Computer Applications of Bharathiyar University

Professor and Head 29|4|'2

Internal Guide
(K. R. Baskaran)

Submitted to University Examination held on 10/05/2002

Internal Examiner

External Examiner

April 24, 2002

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. V. SAMPATH KUMAR** final year M.C.A (Master of Computer Applications) student of Kumaraguru College of Technology, Coimbatore has successfully completed the project titled "**Network System Monitoring**" during the period December 2001 to April 2002.

The project was developed using Microsoft Visual Basic 6.0 and Oracle 8i.

Since the source code is of strict confidentiality it cannot be provided in any format.

We wish him all success in future endeavors.

For PROFLUENT TECHNOLOGIES INDIA PVT LTD.,

R.Balakrishnan
Manager - Projects

DECLARATION

I hereby declare that the project entitled **"NETWORK MONITORING SYSTEM"** submitted to Bharathiyar University as the project work of **Master of Computer Applications Degree**, is a record of original work done by me under the supervision and guidance of **Mr. K. Veerasamy M.C.A.**, *Project Leader, Profluent Technologies, Coimbatore* and **Mr. K.R Baskaran B.E., M.S.,** *Department of Computer Science and Engineering, Kumaraguru College Of Technology, Coimbatore* and this project work has not found the basis for the award of any Degree/ Diploma/ Associate ship/ Fellowship or similar title to any candidate of any University.
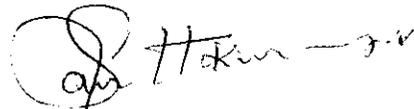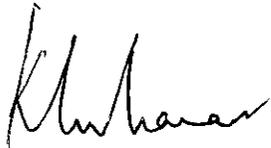
Signature of the student

Place: *Coimbatore*

Date: *29/04/02*

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K. R. BASKARAN

ACKNOWLEDGEMENT

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I express my profound respect and sincere gratitude to **Dr. K.K.Padmanabhan Ph.D,** *Principal, Kumaraguru College of Technology, Coimbatore,* for his kind co-operation in allowing me to take up this project work.

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I express my sincere and heart felt thanks to **Mr. K. Veerasamy MCA,** *Project Leader of Profluent Technologies, Coimbatore,* for his support in finishing the project.

V. SAMPATH KUMAR

SYNOPSIS

SYNOPSIS

The project titled 'Network System Monitoring' has been developed for Profluent technologies Limited, Coimbatore. In which the server monitors the clients in the network.

The Network Monitoring system provides interactive and user-friendly environment for monitoring the client's actions. This software contains two modules:

- ➢ Server Module
- ➢ Client Module

In the server module the server requests the client for the following services.

Server module

- ➢ Current action of the user.

    To fetch the information of current process running and the user details of the client machine.

- ➢ Process Termination

    To terminate a particular process running in the client machine.

- ➢ Screen Capturing

    To capture the current screen of the particular client machine.

- ➢ System Information

    To fetch the processor and memory information of a client machine.

- ➢ History of Users and their Process

    To fetch the information of the past users and their process information.

Client Module:

This client module runs in all the client machine in the network and it monitors and records each and every action of the client machine and sends to the server at the time of request from the server.

Installation:

While the software is installed at client machine it requests to choose a database, (oracle or ms access) after choosing the database the tables at the backend are generated automatically and connected to the server to record the clients actions.

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1. Introduction

1.1 Project Overview

"Network System Monitoring" is a software tool used to monitor the systems that are connected to the network. This software monitors each and every system that is connected to the network and maintains the record of each user who enters the system.

This software tool consists of two modules

1.Server Module

2.Client Module.

1.Sever module

This module is kept in the server and is accessible only by the authorized persons. This module broadcasts through the network, so that the active client receives the message and sends an acknowledgement to the server with their IP-address and system name, so that the list of active nodes are obtained.

Now the server connects to a particular client using IP-address to monitor its action. When the connection succeeds the server request the clients for the following actions.

A. Current Action of the user

B. Terminate Process

C. Screen Capture

D. System information

E. History of users

A. Current Action of the user

When server request for the current action of the user from a particular client, the clients sends the file to the server, which contains the current action of the user, logged in. It contains username, node number, login date, time, process running (current process & background process), process time and memory allocation for each process. So the current action of user can be watched from the server. The file sent by the client can be stored if needed for the future proof.

B. Terminate Process

When the server request for the terminate process the client sends a file which contains the list of process and the process number for the each process running in the client machine. The server receives this file and incase if he has to terminate a particular process in the client machine he just enters the process number to terminate it. When he does it the particular process is terminated in the client machine.
The server can also shutdown a particular client machine

C. System Information

When the server request for the system information of a particular client .The client sends a file, which consist of the node number, username, login mode, number of processor, processor type, current ram size.

D. Screen Capture.

The server sends request to client to capture the current active screen or the entire screen of the client and is stored as .bmp file and the client reads the bmp file and transfers it in form of bytes when the server request .the server then receives the bytes and it writes in a separate bmp file in the server so that the current active or entire screen of the client can be seen from the server.

E. History Of Users

The server can see the history of users of a particular system in the following ways.

a. Users List:

It returns the username, login time and logout time of all the users on a given date.

b. Users On Given Date:

It returns the username, login date, login time, logout time of all the users logged in on the given dates.

c. Users During Given Time

It returns the username, login date, login time, and logout time of all the users during given time.

d. Process done by users On Given date

It returns the list usernames with login time, logout time and list of process done by each user on the given date.

e. Process Done During Given Time

It returns a list usernames with login time, logout time and list of process done by each user on the given date during given time.

6.Users And Process On a Given Node

It returns a list of usernames and a list of process done by each user on a given node.

2.Client Module

This module should be installed at each client in the network.

This is automatically enabled, when the user enters the system it runs as an invisible component, so that the user is unaware of the software that is running in the client machine. When there is a request from the server, the client identifies the type of request and replies to the server

Functions Of Client:

1.When this module is enabled it starts monitoring the user actions and it maintains records for each user in the database. Each record consists of user-id, system no, the time and date when   the user logged in and logged out. It also maintains the record of all process that user has done from the time of login to logout. Process time taken and memory allocation for each process, is also maintained. The database is updated at constant interval of time.
The current action of the user is updated in a separate file for the instant access of the server.

2.When there is a request from the server to capture the current screen, the client module captures the active screen of the client and writes in a bmp file and again when the server request for that file the client transfers the file to the server.

3.Any process currently running the client machine can be terminated from the server by the following way.

The client module waits for the server request to send the current process file and in turn the server request the client to terminate particular process by mentioning the process number to terminate now the client terminates the particular process in the client machine.

The client machine can also be shutdown or restarted from the server when there is an appropriate request from the server.

4.The client maintains a record of the system information and sends it to the server when the server request for it

Client Installation:

In this the client module is installed in all the client machines in the network. While installation the module requests the installer to select the backend (ORACLE or MS-ACCESS). When the installer has chosen the backend the tables for the database is automatically created and connected to the appropriate backend.

1.2 Organization Profile

THE COMPANY

Profluent technologies India private limited is the result of a vision cherished by a group of young entrepreneurs with the zeal to establish a successful business in information technology. Profluent technologies will provide authentic IT solutions to its clients with its plethora of skills in cutting edge technologies. The strengths of the company are its people; 76 professional from diverse technical backgrounds-all converged to promote a synergy hitherto unseen. A dedicated R&D division will ensure that the company toes the line with all innovations in the industry. Rigid quality control methods will ensure timely delivery of quality software. An agile support team will augment the services provided by the company.

INFRASTRUCTURE

The company operates primarily from its at 'Siva's complex'- a prestigious landmark in the city with excellent facilities such as standby generators and aesthetic interiors.

The development unit has an advanced local area network with equipment from top brands like IBM, Intel, and HP etc. High - speed data transmission facilities are available to cater to the needs of overseas clients.

CORE COMPETENCIES

Services provided by Profluent technologies currently are:

APPLICATIONS DEVELOPMENTS

Custom solutions for all types of business, utilizing superior systems analysis and design techniques

ERP solutions for medium and large enterprises Redesign and conversion of existing systems

INTERNET SOLUTIONS

Profluent technologies are your one-stop solution provider to put your business on the Internet. We provide Internet solutions that enable organizations and business systems to improve information exchange and communication by connecting together vendors, customers, suppliers and distributors over the web

- WEB SITE DESIGN
- WEB APPLICATION DEVELOPMENT
- PORTAL DEVELOPMENT
- LONG TEARM WEBSITE SUPPORT AND MAINTENANCE

FACILITIES MANAGEMENT

- Facilities management is a service package offered on an annual basis for managing single or multiple sites. The packages includes:
- Network study, designing, analysis and services on implementation methods
- All server, client, database, peripheral integration with a variety of LAN
- Operating system
- Host/remote connectivity configuration services.
- Seamless integration of all network platforms

2. System Study & Analysis

2.1 Existing system

At present company is not using any software tool to monitor the systems in the network and no system monitoring is done in the company .If at all the company wants to watch the clients action a person has to be appointed to monitor the client, which has the following limitations.

Limitations:

The following are the limitations of the existing system.

1. Client's process could not be monitored and there is no proof for the process done by the client.

2. It is very difficult to maintain records for the clients manually.

3. Human cannot monitor all the systems in the network at the same time.

4. Human cannot remember all the user details and the process details of each user of every client machine.

2.2 Proposed System

The primary objective of the proposed system *"Network System Monitoring* "is to monitor the clients in the network. The development of the software would encompass features interactively visualize the client action then there.

The features of the proposed system would cover the following:

1. It monitors the users action at all the client machines.
2. It maintains the database to hold the records of all the users.
3. A client machine can be monitored at any moment from the server.
4. The current screen of any client machine can be captured.
5. Any process running in the client machine can be terminated from the server.
6. The client machine can be shutdown from the server.
7. The client sends the file to the server incase of the request.
8. The general system information of any client can be viewed from the server.
9. The users on a particular date and node can be viewed.
10. the users between two dates can be viewed.
11. The users between particular times on particular date can be viewed.
12. The process done by each user on particular date
13. The process done by users on particular time on a particular date.

2.3 Requirements on New System

Network system monitoring is the software tool, which helps to monitor the clients in the network. This software tool provides many functions that are related to client .so the new system should possess the following requirements to fulfill the needs of the new system.

The system should know the current users in the network (i.e., users logged in currently) and their IP-address, node number in order to connect with the particular client machine.

The system should be able to communicate in the both sides (server to client and client to server) in order to monitor the client actions and send information to server.

The client module should be installed at every Client machine in the network.

Since this Proposed system is using Windows API functions it needs windows 9x platforms or later versions to support API functions.

2.4 User characteristics.

The proposed system has been developed user interactively and it provides directions at each and every stage, which helps the user to understand easily. Since the user of this proposed system are the authorized persons they possess enough computer knowledge to operate the proposed system.

The whole proposed system is partitioned in to two modules, the server module and the client module.

In the client module the proposed system starts automatically when the user gets login to the system and it runs as an invisible component to the user, so no user is using this module, which means there is no need of any special characters for the users at client machines.

In the server module the user is an authorized person who should posses' good computer knowledge and basic knowledge about the network system administration.

3.Programming Environment

3.1 Hardware Configuration:

Processor	:	Intel Pentium or above
Memory	:	64 MB
Cache Memory	:	512 KB
Hard Disk	:	10 GB
Modem	:	56 KBps Internal modem

3.2 Description of software & tools used.

About Windows 98

Windows 98 isn't just a 32-bit operating system that sits on top of DOS. As is Windows 95. is fully integrated 32-bit protected mode operating system. The need for a separate copy is eliminated. New as of Windows 95,and even better in windows 98,is the ability for programs to spawn multiple threads with its ability to perform.

A preemptive multitasking capability enables system responsiveness and smooth background processing. It is no longer shacked by old DOS FAT file system. Device drivers can now be written in native 32-bit code. These drivers deliver high performance and intelligent memory use, as long as the native 32-bit programming model. Some of the features of windows 98 are:

♣ It is a graphical operating system much like the old Windows, with Face-lift and reliability improvements

♣ It will run all the 32-bit windows 98 programs as they appear on the Appear on the market. The programs will run many times faster than the older times, which is a promise by the Microsoft.

♣ It is a multithread and preemptive, multitasking operating system, Which means it cans multiple applications simultaneously and More Smoothly than ever, especially for those programs that is of The New breed of 32-bit applications written for windows 98.

♣ Has the more Mac like interface, doing away with confusing program manager / file manager design and incorporating a Single integrated arrangement that allows you to place document Icons and folders right on windows desktop and work with them From there. Supports long file names rather than the severely limited eight letter file names used in DOS.

♣ Applications settings and user-right settings in a central location Calls registry. These settings were previously stored in a number Of files like the Autoexec.bat, confic.sys, win.ini and system.ini Files. This arrangement allows for more easily managed PC. These Settings can easily be accessed from a remote pc in a network, allowing a network of corporate PC.

♣ Automatically adapts more fully to the hardware it is running on And thus requires less-fine tuning to take full advantage of your Particular computer setup available disk space, amount of RAM And so forth. It is more proficient at

Cleaning up after faulty application crash, thus prevent windows from crashing all together. If a program crashes, we can eliminate it from the crash list without affecting the other running applications. Memory and other resources, the application was using are freed for use by the system.

♣ Incorporates object linking and embedding version 2.0. This Allow you to easily create fancy compound documents combining information from several different application that supports OLE.

The above given are some of the important features of windows 98

About Windows NT

The Microsoft Windows family of operating systems is designed with Interoperability in mind. Increasingly, customers are demanding flexible, open Networking capabilities as basic components in operating systems. Microsoft Meets these needs today with the Windows for workgroups operating system with integrated networking, the Windows NT operating system, and the Windows NT Advanced server, all incorporating networking capabilities as integral components.

The Microsoft family of operating systems supports interoperability with The Novell NetWare network operating systems. Windows for workgroups and Windows NT can be configured to access data and printers on Novell

NetWare Servers. The Windows NT Advanced server operating system allows existing NetWare clients to access server-based applications as they continue to access NetWare file and print servers. You can add these Windows family operating Systems into your existing environments and be assured of compatibility, interoperability, and protection of your investment in existing NetWare servers.

About The Software Used

Visual Basic 6.0

Graphical user interface or GUI has revolution the microcomputer Industry. The user is presented with a desktop filled with Icons and with programs that use mice and menus. Microsoft Visual Basic is the fastest and easiest way to Create applications in Microsoft Windows platform. Visual basic provides a complete set of tools to simplify rapid application development. We can use grids to handle tabular date, communicate with other windows applications and databases.

Visual Basic is object oriented; that is it revolves around build in objects. Visual Basic makes use of features like object linking and embedding (OLE), Active controls. Visual Basic can be extended by adding custom controls and calling procedures in Dynamic linking libraries. The specially constructed libraries Can be loaded any linked at run time, Dynamic linking increases program modularity since it can be compiled and tested separately. Using this powerful Applications can be created.

The following features can justify the use of Visual Basic

* Visual Basic allows connection to a wide range of back-end Databases such as

    * Sybase
    * Oracle
    * SQL Server
    * MS Access

* It provides excellent support in creating easy to use GUI based Applications.

* It follows event driven paradigm for programming.

* It supports object-oriented concepts.

* VB supports easy to use ADO objects through which relational, Non-Relational databases E-mails can be accessed

* VB is independent of database management system through Open Database connectivity (ODBC).

Event Driven Program

Visual basic is event-driven, that is, it responds to the events like lick, Mouse move etc. Each action in the program is triggered by one or more events. The core of visual basic programming is a set of independent pieces of code that are activated by and respond to only the events they have written to recognize.

Data Management

In Visual basic data can be stored as databases or files. Data storage using database technology is through the Visual basic control called data objects. Visual Basic contains data objects like DAO, RDA and ADO. Among this ADO is New to VB 6.0. Active data object (ADO) is the most powerful data object. By means of this any kind of database, which is in any geometry, can be connected.

The Visual basic compiler is fast, and even lets to do background compilation or compile only the code that is needed to start the application. Visual Basic has an extensive online help system for quick reference while developing an Application.

New controls

♣ ADO Data Control   A new OLEDB-aware data source control that   Functions much like the intrinsic data and Remote Data controls, that It allows you to create a database application with minimum code.

♣ Cool bar Control A container control that can be used to create User-Configurable toolbars similar to those in Microsoft Internet Explorer.

♣ Data Grid Control An OLEDB – aware version of DBGrid, the control Allow you to quickly build an application to view and edit record sets. It also supports the new ADO Data control.

♣ Data List Control, Data Combo controls these controls are OLE DB Versions of the DBList and DBCombo controls. They also support the new ADO Data control.

♣ Data Repeater Control Insert a user control into the Data Repeater to create a custom view of a database, Similar to Access Forms. The User Control can contain Textbox, checkbox, or other Controls bound to data fields.

♣ DateTimePicker Control Place this control on a form when you need to provide a drop-down calendar for quick entry of dates and Times. Please read this note on upgrading applications that use the Windows common controls.

Language Features

♣ User-defined Types in Public Methods User-defined types can be Arguments or return types of public properties and methods.

♣ Function Can Return Arrays Functions and properties procedures Will be able to Return arrays

♣ Resizable Arrays Can be Assigned Variable-sized arrays can now Appear on the left side of an assignment. Fixed-sized arrays cannot Appear on the left side of an Assignment, although they can appear On the right

♣ File System Objects offers a streamlined set of routines to traverse The file system and create text files and directories.

♣ Call By Name Allows access to a property or method by specifying A string containing the name of the property or method, rather than By coding the name explicitly.

♣ Create Object Function Enhancements Create Object now lets you Specify a machine name as an optional argument, which allows you To create objects on remote machines.

Data Access

♣ ADO (Activex Data Objects) This new data access technology Features a simpler object model, better integration with other Microsoft and non-Microsoft technologies, a common interface for Both local and remote data access, removable and disconnected Record sets, a user-accessible data binding interface, and hierarchical Record sets.

♣ Data Environment The Data Environment designer provides an Interactive, design-time environment for creating ADO objects. These can be used as a data source for data-aware objects on a Form or report, or accessed programmatically as methods and Properties exposed off the Data Environment object. The Data Environment designer supports all the functionality of Visual Basic's User connection designer, as well as additional features, including Drag and drop, hierarchies, grouping, and aggregates.

♣ ADO Data Control   A new OLEDB-aware data source control that Functions much like the intrinsic Data and Remote Data Controls, in That it allows you to create a database application with minimum Code.

♣ Enhanced Data Binding In previous versions of Visual Basic, it   Was only possible to bind controls together on a form. In Visual Basic 6.0, we've made it possible to bind any ADO/OLE DB data Consumer. You can set the Data source

Property of controls at run Time to dynamically bind to data sources. You can create classes that are data sources and consumers, and bind them through the New Bindings collect object. You can create user controls that are Data sources, similar to the ADO Data control. You can create user Controls that are complex-bound, similar to the Data grid control.

SQL server and Oracle databases. You can write triggers using the Editor too.

♣   SQL Editor allows you to add new stored procedures to existing

Oracle 8.0

The oracle8.0 database from Oracle Corporation is a cooperative server and an open RDBMS used to support mission-critical applications. It is fully portable to more than 80 distinct hardware and operating system platforms, from desktop systems to mainframes and super computers. Platforms include UNIX, OS/2, Windows 95, Windows NT, and Macintosh. This portability enables the freedom to select databases server platforms that meets current and future needs without affecting already existing applications. Oracle delivers scaleable high performance for a large number of users on all hardware architectures.

Oracle is a relational database. The key to this type of database is an understanding of the relationship between data, and then structuring the information base to reflect those relationships. In this way an Information base would be built stand the test of time. A relational database is data-driven not design-driven. It is designed once, and the data changes over time without affecting the applications.

The Oracle DBA can compile and execute SQL sentences issued by a user. SQL * PLUS is made up of two distinct parts these are

- ♠ Interactive SQL

- ♠ PL/SQL

Interactive SQL is designed to create, access and maintain all the data Structures like tables, indexes etc.. It can also be used for interactive data Manipulation.

Programmers can use PL/SQL to create programs for validation and manipulation of data table. It provides the user with all the facilities of a standard, 4GL Programming Environment.

Oracle Database is role based. Roles are a named collection of privileges. This enables you to group together privileges on tables and other objects and other objects and grants them to Individual users or groups of users.

Oracle roles enable organization to have multiple DBA'S and precisely control the special privileges given to each DBA. Oracle supports the largest Of databases, potentially hundreds of gigabytes in size. To make efficient use of Expensive hardware devices, it allows full control space usage.

Oracle supports large numbers of concurrent users executing a variety of database applications operating on the same data. It minimizes the data contention and guarantees data concurrency. At some sites oracle works 24 hours per day with no down time to limit database throughput.

Normal system operations such as databases backup and partial failure of the system do not interrupt Database use. Also oracle can selectively control the availability of data at the database level and at the sub database level. Oracle offers flexible space management and provides open connectivity to and from other vendor's software.

About Winsock ActiveX Control

The **Winsock** control is an ActiveX control that provides a way for applications to communicate using the TCP/IP or UDP protocols. A **Winsock** control uses the underlying network connection or infrared port to transfer data. Because ·a **Winsock** control can act as a client that connects to a server application or as a server that provides connections to network clients, the first step in using a **Winsock** control is to determine whether the control will act as a client or as a server.

Winsock server applications using the TCP/IP protocol set the **Protocol property** to **sckTCPProtocol** and the **Local Port** property to the port number the control will use to receive data. After the port number is set, the **Winsock** control can listen for data arriving at the port. To configure a **Winsock** control to listen on the port, call the **Listen** method.

When a client attempts to connect to the server application, the **Winsock** control generates the **Connection Request** event. To accept the connection request, call the **Accept** method. If the **Winsock** control can successfully accept the connection, it starts the **Connect** event and sets the **RemoteHostIP** and **Remote Port** properties with the IP address and port number of the connecting client. After a connection is made, the control sets the **State** property to **sckConnected**. You then can begin to transfer data.

A connected Winsock control receives data through the connection. When data is sent to the server, the Winsock control generates the Data Arrival event, indicating that the data can be read from the control. To read the incoming data from the control, you can use the Get Data method.

To send data through a connected Winsock control, you can use the Send Data method. As the data is sent through the control to the IP address and port number specified in the RemoteHostIP and Remote Port properties, the Winsock control generates the Send Progress event to notify you of the number of bytes sent and the number of bytes left to send. When the data transfer is complete, the control generates the Send Complete event. After all data transfer has been completed, you can close a TCP/IP connection by calling the Close method. When a connection closes, the control generates the Close event. In addition to the Connect and Close events, the Winsock control can initiate the Error event to notify you of network errors. Unlike control errors or code errors, network errors do not cause a run-time error, but only raise the Error event.

To create a client application, set the Remote Host and Remote Port properties, then call the Connect method. Once the connection to the server is established, you can transfer data as usual by using the Send Data and Get Data methods.

4. System Design & Development

4.1 Input Design

Input screens are the primary interface between the user and the software. The input screens are designed in such way that has simple intuitive and user-friendly layouts. Input validations are performed to enforce all the necessary systems data constraints. The input screens are designed such that if erroneous data is submitted for processing it is detected even during input so that corrections can be made before storage.

For instance, in connection with the client machine the IP-address is accepted as input and if the client is inactive while connecting then a message box displays that particular client is inactive and asks for the new valid input.

The input screens are designed for the convenient use of the users. The list boxes are used to list the IP-address of the active client and the selection of the list box enables a connection between the server and the particular client.

The combo boxes are used to list process-ids, exit code, handle of the process etc..,The user selects a process number the particular index value of the combo box is selected automatically which makes the input valid for the processing.

The date picker is used to select the date and it is formatted automatically as a valid date for the input

Most of the input (request) to the client machine is automatically sent just by a click of the appropriate command button.

Sample input screen formats are given in the Appendix.

4.2 OUTPUT DESIGN

Output design of the system emphasize on preparing the outputs as required by the user. Users evaluate the system using the output obtained from the system. In this project the output is designed in the form of files and bitmap images.

The various outputs generated are:

1.Process of current user.

A file sent by the client, which consist of the following:

Node number

User name

Login date,

Login time,

List of current process running.

2.Process Termination.

An acknowledgement from the client that the particular process has been terminated.

3.Active screen of current user.

This is bitmap image sent by the client in the form of file, which consist of the current screen of the particular client machine.

4. System information

A file sent by the client, which consist of the following:

Node number

Total RAM size

Available RAM size

Total Physical Memory

Available Physical Memory

Type of Mode

Type of processor

Number of Processors

5.History of users

This provides the information of all the users worked in the network and they're past records of working.

A. User list

Username

Node Number

Login date

Login Time

Logout Time

B. Users on given dates.

Username

Node Number

Login date

Login Time

Logout Time

C. Users during given time on a given date.

Username

Node Number

Login date

Login Time

Logout Time

D. Process done by users on a given date

Node number

User name

Login date

Login Time

Process list

E. Process done by users on a given date during given times.

Node number

User name

Login date

Login Time

Process list

4.3 DATABASE DESIGN

Database design aim at storing the data and enabling one or more users to share the common data, thereby eliminating the redundancy and improve data consistency.

Description of tables given below:

User details:
This table is used to store the details of all the users who enter a client machine.

Field	DataType	Description
Username	Varchar	Name of the user
NodeNo	Varchar	Node number
LoginTime	Date	Time of Login
LoginDate	Date	Date of Login
LogoutTime	Date	Time of Logout
LogoutDate	Date	Date of Logout

Process Details:

This table is used to store the Process details of the client machine.

Field	Data Type	Description
Username	Varchar	The name of the user
Nodeno	Varchar	Node number
LoginTime	Date	Time of login
Logindate	Date	Date of Login
Processname	Varchar	Process list
Processmem	Varchar	Memory usage
Processtime	Varchar	Time Taken
Logouttime	Date	Time of logout
Logoutdate	Date	Date of Logout

4.4 Process Flow Diagram

Figure 1

30

Figure: 2

Service to Server

Connecting To Client 3

| Client 1 | Client 2 | Client 3 |

Server   IP-Address Of Client 3

| Client 4 | Client 5 | Client 6 |

Services To Server
1. Current action of user
2. Process Termination
3. Screen Capture
4. System Information
5. History Of Users

Display
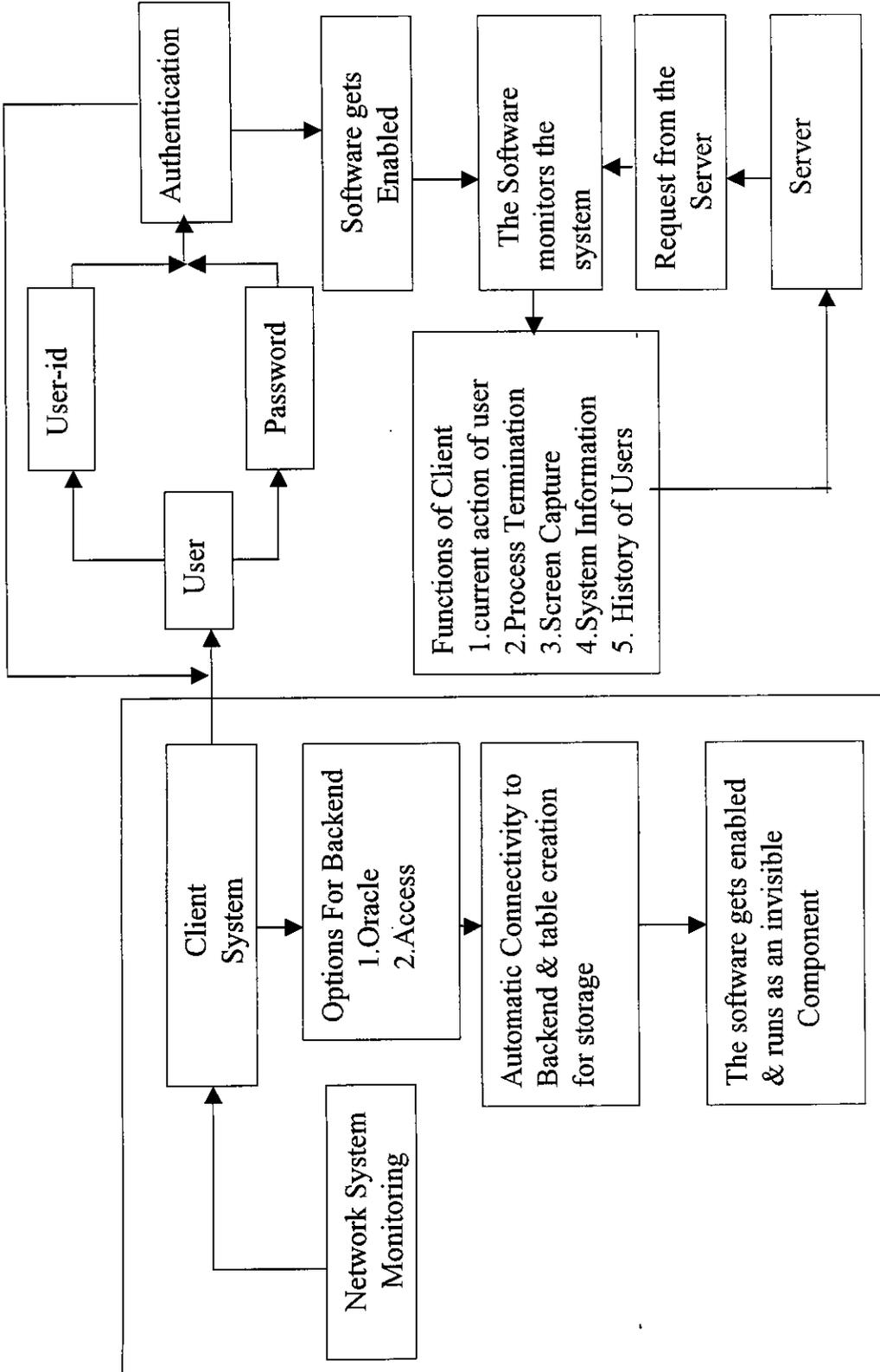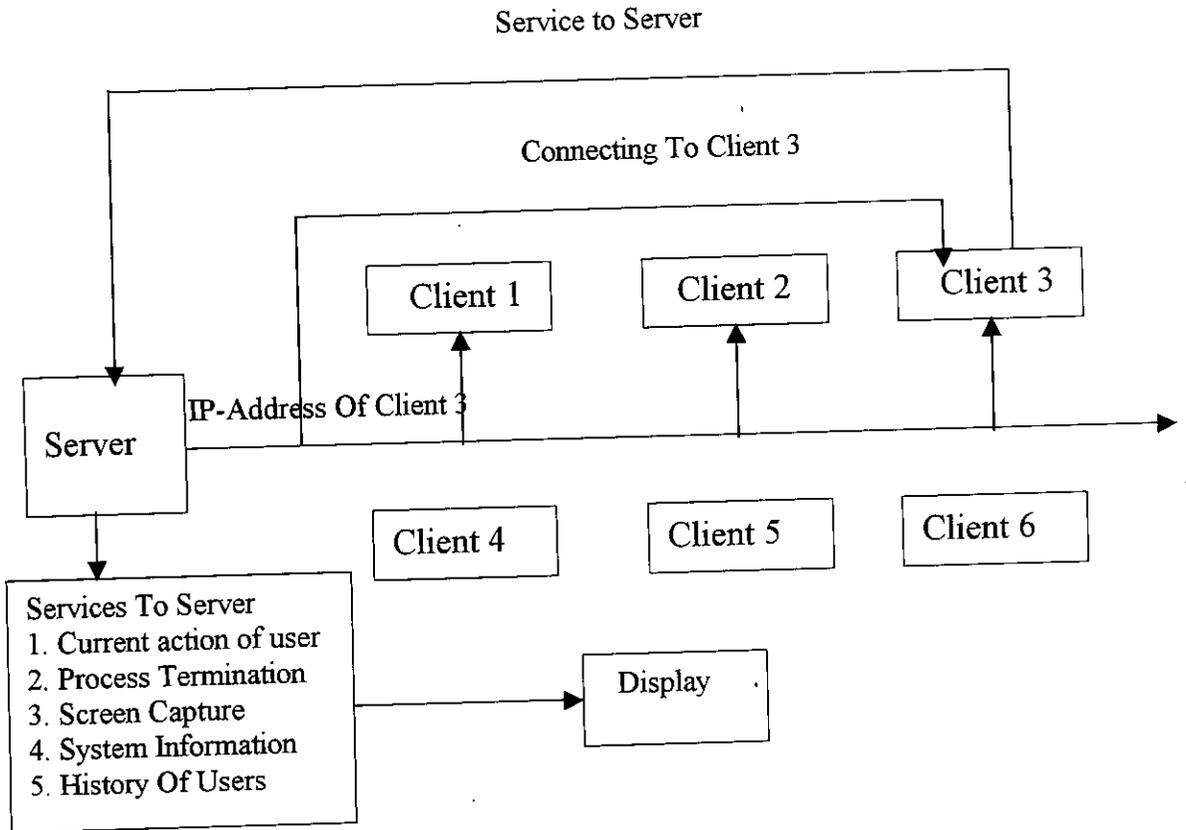
5. System Implementation & Testing

5.1 System Implementation

As a policy every product in the company ready for release undergoes a versioning and release management process. The product is versioned and then implemented in the client location. A complete set of operational documentation, user's manual and guidelines are supplied. Professionals exclusively give user training to a few in the client place from the company.

Implementation Procedures

The project undergoes a versioning and release management before it is delivered to the client. It is a process of identifying and keeping track of different versions and releases of the system. And the released product usually includes *Configuration files* defining how the release should be configured for particular installations. Data files needed for successful operations. An *Installation Program, which* is used to help install the system on the target hardware. Electronic and paper documentation describing the system. All these information are made available on a medium, which can be read and understood by the customer for the software.

The following factors are considered before implementation. Checking if all the components which make up the system been included, if the appropriate version of each required component been included, are the data objects included, etc... An installation program is created and the entire kit is delivered to the client.

User Training

The kit delivered consists of a complete guide on the new system developed. A through training on the new system is given to a representative from each of the user area and an overall demo given to the entire team. The queries from the audience were answered and hints given on various issues. Special training was given to the admin staff that is to play the role of super user. The configuration details and trouble shooting methodologies were explained and his performance absorbed. The user manual was completely explained and doubts cleared for the same. Installing and uninstalling the package and taking a backup of the data were demonstrated to the super user.

Various possible exceptions and the possible causes for it from the user's end were explained. The various user environments and the right of access specified to each user was clearly explained and demonstration given to the team on different user environments. Instructions on successful operation of the system and trouble shooting methodologies were thus discussed.

Operational Documentation

Properly produced and maintained system documentation is a tremendous aid to maintenance engineers. The system documentation includes all of the documents describing the implementation of the system from the requirements specification to the final acceptance test plan.

A complete set of *Operational Documentation* was prepared for the client, who included the features of the system, the access rights allocated for various users and trouble shooting details. The special features of the system were highlighted. A step-by-step procedure was included in the documentation for data entry, report generation and saving reports in text, html or rich text format. The documentation

Prepared keeping in mind users who have little or no knowledge of computers.

The operational documentation includes a document describing the overall architecture, a maintenance guide, a user manual for operations like data entry, report generations, trouble shooting and a list of error codes and their causes and solutions. The purpose of input controls and the validations for the same are explained diagrammatically.

A clear picture of the system and its functionalities are thus provided.

System Maintenance

The process of changing a system after it has been delivered and is in use is called software maintenance. The changes may involve simple changes to correct coding errors, more extensive changes to correct design errors, or significant enhancements to accommodate new requirements. It is the process of changing the system to maintain its ability to survive.

Owing to scope creeps or new requirements in the future there could be possibilities for changes in the system in future. The system has very few external environmental dependencies which will make it more adaptable to changes. The application domain is clearly defined which will help in making changes to a new domain.

The system has provisions for corrective maintenance, adaptive maintenance and perfective maintenance. *Corrective maintenance* is concerned with fixing reported errors in the software. The expense of such correction depends on the error that is trapped. It the trapped error is coding error it is often cheap to fix it whereas design errors are expensive to fix up. *Adaptive maintenance* is concerned with changing the software to a new environment like a new configuration of hardware or operating system. In such kind of a change the new

Operating system for the client is to be any version of windows operating system to support the graphical user interfaces being used in the system. *Perfective maintenance* involves implementing new functional requirements as a result of a business change or scope creep from the customer's side.

The company adopts version control through which an enhanced system will be given the next successive version and it is in the interest of the company to make the newer version compatible with the previous one so that there will be no need to bring about major changes in the existing database. Before a system is released a record of the parts of the software, which can be re-engineered later, are made note of. In case of a change request from the client an impact analysis is performed and if the need is essential the changes are incorporated and analyzed. The enhanced system is then versioned and released.

5.2 System Testing

Testing Methodologies

Periodical tests were conducted during the design and implementation phases of development. Tests were conducted as per test plans, which were scheduled according to the company's policies. A detailed report on various tests conducted and the phase in which they were conducted is given below. A *Bottom-up testing methodology* was adopted to test the system developed. A bottom-up test strategy starts with the fundamental components and works upwards.

While conceiving the Architectural Design of the design phase in development decomposing of the entire project into modules, the relationship between them and the data they involve were thoroughly analyzed. In formulating the detailed design during the design phase an analysis was conducted on the algorithm

Specification to implement functions, decision on data structures to represent data, and the decision of design techniques to be followed.

In the implementation phase tests were conducted according to the most widely used five stages testing process. The system tests involved *Unit Testing, Module testing, Sub-System Testing, System Testing and Acceptance Testing*.

Unit Testing

Unit testing was used to test individual units in the system and ensure that they operate correctly. Alternate logic analysis and screen validations were tested in this phase to ensure optimum efficiency in the system. The procedures and functions used and their association with data were tested.

Module Testing

Module testing was used to ensure that the dependable components in a module work in coordination with one another. Functional testing, performance testing and stress tests were conduct on modules independently to ensure robustness in the system developed. The various forms, their validations, relationships between forms, tables and the data flow between components in a module were analyzed and tested. The procedures and functions common to a module were also tested during module testing.

Sub-system Testing

Sub-system testing also known as integration testing was used to ensure that the modules are available for integration with one another to form the final integrated system. Interface testing was conducted to ensure that the modules could work in harmony with one another. The relationship between the modules and the data they share were tested. The flow of information or data from one module to

Another was tested. Procedures and functions common to modules were analyzed and tested.

System Testing

System testing was carried out after integrating the modules into one workable unit. Tests were conducted to ensure that the system developed matches the requirements specified by the client and the external observations perceived during the analysis phase. Interactions between modules were keenly analyzed and tests conducted to ensure robustness in the integrated system. Tests were conducted using simulated data.

Acceptance Testing

Acceptance Testing was conducted to ensure that the developed system is in accordance with the requirements of the client. The tests were conducted using data supplied by the client. The acceptance testing was carried out as *Alpha and Beta tests*. The alpha test was conducted at the company where the project was developed and beta test was conducted by the company at the clients place to ensure that the package to be delivered is to the satisfaction of the client.

The above tests were conducted in accordance with the *test schedule* formulated by the company. Unit tests were to be conducted on developing each component, module testing when each component is being integrated with a module, sub-system test when the modules are tested and found fit, system test on integrating all modules into one system. Acceptance testing, both alpha and beta to be done by the quality assurance team of the company.

6.conclusion

"The Network System Monitoring" has met all the objectives and goals that are planned during the design of proposed system .The procedures and assumptions made in the designing this project were strictly followed.

Reviews have been collected from the user about modules of the system and are found to be satisfactory

7. Scope for Further development

The project is implemented keeping in mind the possible future enhancements and the modules are designed in such a way that enhancements are possible without any change in the basic structure of the system.

In this proposed system a process running in the client machine can be terminated but in the future enhancement a process running in a particular application should be terminated (i.e. for example, A document file opened in word should be closed instead of terminating the word). A Bmp file sent from the client takes some time to be transferred to the server, due to is size .So in the future enhancement the bmp file should be compressed for faster transfer of file.

The database design has provisions for enhancements. The relationships between data are well-defined and key columns identified so that addition of new tables to the system in future can be done with ease. The table designs as well as the program logic are done bearing possible future changes and enhancements in mind.

The system is developed in a self-documentary way, which would help any Programmer to analyze it and incorporate enhancements to it.

BIBLIOGRAPHY

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✓ George Koch, Kevin Loney "Oracle Complete Reference"
BPB Publications - 1980

✓ Lee "Structured System Analysis and Design"
Galgotia Publications - 1980

✓ Bill Hatfield "Windows API Bible"
Mc GraHill Publications - 1980

Network System Monitoring
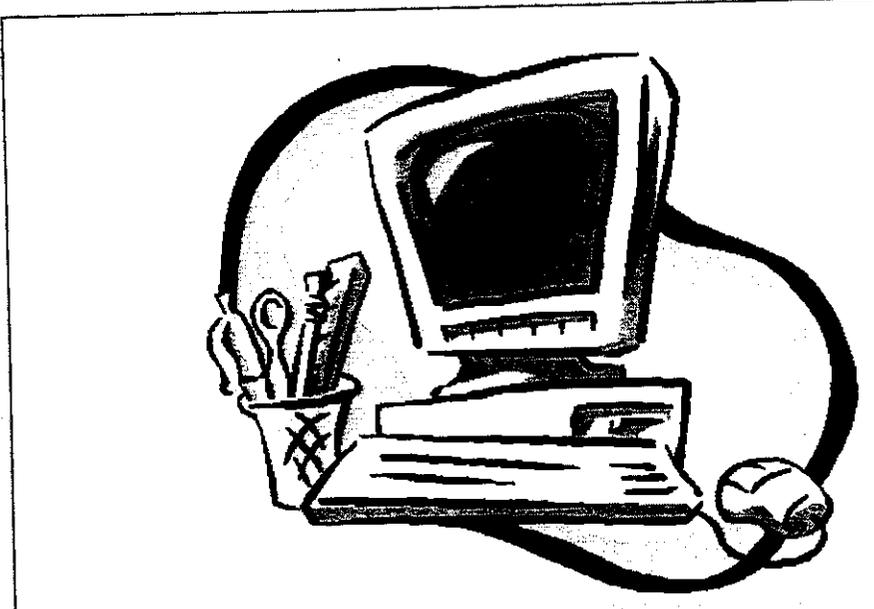
Username [******]

Password [******]

OK

Network System Monitoring

Server

IP-Address\System Name OF
ActiveNode

```
Currentusers
node02
node06
node13
node05
node08
node14
node22
node21
node07
```

| GET | REFRESH |

ok

EXIT

Network System Monitoring

PRESS CONNECT TO CONNECT WITH: node22

Connect

<<Back>>

Network System Monitoring

Current Process Of node22

```
chadru NODE22 9:13:39 PM 9:13:39 PM 4/25/02 4/25/02
C:\WINDOWS\SYSTEM\KERNEL32.DLL@
C:\WINDOWS\SYSTEM\MSGSRV32.EXE@
C:\WINDOWS\SYSTEM\SPOOL32.EXE@
C:\WINDOWS\SYSTEM\MPREXE.EXE@
C:\WINDOWS\SYSTEM\MDM.EXE@
C:\WINDOWS\SYSTEM\MSTASK.EXE@
C:\WINDOWS\SYSTEM\RPCSS.EXE@
C:\WINDOWS\EXPLORER.EXE@
C:\WINDOWS\SYSTEM\SYSTRAY.EXE@
C:\WINDOWS\SYSTEM\LOADWC.EXE@
C:\WINDOWS\RunDLL.EXE@
C:\PROGRAM FILES\MICROSOFT VISUAL STUDIO\VB98\VB6.EXE@
C:\PROGRAM FILES\MICROSOFT VISUAL STUDIO\COMMON\TOOLS\WINAPI\APILOAD.EXE@
```

Receive	Save To File	Show

<<Back>>

Network System Monitoring

System Information

Click Receive To Get The Client Machines Genderal Information

---

main   ⊠

NODE22 No of Processor: 1 Mode Of Windows:Normal Mode Total Physical
Memory:64,980KBAvailable Physical Memory: 200KBTotal Virtual Memory: 2,093,056 KBAvailable
Virtual Memory: 1,974,912 KBType Of Processor: 586

[OK   ]

Receive

<<Back>>

Screen Capturing   node22

Outlook Express

File Edit View Tools Message Help

New Mail   Send/Recv   Addresses   Find
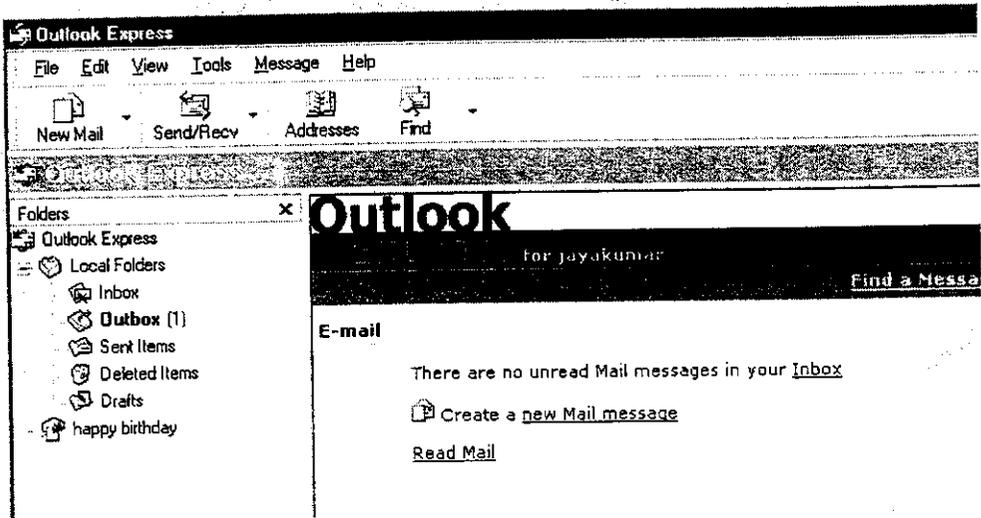
| Capture |
| Request |
| Get |
| Show |

Folders   ×

Outlook

Outlook Express

Local Folders
  Inbox
  Outbox (1)
  Sent Items
  Deleted Items
  Drafts
  happy birthday

for jayakumar

Find a Messa

E-mail

There are no unread Mail messages in your Inbox

Create a new Mail message

Read Mail

Directions

Click Capture To Capture The Current Screen Of the Client

Click Request To Send Acknowledgement To Client

Click Get To Save The File

<<BACK>>

ENTIRE VIEW

Entire Screen View Of   Node22

Outlook Express

File   Edit   View   Tools   Message   Help

New Mail   Send/Recv   Addresses   Find

Outlook   Go to msn

for jayakumar   Find a Message...   Identities ▼

| Folders   × |
| Outlook Express |
| Local Folders |
| Inbox |
| Outbox [1] |
| Sent Items |
| Deleted Items |
| Drafts |
| happy birthday |

E-mail

There are no unread Mail messages in your Inbox

Create a new Mail message

Read Mail

Newsgroups

Create a new News message

Read News

Subscribe to Newsgroups...

| Contacts ▼   × |
| Main identity |
| Microsoft Outlook Express Team |

Contacts

Open the Address Book...

Tip of the day   ×

When replying to a message in a newsgroup, first select the message to which you're replying.

Then click **Reply Group** to post a reply to the entire newsgroup, or click **Reply** to send an e-mail reply to the author only.

Network System Monitoring

Process Termination

Process Running In Client Machine

```
chadru NODE22 4/25/02 9:31:24 PM
C:\WINDOWS\SYSTEM\KERNEL32.DLL0
C:\WINDOWS\SYSTEM\MSGSRV32.EXE1
C:\WINDOWS\SYSTEM\SPOOL32.EXE2
C:\WINDOWS\SYSTEM\MPREXE.EXE3
C:\WINDOWS\SYSTEM\MDM.EXE4
C:\WINDOWS\SYSTEM\MSTASK.EXE5
C:\WINDOWS\SYSTEM\RPCSS.EXE6
C:\WINDOWS\EXPLORER.EXE7
C:\WINDOWS\SYSTEM\SYSTRAY.EXE8
C:\WINDOWS\SYSTEM\LOADWC.EXE9
C:\WINDOWS\RunDLL.EXE10
C:\PROGRAM FILES\MICROSOFT VISUAL STUDIO\VB98\VB6.EXE11
C:\PROGRAM FILES\MICROSOFT VISUAL STUDIO\COMMON\TOOLS\WII
C:\ORACLE\ORA81\BIN\SQLPLUSW.EXE13
```

Directions

1.Click Receive To Get The Current
  Process Running in the Client Machine

2.To Terminate a Process in Client Machine

   Type The Process Number Which Appears
   After Each Process

   Click Terminate

3. Click Confirmation To Conform Tremination

Process Number

13

Receive

Terminate

Confirmation

CAUTION:

Don't Try To Terminate Kernal32.Dll

<<Back>>

Network System Monitoring

Process Termination

Process Running In Client Machine

```
chadru NODE22 4/25/02 9:31:24 PM
C:\WINDOWS\SYSTEM\KERNEL32.DLL0
C:\WINDOWS\SYSTEM\MSGSRV32.EXE1
C:\WINDOWS\SYSTEM\SPOOL32.EXE2
C:\WINDOWS\SYSTEM\MPREXE.EXE3
C:\WINDOWS\SYSTEM\MDM.EXE4
C:\WINDOWS\SYSTEM\MSTASK.EXE5
C:\WINDOWS\SYSTEM\RPCSS.EXE6
C:\WINDOWS\EXPLORER.EXE7
C:\WINDOWS\SYSTEM\SYSTRAY.EXE8
C:\WINDOWS\SYSTEM\LOADWC.EXE9
C:\WINDOWS\RunDLL.EXE10
C:\PROGRAM FILES\MICROSOFT VISUAL :
C:\PROGRAM FILES\MICROSOFT VISUAL :
C:\ORACLE\ORA81\BIN\SQLPLUSW.EXE1
```

Directions

1. Click Receive To Get The Current
   Process Running in the Client Machine

main [x]

Terminated C:\ORACLE\ORA81\BIN\SQLPLUSW.EXE

[OK]

e a Process in Client Machine

Process Number Which Appears
Process

inate

mation To Conform Tremination

Process Number

CAUTION:

Don't Try To Terminate Kernal32.Dll

Receive

Terminate

Confirmation

<<Back>>

Network System Monitoring

History Of Users

Quries

User Details	Process Details
Users On Given Date	Process Done By User During Given Time
Users Bet'n Given Dates	Process Done By User On Given Date
Users During Given Time	Users And Process On a Given Node

<<Back>>

Network System Monitoring

History Of Users

Quries

User Details	Process Details
Users On Given Date	Process Done By User During Given Time
Users Bet'n Given Dates	Process Done By User On Given Date
Users During Given Time	Users And Process On a Given Node

Select The Date

10-Apr-02

Show

<<Back>>

Network System Monitoring

User Details On Date   25-Apr-2002

UserName	Node	Login Time	Logout Time
pon	NODE22	5:14:40 Hai	5:13:22 Hai
chadru	NODE22	9:06:57 PM	5:19:52 Hai
pon	NODE03	5:27:28 Hai	9:22:24 PM
ova	NODE22	05:50:56 PM	6:13:39 Hai
sampath	NODE21	6:17:25 Hai	07:15:06 PM

<<Back>>

Network System Monitoring

History Of Users

Quries

User Details	Process Details
Users On Given Date	Process Done By User During Given Time
Users Betn' Given Dates	Process Done By User On Given Date
Users During Given Time	Users And Process On a Given Node

Select The Date

| 01-Apr-02 | ▾ |

Select The Date

| 26-Apr-02 | ▾ |

| Show |

<<Back>>

Network System Monitoring

User Details Between   01-Apr-2002   And   26-Apr-2002

Username	Node	Date	LoginTime	LogoutTime
chadru	NODE22	10-Apr-2002	9:06:57 PM	5:19:52 Hai
pon	NODE22	01-Apr-2002	5:27:28 Hai	9:26:41 PM
ova	NODE03	25-Apr-2002	05:50:56 PM	6:13:39 Hai
sampath	NODE22	25-Apr-2002	6:17:25 Hai	07:15:06 PM
siva	NODE21	25-Apr-2002	09:45:56 AM	6:24:50 Hai

<<Back>>

Network System Monitoring

Select The Date | 25- Apr -02 ▾ | **RETRIVE**

UserName	Node	LoginTime	LogoutTime	Process
sampath	NODE22	6:17:25 Hai	6:17:33 Hai	C:\WINDOWS\SYSTEM\SPOOL32.EXE@
				C:\WINDOWS\SYSTEM\MPREXE.EXE@
				C:\WINDOWS\SYSTEM\MDM.EXE@
				C:\WINDOWS\SYSTEM\MSTASK.EXE@
				C:\WINDOWS\SYSTEM\RPCSS.EXE@
				C:\WINDOWS\SYSTEM\PSTORES.EXE@
				C:\WINDOWS\SYSTEM\DDHELP.EXE@
				C:\WINDOWS\EXPLORER.EXE@
				C:\WINDOWS\SYSTEM\SYSTRAY.EXE@
				C:\WINDOWS\SYSTEM\LOADWC.EXE@
				C:\WINDOWS\RunDLL.EXE@
				C:\PROGRAM FILES\MICROSOFT VISUAL STUDIO\VB98\
				C:\PROGRAM FILES\MICROSOFT VISUAL STUDIO\COMM

| First | Next | Previous | Last |

<<Back>>