SIMPLE NETWORK MANAGEMENT Version 1.0

PROJECT REPORT

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF

M.Sc (APPLIED SCIENCE - COMPUTER TECHNOLOGY)
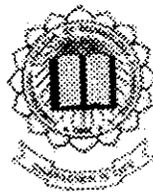
OF BHARATHIAR UNIVERSITY $P-969$

Submitted by

R.Sendil
Reg. No – 0137Q0054

Guided by

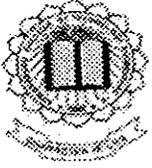**Ms. P.Parameswari, M.C.A, Lecturer,**

Department of Computer Science and Engineering

Kumaraguru College of Technology
(Affiliated to Bharathiar University)

Coimbatore – 641 006

APRIL 2003

KUMARAGURU COLLEGE OF TECHNOLOGY

(Affiliated to Bharathiar University)
Department of Computer Science and Engineering

Coimbatore – 641006

CERTIFICATE

This is to certify that the project work entitled

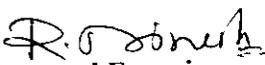# "SIMPLE NETWORK MANAGEMENT Version 1.0"

Done by

R.Sendil
Reg. No – 0137Q0054

Submitted in partial fulfillment of the requirement for the award of the degree of M.Sc (Applied science - Computer Technology) of Bharathiar University.

Professor and HOD

Internal Guide

Submitted to University Examination held on _10·05·2003_

Internal Examiner (10·5·03)
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External Examiner

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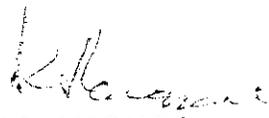
CERTIFICATE

This is to certify that Mr. **R. Sendil, M.Sc(AS-CT)** student of
Kumaraguru College of Technology, Coimbatore-641006,   has done a
project work as a part of his curriculam on **Simple Network
Management VRI.O,** in our Organisation from   **02-12-2002 to
11-04-2003**.

for Seshasayee Paper and Boards Limited

(K.RAMASAMY)
Deputy Manager(Welfare)

DECLARTION

I hereby declare that the project entitled "**SIMPLE NETWORK MANAGEMENT Version 1.0**" is successfully done at Seshasayee Paper and Board Limited, Erode and submitted to **Kumaraguru College of Technology**, Coimbatore afflicted to Bharathiar University as the project work of **M.Sc (APPLIED SCIENCE - COMPUTER TECHNOLGY)**, is a record of original work done by me during my period of study in Kumaraguru College of Technology, Coimbatore – 641 006, under the supervision and guidance of **Ms. P.Parameswari M.C.A,** *Lecturer, Dept of CSE, Kumaraguru College of Technology, Coimbatore.* And this project work has not formed the basis of award of any Degree / Diploma / Associate ship / Fellowship or similar title any candidate of any university

Name   :   R.Sendil

Reg. No :   0137Q0054

Signature:

ACKNOWLEDGEMENT

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I admit my heart full thanks to my course co-coordinator, **Mr. R.Dinesh**, M.S., Assistant Professor, Department of Computer Science, Kumaraguru College of Technology, Coimbatore, for being supportive throughout the tenure of my project.

I express my deep sense of gratitude to **Ms.P.Parameswari**, M.C.A., Lecturer, Department of Computer Science, Kumaraguru College of Technology, Coimbatore, for her valuable guidance and constructive suggestion during the course of this project.

My heartfelt thanks and gratitude to **Mr. K.Ramasamy**, Deputy Manager, **Seshasayee Paper and Boards Limited**, Erode, for granting me permission to undertake the project work.

I also take this opportunity to extend my sense of gratitude to all the faculty members, non-teaching staffs of the Computer science Department, K.C.T, Coimbatore, for their guidance and co-operation rendered throughout my course.

CONTENTS

1.0. COMPANY PROFILE

M/s Seshasayee Paper and Boards ltd., was promoted by Seshasayee Brothers Private Limited. In 1950's India saw the birth of many newspaper mills. M/s Seshasayee Paper and Boards limited, SPB as the company shortly called, located on the banks of river cauvery was established in June 1960, supported by over 13000 share holders and with a rated capacity to produce 20000 tones of pulps and paper per annum.

The company was the recipient of ISO 9001 and 14001 award for its consistent performance on all fronts.

This factory was established in technical collaboration with M/s Persons and Whitmore South Asia Inc., USA, the first ever in the world to cook bamboo and bagasse in the digester.

Owing to continuous short supply of bamboo, the mill started using various types of hardwood and softwood in its furnish and at present the mixture of bamboo and wood is in the ratio 10:9 such as percentage of wood in the furnish can truly be claimed as technological break through. Then SPB began to grow, expand and diverse its capacity in 1969as 35,000 tones of pulp and paper per annum.

In 1976, the paper mill embarked upon its second expansion of the project to increase its capacity to 60,000 tones per annum. In 1981, the company bagged a prestigious contract to render technical consultancy for installation of massive newsprint of a project based on bagasse for the TamilNadu government involving the capital outlay Rs.200 crores.

The third expansion of the company from 60,000 tones to 1,15,000 tones is consummated in the year 2000. The company bags the First prize for environmental protection by the TamilNadu pollution control board for the year 1995-1996.

There are more than 1000 employees working in various departments of the Organization, working for the office automation jobs of all the other departments of the organization. All the process including the production, automation, inventory, payroll, stores, accounting, purchase, etc., are computerized.

There are more than 60 nodes connected in the network, and also more than 20 personnel computers are available in the organization situated at various departments. "Windows 2000" and "Unix" is the main server used by the organization to serve all the nodes in various departments of the concern and "Oracle" is the database management system used by the organization.

2. INTRODUCTION

2.1 PURPOSE

The main aim of this project is to help the organization in managing the networks. As network become larger and more complex, corporations are requiring more advanced tools to manage networking devices, components and services. Network management generally refers to the ability to perform specific administration tasks.

SNMP Version 1.0 stack enables network administrators to manage network performance, find and solve network problems, and plan for network growth. SNMP Version 1.0 enables a network administrator to query and set values on a remote device that has been configured with an SNMP agent. SNMP Version 1.0 is a connectionless management system.

SNMP Version 1.0 is based on Client / Server model. In this model Clients has to connect to the Server. There will be an administrator who can logon to the Server from any system in the network and can manage any device in the network.

2.2 SCOPE

The main aim of this project is to help the organization in managing the networks. As network become larger and more complex, corporations are requiring more advanced tools to manage networking devices, components and services. Network management generally refers to the ability to perform specific administration tasks. This project will be helpful in Network Management and Organizing. The main function of this SNMP protocol is to makes it possible to manage all SNMP devices in the network. It permits interactive network administration via parameter checks, or supervision of certain network conditions.

SNMP is based on a query-response model. SNMP provides a set of commands to Set and Retrieve values of objects in Management Information Bases (MIB). These messages are encapsulated within a UDP (connectionless protocol) datagram and routed via IP. This enables the agent and the management station to reside on different subnets and still be to communicate with each other. SNMP provides five commands, to GET and SET MIB values of the agent and also listens to the Traps generated by the agent.

2.3 DEFINITIONS, ACRONYMS, ABBREVIATIONS

SNMP AGENTS:

A SNMP agent follows the client-server model. The agent responds to the management requests from any of client applications that wish to access the resources it contains. The agent centralizes all requests, dispatches them and returns any responses. The agent handles the communication issues involved with receiving and sending data. These agents are inbuilt with Windows 2000. In case of Windows 9X or Windows ME, special software must be installed to interact between the Client and the Server.

NETWORK MANAGER:

The remote manager is a java application running on a distant host. When the client establishes the connection with the manager, the other components of the application can issue management requests to the manager. Management application can issue management requests simply by getting or setting attributes.

MIB:

MIB is an ASCII file that describes the items of devices information that can be obtained from or acted on by the agent. Information in a MIB is called as "objects" the identifier for the object is as "object identifier".

UDP/IP:

UDP/IP is nothing but User Defined Protocol / Internet Protocol. A UDP is a TCP complement that offers a *connectionless* datagram service that guarantees neither delivery nor correct sequencing of delivered packets. An IP is a routable protocol in the TCP/IP protocol suite that is responsible for IP addressing, routing, and the fragmentation and reassembly of IP packets.

SNMP:

A network protocol used to manage TCP/IP networks. In Windows, the SNMP service is used to provide status information about a host on a TCP/IP network. This status information is read using the MIB objects. The requests are processed using this object.

SNMP	- Simple Network Management Protocol
MIB	-Management Information Bases
ASN.1	-Abstract Syntax Notation one
UDP/IP	-User Datagram Protocol/ Internet Protocol

CLIENT:

Any computer or program connecting to, or requesting the services of, another computer or program is called CLIENT. Here the Client is the Managed device.

SERVER:

In general, a computer that provides shared resources to network users. The server here is used as an tool for Managing the Managed device.

ADMINISTRATOR:

A person responsible for setting up and managing domain controllers or local computers and their user and group accounts, assigning passwords and permissions, and helping users with networking problems. Administrators are members of the Administrators group and have full control over the domain or computer.

3. GENERAL DESCRIPTION

3.1 SYSTEM ANALYSIS

System analysis is an important phase in project development. Since analysis phase influences whole project, it should be preceded perfectly. An important function of the preliminary investigation is to determine whether this system is feasible or not.

AGENTS

A SNMP agent follows the client-server model the agent responds to the management requests from any of client applications that wish to access the resources it contains. The agent centralizes all requests, dispatches them, and returns any responses. The agent handles the communication issues involved with receiving and sending data.

MANAGER

The remote manager is a java application running on a distant host or local host. When the client establishes the connection with the server, the management components of the application can issue management requests to the agent. Management application can issue management requests simply by getting or setting attributes.

SNMP provides set of commands GET, SET, and Get-NEXT to objects in the MIBs of managed object. These commands are formatted in ASN.1 and are sent using UDP/IP. The connectionless exchange of commands and responses is used to set and read attributes of management application.

SNMP is based on a query-response model. SNMP provides a set of commands to Set and Retrieve values of objects in Management Information Bases (MIB). These messages are encapsulated within a UDP (connectionless protocol) datagram and routed via IP. This enables the agent and the management station to reside on different subnets and still be to communicate with each other. SNMP provides five commands, to GET and SET MIB values of the agent and also listens to the Traps generated by the agent.

SNMP defines five commands.

1. GetRequest

2. GetNextRequest

3. Set Request

4. Get Response

5. Trap

First two messages (GetRequest and GetNextRequest) are used to get the values from the MIBs and the third message (Set Request) is used to set the value for MIB objects.

3.2 PROBLEM DEFINITION

A huge radius of network is necessary in the organization and lot network devices such as the router, switches, nodes, terminals, servers, hubs, etc., must have to be maintained. The prime necessity of the system is, it must have to manage all the network devices attached to the inter network formed in the organization.

Since the network devices belongs to various vendors and of various formats, a universal platform independent and architecture neutral system to manage all the devices. The present management system is a time consuming and needs a lot of heavy work to manage the network devices. Although a network administrator is there to manage the device manually, the need of an automated system is these devices become essential.

About the existing system:

The existing system of maintaining or managing the network in the organization is a very tedious job as each and every task must have been done by the administrator who is doing the job of maintenance. Since the organization is within a huge campus of several hectors, manually managing the devices by going to the place of problem for searching the device with problem is very tedious.

Proposed System:

The proposed system of management of devices is used to manage all the devices in the network through a Query - Response model. Here Query is Set by the Server and the Response is done by the Client connected to the server. By asking question to the device which is to be managed, the management application will manage all the devices. The managed devices in turn will response to the queries placed by the managing device.

Need for the Proposed System:

The proposed system is necessary because of reduction in heavy manual work and the usage of those energy to those work needed at other areas. Automation of this management task will increase the percentage of perfection. Since Client – Server communication is done, a centralized administration can be done using this system. The Administrator can manage any system (i.e. Client or Managed Device) in the network from any remote host since each system is connects to the Server application.

Objectives of the System:

It can monitor devices made by different manufacturers and installed on different physical networks. The SNMP system is used to get and set the MIB values when proper OID s (Object IDs) is given as input. SNMP also listens to traps sent by the agent in the Client or Managed device.
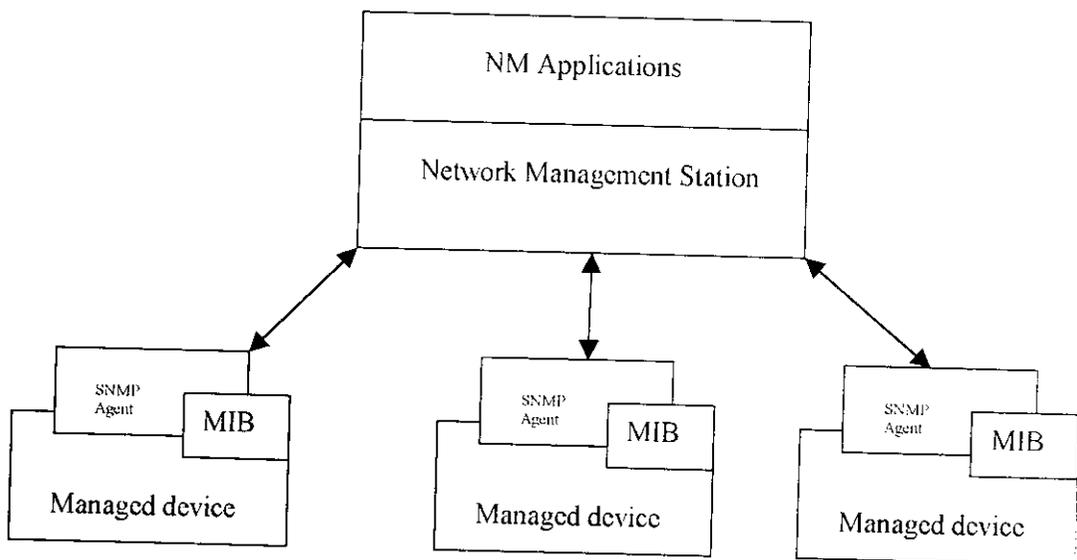
4. SPECIFIC REQUIREMENTS

4.1 FUNCTIONAL REQUIREMENTS

SNMP Model:

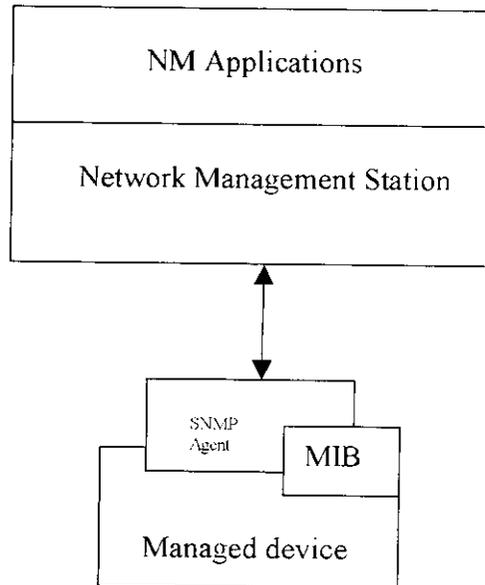Since we are using SNMP protocol as a core thing in this project we will discuss thing in detail regarding this protocol.

The SNMP Model

SNMP Components:

1. Network Management Station (NMS)

2. Management Agent

3. Management Information Base (MIB)

4. SNMP Protocol

Network Management Station (NMS)

1. The NMS Consists of:

   a. A set of managed application

   b. SNMP interface to Device Agent

   c. Management Information Database

2. The NMS Monitoring and Control Network devices through the device agent.

3. NM application process and present network information to the network manager.

4. SNMP defines the protocol for communication between the NMS and Agents

The SNMP Agent
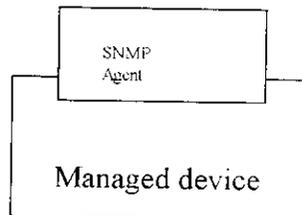
1. The Agent is a software program that runs on the Managed device.
2. The Agent gets information about specific parameter from the Managed device.
3. The Agent is the only link between the Managed device and NMS

The SNMP Agent as explained above is a software program that runs on the Managed Device and the Managed Device can be of a Routers, Bridges, Servers, Hubs, Workstation, etc., SNMP Agent acts as a Interface between the managing device and Managed Device and sends and receives for the sake of a managed device. The agent software will collect details regarding the managed device according to the requests of the managing device to the agent software.

The Agent is software that implements SNMP protocol and UDP/IP protocol for the sake of sending and receiving of information to or from the network management system.

MANAGEMENT INFORMATION BASE

Management Information Bases are those files provided by each and every software vendors. The Management Information Base (MIB) as already explained is as ASCII file that describes the items of device information that can be obtained from or acted on by the agent. The objectives that can be retrieved are the life time of the device, its distance from the Management Device. As each information in MIB is called as"object identifier".

As Management Information Base is a description file in a Standard format that can be compiled. The SNMP Agent Software can get the Object value from the compiled MIB file of the Managed Device.

The values are stored in a structured form in the Management Information Bases. So that retrieval and setting of values or data in a MIB file will be standardized and will be an easy task for managing. This MIB is a not a database having data stored in it but it is a structured file which can be compiled. This enables the management application to interact with the Managing device easily and efficiently.

SNMP Protocol

SNMP protocol is mainly used to manage all the network devices through interactive query response model by the way of parameter checks and by the supervision of some predefined conditions.

The following is the diagram illustrating the general idea regarding the SNMP protocol with the management application at left and the managing device at right.

SNMP Protocol

MANAGER		AGENT	MIB
	SNMP Messages		
UDP		UDP	
IP		IP	
LINK		LINK	
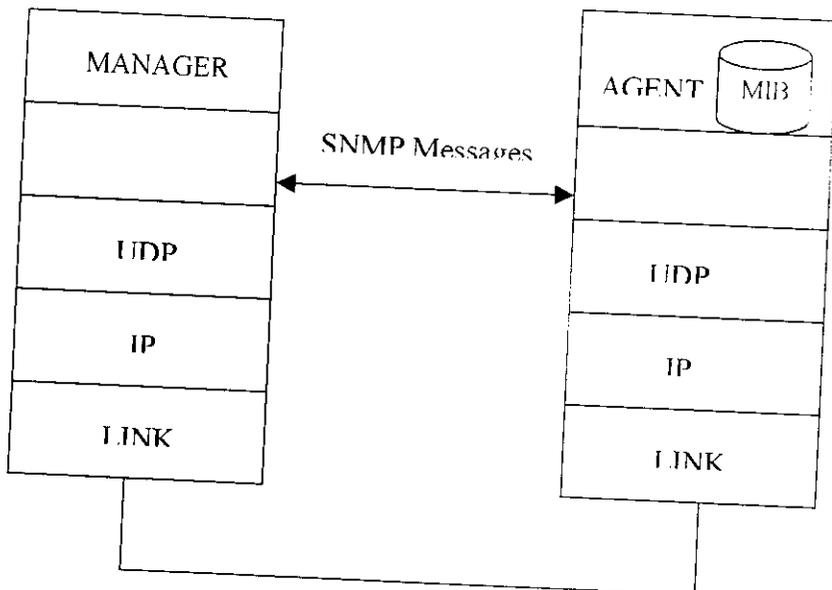
SNMP protocol defines five set of commands, which are used to Set and Get data from the remote device which is to be managed. These command are not only used for getting and setting the values on a remote managed system or devices but also to check for some predefined conditions to be occurred on the remote system or device through Trap messages.

SMNP Commands:

Get Request   -   A request from the NMS to the agent to send
                            MIB Value back to the NMS.

Get Next Request   -   A request from the NMS to the agent to send MIB value for
                            the next object after the specified object.

Get Response   -   The agent responds to a request that sends back request
                            data to the NMS.

Set Request   -   A request from the NMS that instructs an agent to change the
                            value of a MIB object.

Trap   -   Message sent by an agent to the NMS when an object value
                            exceeds a specified threshold.

4.2 DESIGN & DEVELOPMENT

The primary objective of architectural design is to develop a modular program structure and represents the control relationships between modules in addition a program when customer software is built for one customer to validate all requirements if software is built for one customer to validate all requirements if software id developed as a product to be used by many customer it is impractical to perform formal acceptance test with each one.

Client – Server – Administrator

Client: Client is the system where the SNMP agent will be running. First the Client establishes a connection with the Server using the Server IP address. Once the connection is established the SNMP agent is started in the client. This agent takes care of sending and receiving data between the Managed device and the Managing device.

Server: Server is the system where the clients make a connection. The server keeps track of the number of user Logging in to it and Logging Out from it. The Server creates a Vector and keeps the details about each and every user. Once a user logs in, then it updates its user list. If any user logs out then that user is remover from the user list.

The server has a small set of commands. These commands are execute in the server. These commands are only basic commands. They give you only a little information about the Server.

User: This user command displays the number of Current users Logged into the Server.

Path: This command displays Path information.

Cls: this command clears the Server Screen

Exit: This command stops the Server and sends information to Clients that the Server is down.

Administrator: Administrator is the one who manages the managed device. The administrator logs into the server by providing the server IP address. Once the administrator logs into the server, he will be able to know the user currently logged into the server. From the information the administrator will be able to monitor and manage the Managed device. The administrator can connect to the server from any system in the network. He can monitor from the server or even monitor the client system which he is logged in.

The administrator is provided with a password to log in to the Server. Once the administrator logs in to the server then he can Monitor and manage the systems.
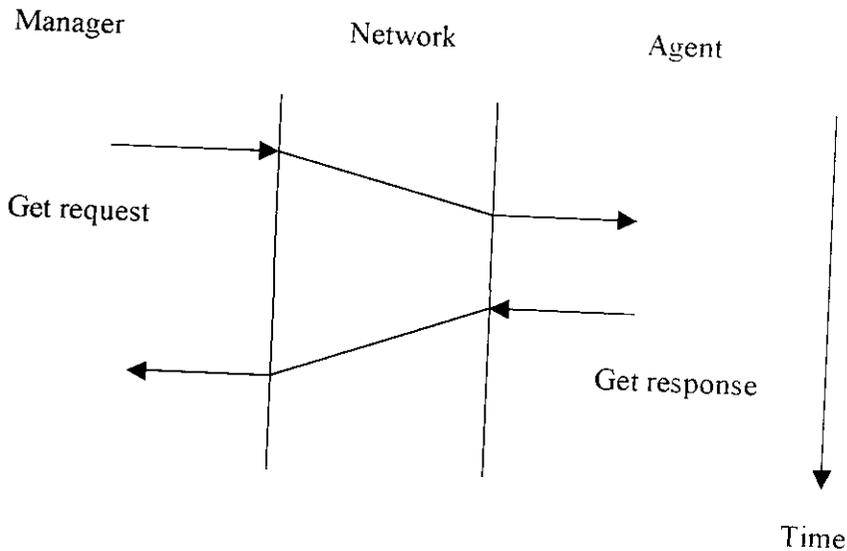
SNMP Commands

SNMP commands used to Monitor and manage a system.

GETREQUEST

GETREQUEST command is one which is place from the managing device to the managed device to ask some data from the managed device.

SNMP primitive Operations

Get

Manager   Network   Agent

Get request
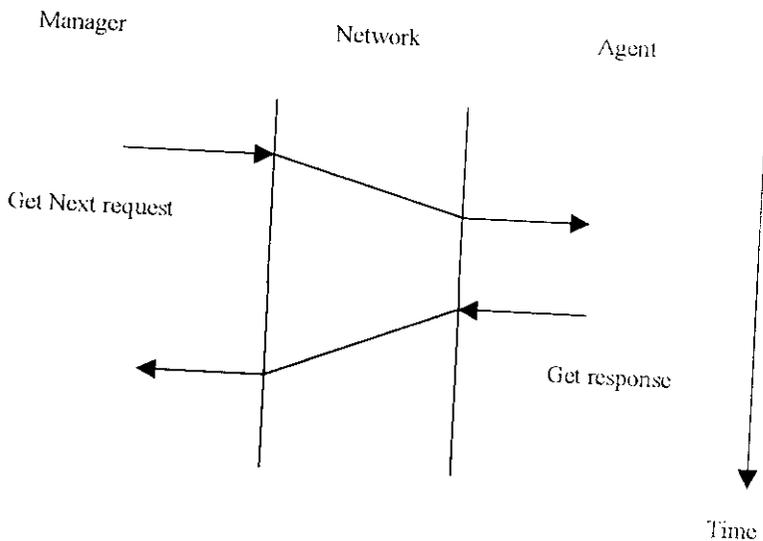
Get response

Time

GETRESPONSE

GETRESPONSE command is used to get the response from the managing device for the query which we have placed from the managing device.

GETNEXT

This is used to get the data which is next to the object id which we are placing as parameter to the command. The main demerit in this command is that it will return an error message if there is no successor for the object id which has passed.

SNMP primitive Operations

Get-Next

Manager   Network   Agent

Get Next request

Get response

Time

The same GETRESPONSE command is used for the sake of getting response from the managing device. Thus the functionalities are same for the 2 commands but the goal which is reached is different for the 2 commands.

SET

This is used to SET the data which is in the Management Information Base of a remote device for the corresponding object id which we are placing as parameter to the command.

SNMP primitive Operations

Set

Manager   Network   Agent
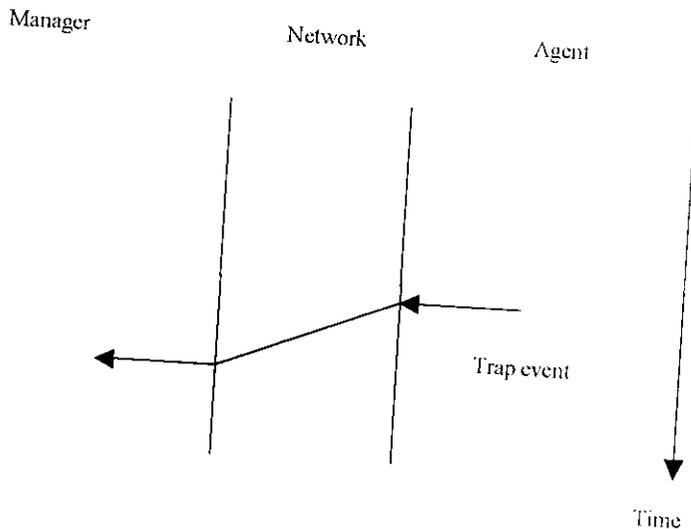
Get request

Get response

Time
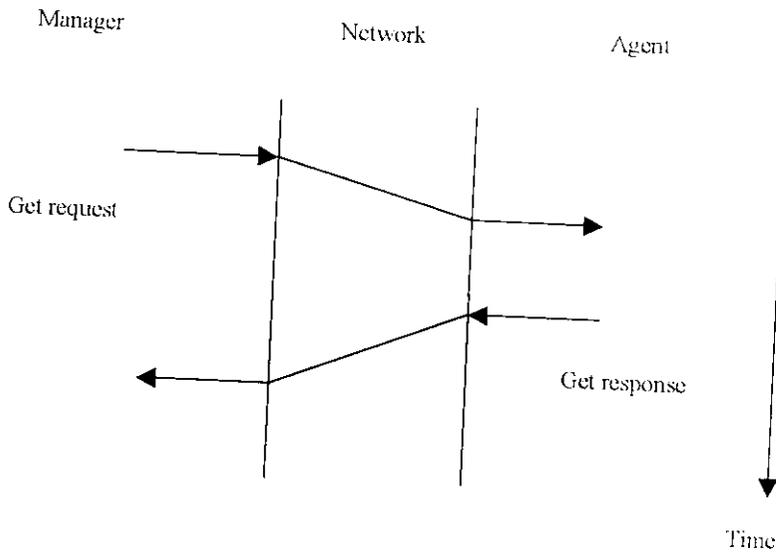
TRAP

This is used to send the message to the management application about the occurrence of some predefined conditions which is held in the managed device.

SNMP primitive Operations

Trap

Manager	Network	Agent

Trap event

Time

The trap message will be send to management application in some of the remote device. The configuring work for setting the device which is to be receiving the trap message will be done on the SNMP agent software which is installed in the managed device.

4.3 PERFORMANCE REQUIREMENTS

4.3.1 SECURITY

As far as security it concerned in this project the clients has less security than the server. This is because the server is capable of reading the clients information and is able is change the values of the client. The server has full control over the client. The client system which can be altered has less security.

4.3.2 AVAILABILITY

These features are presented in a menu form, so that the user can access it easily. There are specific buttons for each function. The administrator has to enter the IP address of the client and he can get the relevant information by clicking the needed button. The result is displayed in the screen.

4.3.3 RESPONSE TIME

Basically the response time increases as the system speed and network speed is increased. Since the project uses network, there can be external problems like hardware interface failure; the software is reliable enough to give results with less response time. The response time of the software can further be decreased by maintaining the network and their hardware interfaces in good condition and free of errors

4.4 SYSTEM SPECIFICATION

4.4.1 HARDWARE REQUIREMENTS

Managing device:

Main processor	:	Intel Pentium III
Clock speed	:	600MHZ
Ram	:	64Mb
Hard disk capacity	:	10 GB
Serial ports	:	2
Parallel ports	:	2
Operating system	:	Windows 2000 Professional
Network protocol	:	UDP/IP
CDD	:	52x CD

Managed devices:

These can be Computers running Windows NT or Windows

4.4.2 SOFTWARE REQUIREMENTS

OS	:	Windows 2000
Language	:	Java 1.3
Back end	:	Abstract Syntax Notation.1.1
Service	:	SNMP Agent.
Communication		
Protocol	:	UDP/IP
Physical link	:	The physical connection is either effected via the Network (Ethernet, token Ring, and FDDI) or it is established indirectly via a modem link.

4.4.3 EXTERNAL INTERFACE REQUIREMENTS

The terminals must be interfaced with other terminals to work in the network. The basic requirements for external interface are:

- Network Interface Card (NIC)
- Centralized Hub or Switch
- Software that invokes connection

4.4.4 H/W AND S/W INTERFACES WITH OTHER SYSTEMS

- Transmission Control Protocol/Internet Protocol Simple
- Network Management Protocol
- SNMP agent
- User Datagram Protocol/ Internet Protocol

4.4.5 SELECTION OF SOFTWARE

Windows 2000:

Windows 2000 is a major upgrade, comining the best from both Windows NT and windows 98 to produce the latest operating system technology. Deploying Windows 2000 professional on the desktops allows the user to take advantage of a more reliable, secure, and manageable operating system.

It provides enhanced security features to protect sensitive business data both locally on desktop computer and as it is transmitted over LAN, phone lines / internet. Windows 2000 is a very demanding operating system. It support the broad range of ligancy hardware as supported by windows98 , and running windows 2000 requires quite a bit more RAM and Hard Disk space than that is needed for windows 98 but windows 2000 has more options for security and multitasking scheduling. It comes in two versions.

Windows 2000 professional

Designed to work as member of a Windows 2000 Workstation, as a client of Windows 2000 Server Domain, as a Novell NetWare or on a stand-alone workstation. It is aimed towards users who need a reliable operating system with a high level of security.

Windows NT server

Essentially the same as the windows 2000 professional but with added features, which enable it, work like a network operating system. Windows 2000 server is really a complete Operating System itself, not relaying on DOS for lower level functions. The following clients can serve as workstation on a Windows 2000 network.

- Windows 95/ 98/ ME

- Windows 2000 workstation / XP

Because Windows 2000 workstation is designed to work well with windows 2000 server, it is excellent as a client on a windows 2000 network. SNMP Server application is to be executed on Windows 2000 System. The Managed device or the Client can have any Windows Operating System.

Java 1.3

The software used in our project is java. Java is a programming language developed by Sun Microsystems. Java is an object oriented programming language. According to Sun Microsystems, Java is "simple, object-oriented, statically typed, compiled, architecture neutral, multi-threaded, garbage collected, robust, secure, and extensible."

FEATURES OF JAVA:

- **Simple & Robust:**

    Java is easy to learn and use efficiently. It borrows most of its syntax from C/C++, so it is easy for C/C++ programmers to understand the syntax of Java code.

- **Multithreading:**

    Java supports multithreading programming, which allows as doing many things simultaneously. Multithreading is mainly used to create interactive and Network programming.

- **Platform Independent:**

    Java is architecture neutral. Java is both a compiled and an interpreted language. Java code is compiled to Java byte-codes, which are then executed by a Java runtime environment, called the Java virtual machine. This architecture makes Java an extremely portable language.

- **Performance:**

  Performance is always a consideration. A Java application will not achieve the performance of a fully compiled language such as C or C++. However, for most applications, including graphics-intensive ones such as are commonly found on the World Wide Web, the performance of Java is more than adequate.

- **Secure:**

  The Java runtime system is designed to enforce a security policy that prevents execution of malicious code. Java uses a three-layer security model to protect a system from untrusted Java code. The class is Java's basic execution unit and security is implemented at the class level.

- **Exception Handling:**

  Java has a powerful exception-handling mechanism. Exception handling provides a way to separate error-handling code from normal code, which leads to cleaner, more robust applications.

- **Memory Management**

  Java takes care of memory management for applications, Java supports the dynamic allocation of arrays and objects, and then takes care of reclaiming the storage for objects and arrays, using a technique called *garbage collection*.

AWT (Abstract Window Toolkit)

It provides the capability to create platform independent, graphical User Interfaced programs and is very important contributor to java's popularity. The java provides four classes to create and manage the graphical user interface components in the Abstract Window Toolkit.

Basic Class:

This class contains the fundamental building blocks for graphical user interface designing. These components include

- Button
- Labels
- Check Box
- List
- Scroll Bar
- Text Field
- Text Area

Container Class:

The container classes are used to contain other objects. These objects may be container class components or other components.

- Container
- Panel
- Frames
- Dialog

Layout Class:

The layout class is used to place the components added to the applet or frames in the particular place. This class contains five standard managers.

- Flow Layout
- Border Layout
- Grid Layout
- Grid Bag Constraints
- Card Layout

Menu Class:

This class contains the drop or popup menus and check box menus. It contains the following components.

- Menu Bar
- Menu
- Menu Item
- Check Box Menu Item

JFC (Java Foundation Class)

JFC is an extension of the AWT. The JFC visual components extend the AWT container class. Swing components facilitate efficient graphical user interface (GUI) development. Swing components contain a replacement for heavyweight WT components as well as complex user-interface components.

JAVA NETWORKING

Socket Overview:

A network socket is not like an electrical socket. Various plugs around the network have a standard way of delivering their payload. Anything that understands the standard protocol can "plug in" to the socket and communicate. The Socket class provides a reliable, ordered stream connection (that is, a TCP/IP socket connection). The host and port number of the destination are specified when the Socket is created.

Server Socket

A Server Socket object represents what Socket-type connections communicate with. Server sockets listen on a given port for connection requests when their accept () method is called. The Server Socket offers connection-oriented, ordered stream protocol (TCP). In fact once a connection has been established, accept () method will return a Socket object to talk with the remote end.

Datagram Socket

A Datagram Socket provides an unreliable, connectionless, datagram connection (that is, a UDP/IP socket connection).

5 SYSTEM TESTING AND IMPLEMENTATION

5.1 TEST PROCEDURE

Testing is the process of executing a program with the intent of finding an error. A good test case is one that has a hide probability of finding an undiscovered error. It follows the most server defects or those that cause the program to fail and meet its requirements. The number of test to be caused out should be planned long before testing plans. Test planning can begin as soon as requirement module is complete.

The first test plan generally focuses on individual program modules. As testing progresses and testing shift focus in an attempt to find error in integrate clusters of modules and ultimately in the entire system. There are large numbers of system covered out before the software is implemented.

Testing is an important stage in the system development life cycle (SDLC). The test is s set of data that a system will process as normal input. As the philosophy behind testing is to find errors, the data are created with the intent of determining whether the system will process them correctly. Software testing is an important element of software quality assurance and represents the ultimate review of specification, design, and coding.

5.2 IMPLEMENTATION

Implementation is one of the most important tasks in a project work. Implementation is the phase, in which one has to be cautious, because all efforts undertaken during the project will be fruitful only if the software is properly implemented according to the plants made.

The implementation phase is less creative than system design. It is primarily concerned with use of training, site preparation, and file conversion. Depending on the nature of the system, extensive user training may be required. Programming itself is a design work. Programming provides a reality test assumptions made by the analyst. Once the programs become available, the test data are read into the computer and processed.

5.3 REPORTS

Starting the system by executing the java class file generated for the system using the "java" command of jdk1.3 after compiling the system by using the "javac" command as follows,

Server:

To start the Server the Server coding is compiled and executed.

>javac Server.java

>java Server

Client:

As like Server application the Client coding is compiled and executed.

>javac Client.java

>java Client (IP Address of that System)

  e.g. (java Client 198.168.101.103)

Once the Client application is executed an GUI windows is opened which says the status of connection between the Client and Server.

Administrator:

The administrator logs in to the server by the following command

>javac Admin.java

>java Admin (IP Address of the Server)

Once the Admin application is executed the GUI window for the Administrator is opened. From this window the Administrator can Monitor and Manage the systems he wants with the help of GET, SET commands.

6.0 CONCLUSION

6.1 CONCLUSION

To conclude, the Network Management System Version 1.0 is considerably an advantageous project to facilitate the network management in the concerns networking area. The use of JAVA and ASN .1 in the project facilitates the project to be implemented in any type of network easily.

6.2 LIMITATIONS

o The Network Management System Version 1.0 appears a little too complicated.

o This project works in devices which are supporting the SNMP protocol only.

o Since the project is using the UDP/IP protocol the security in the system is very less and also for the confirmation we must have to use a special function link get response.

6.3 FEATURES

This Network Management System Version 1.0 stack will be used by the manager application (e.g. MIB Brower) in the Managing Device for monitoring the Managed device's information.

The scope of this "Network Management System Version 1.0" project is to Get and Set the necessary values to the managed devices, when proper OID's (device Id's) are given as input. And it also listens to Traps send by the agent from the managed device to the managing device. It can be used to manage devices in a heterogeneous internet made of different LANs and WANs connected by routers or gateways made by different manufacturers.

The protocol is designed at the application level so that it can monitor devices made by different manufacturers and installed on different physical networks.

6.4 SCOPE FOR FURTHER DEVELOPMENT

- ○ The project can be developed for Linux Environment.
- ○ The Administrator will have more GUI support for Managing the remote System.
- ○ The Administrator can have a GUI screen of the client. Instead of looking the details in character mode(CUI) the Admin can have a look at the Client window.
- ○ More documentation and help files are to be included.
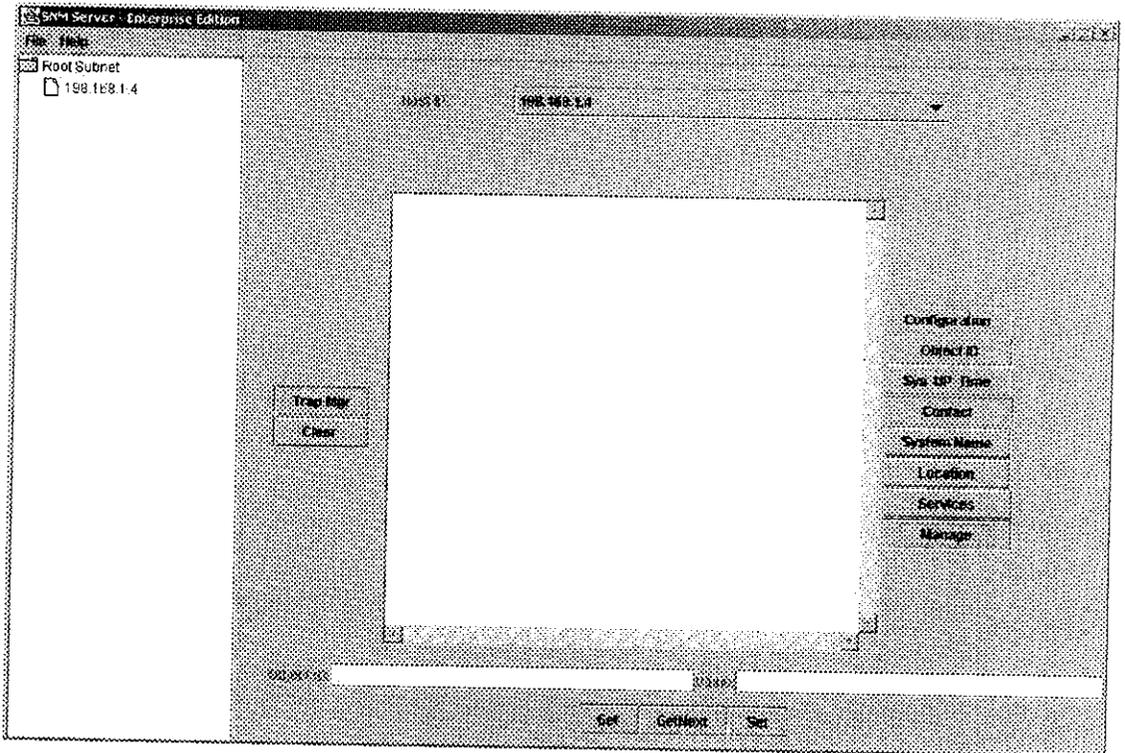
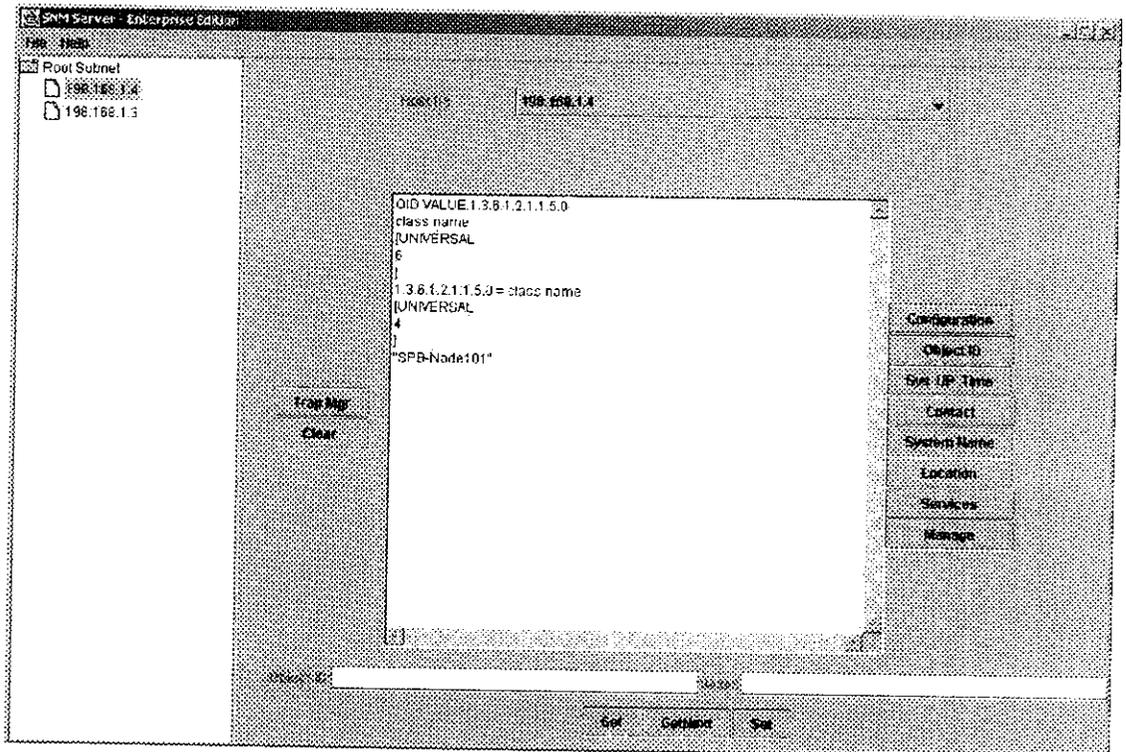# ADMINISTRATOR – LOGIN WINDOW
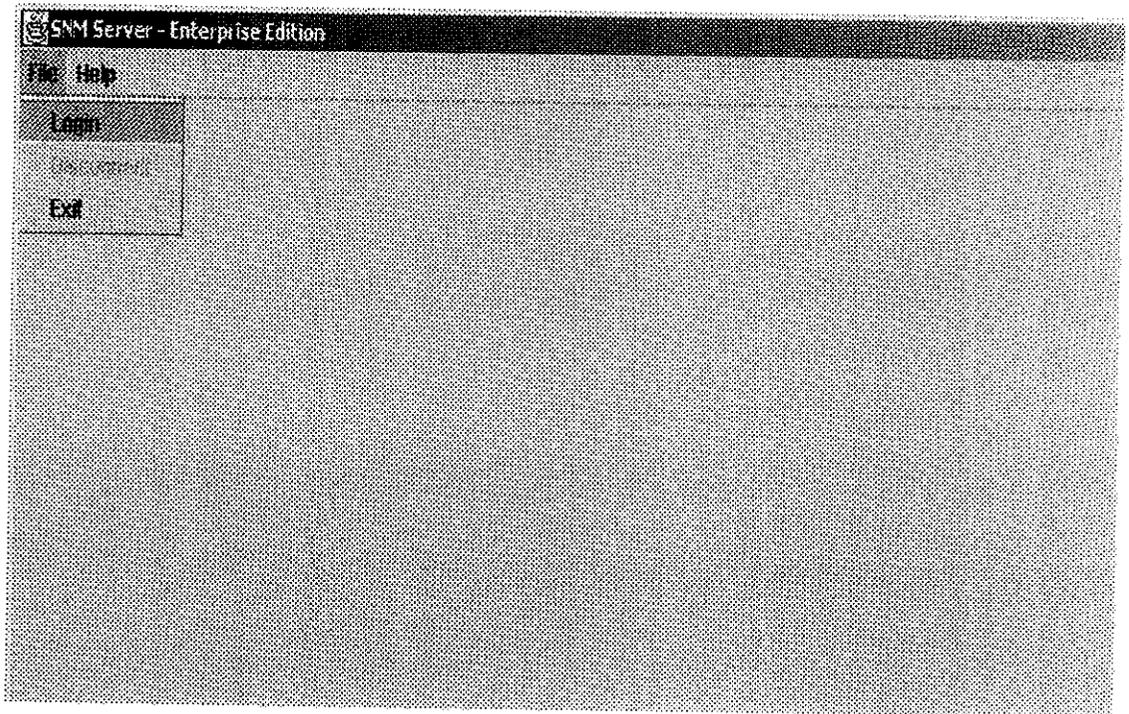
ADMINISTRATOR – PASSWORD WINDOW

File   Help

User Name   admin

IP Address   196.168.1.4

Password   ******

# ADMINISTRATOR – MONITORING WINDOW

ADMINISTRATOR – MONITORING WINDOW

ADMIN – USER LIST (CUI)

```
C:\WINDOWS\System32\cmd.exe - java Admin 198.168.1.4
C:\snmp>java Admin 198.168.1.4
Login
Socket[addr=CENDILS/198.168.1.4,port=1234,localport=1173]
checking..
checking..
user 0 = 198.168.1.4
checking..
user 0 = 198.168.1.4
user 1 = 198.168.1.3
checking..
user 0 = 198.168.1.4
user 1 = 198.168.1.3
user 2 = 198.168.1.1
removed id = 2
checking.
user 0 = 198.168.1.4
user 1 = 198.168.1.1
removed id = 0
checking..
user 0 = 198.168.1.4
Disconnect
Exit
```

CLIENT - WINDOW
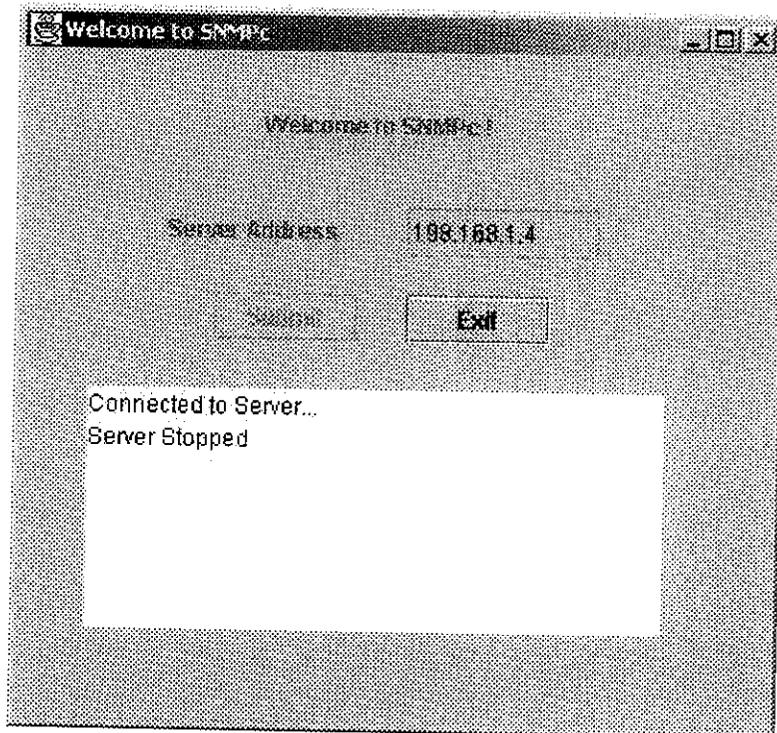
CLIENT – SNMP AGENT

SNMP Agent - Client

Field	Value
Status:	Listening on Port 161
sysDescr:	Accounts System 01
sysObjectID:	0
sysContact:	Administrator
sysName:	SPB-Node101
sysLocation:	Accounty Deptartment

udpInDatagrams:	333	icmpInMsgs:	567
udpOutDatagrams:	787	icmpOutMsgs:	765
ipInReceives:	567	tcpInSegs:	99
ipOutRequests:	345	tcpOutSegs:	98

atIIndex:	atPhsAddress	atNetAddress:
1	1:5:198:55:0:19	
1	0:5:167:67:0:17	16.1.0.8

Fire Trap
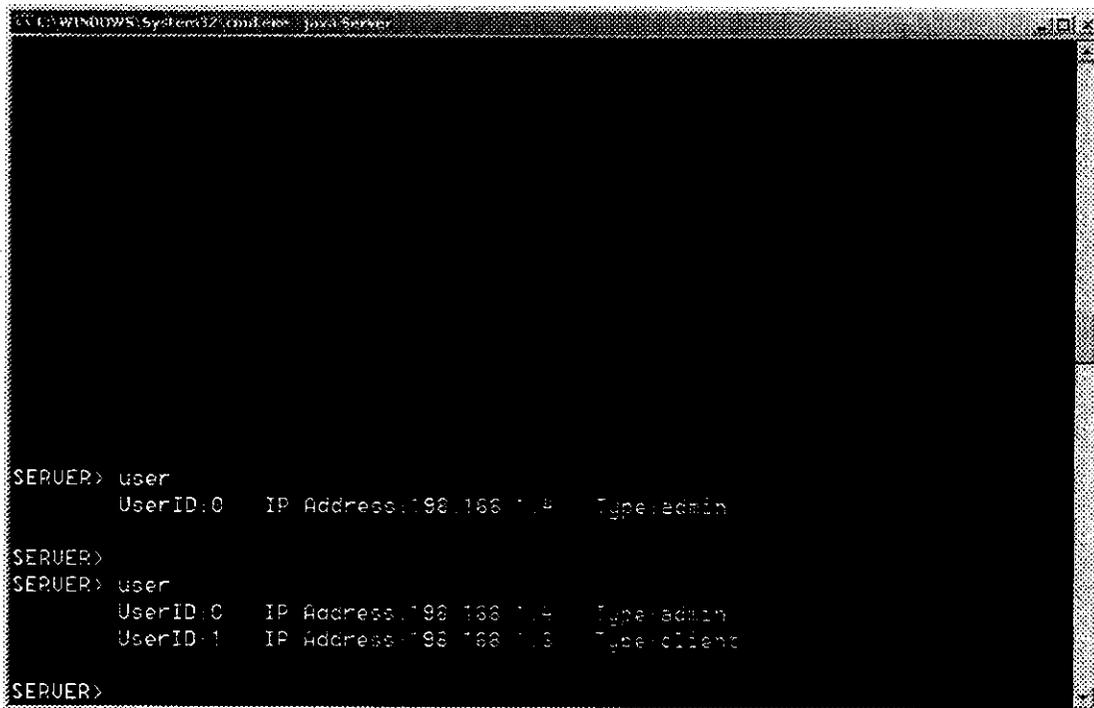
SERVR – USER LIST


```
SERUER> user
        UserID:0    IP Address:198.168.1.4    Type:admin

SERUER>
SERUER> user
        UserID:0    IP Address:198.168.1.4    Type:admin
        UserID:1    IP Address:198.168.1.3    Type:client

SERUER>
```

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            Michael T. Nygard
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            Tom Trinko