Controlling LAN using J2ME and RMI API

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Abstract

The system implemented in this paper aims at developing an application/tool which helps the network administrator to control or monitor the network, i.e. intranet through mobile using GPRS connection, when he/she is out of work place through mobile. It also need to control the components that allows the users to interact with the application in various ways- for example compile, edit, write etc. The system is simple to use and has an easy to use interface.

Keywords: LAN, GSM, J2ME, Client, Server, RMI.

1. Introduction

The term "computer" now-a-days encompasses not only Desktop computers. They include cell phones, mobile phones, car navigation systems, pagers, personal digital assistants, digital set-top boxes etc., therefore the field of computers drastically expanding. It has always been a tedious task for the persons managing these computers to control or monitor the systems. How nice it would be to check the status of the machines connected to a network from your house. The checking of status of machines could include viewing the IP Addresses of machines, viewing the processes running on the machines, starting a new process, killing a process which is currently running etc. This paper aims at the listed out tasks using J2ME and RMI API.

2. Features Controlled by the System

2.1 View the clients

The list of all the clients working in a LAN

2.2 View the processes

The list of all the processes running on the machine in a LAN

2.3 Activate a process

A light process can be started on any remote machine in a LAN

2.4 Kill a process

Any process can be killed on the machine.

2.5 Open a file

A text file can be opened

2.6 Shut down

Even a machine can be shut down if it is misbehaving

2.7 Save the message on the client

A message can be typed on the cell phone and can be saved on the client of a LAN

3. Literature Survey

3.1 Shiva Shree Nagendra R, Bhat Geetlasxmi Jairam, "Mobile LAN-Controller", IJARCCE, April, 2015

The paper proposes a system which provides an integrated solution wherein the work of the team members situated in a LAN can be monitored through the mobile phone of the manager without the notice of the members thereby improvising the productivity of the team. The system proposed can be used as a simple application to monitor the activities being executed on a LAN. This provides a tremendous opportunity to the network

administrator/manager/trainer to ensure that the productivity of the working environment is maintained [1].

3.2 Prof. Mamata Bhamare, Tejashree Malshikare, Renuka Salunke, Priyanka Waghmare, "GSM Based LAN Monitoring and Controlling", IJMER, 2012.

The paper proposes to develop an integrated software solution that allows a network administrator to remotely monitor his LAN by his cell phone. In a concern, computers are grouped together to form a network to manage and control activities of network while in office is an easy task, but while you are outstation/away from office to monitor and controlling of network instead of depending on third party information you can always have your cell phone serve the purpose, login anytime to application and see who is busy with what in the office [2].

3.3 Prof. C. S. Nimodia, Prof. S. S. Asole, "A survey on Network Monitoring and Administration using email and android phone", IJETAE, 2013.

The main objective of this paper is to provide maximum details about the network to the administrator on their email accounts and android phones, when administrator is away from office or goes out station. In the era of internet services & mobile phones, email & mobile applications are widely used and it has penetrated every part of our life, but remote monitoring of networks through email and android mobile applications which are GPRS or Wi-Fi enabled is still a mirage. There can be number of protocols which are used to monitor and control the network using android phone; it can be android protocol and network management protocols or combination of them [3]

4. Architecture of the System

The administrator is provided with the GUI based application developed using J2ME. The application is opened on the mobile phone of the administrator. He/she has been provided with many options to control the LAN devices including starting the process, viewing the processes running, killing a process, saving a message etc. Server is the central part of overall system. The cell phone user should interact with the server in order to control the Local Area Network. The web server and the server part program must run in the server. The server must be interconnected to all client terminals. The block diagram of the system proposed is as shown in Figure 1 [1].
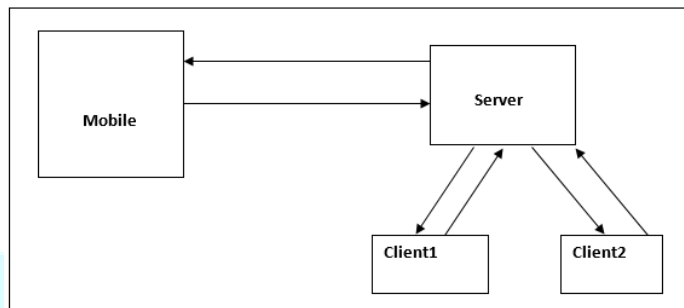

Fig. 1. Block diagram of the System

5. Technologies used in the System

Operating system: Windows 98/2000/XP/7
Software tool   : KToolbar, J2SDK
Server   : Tomcat server
Database   : MS-ACCESS
Languages   : J2ME and RMI API
Intel Pentium-700MHz or an equivalent/ higher processor
128MB RAM
600MB of hard disc space

5. Implementation

The core part of the system's implementation is J2ME and RMI API. Java which began as a programming language in order to create programs for the embedded systems transformed itself into a language suitable for running microcomputers which is now known as J2ME. J2ME is a reduced version of the Java API and JVM aptly suiting embedded systems and microcomputing devices which have resource constraints. Java APIs and JVM has been reduced to the minimal coding in J2ME [9].

J2ME has been used to create the Graphical User Interface (GUI) of the implemented application. A MIDlet has been developed which can operate on MIDP small computing device.

The design of the GUI for a MIDlet in this project has been kept minimal to allow it to run on even a modest set of mobile devices.

The RMI i.e., Remote Method Invocation API is the crux of this implementation. It allows an application running in one JVM to access the objects located in another JVM. It is used to create a remote communication between Java applications and components. A client in RMI is the application which requires the services of an object. A server creates an object and makes the object available to clients. Here dynamic code loading is employed.

In the communication between client and the server, the server must create a remote interface which is available in java.rmi.Remote class. This remote interface is in turn used by the clients to interact with the server.

MS-Access is the database used for simple one-step authentication to make sure that authorized network administrators use this application.

Tomcat Server is used to host the Java application.

Netbeans IDE is used in this project to emulate the mobile phones to demonstrate the working of the application using hand held devices.

Fig. 2. Dara Flow diagram of the System

6. Result

The System was implemented highly successfully with the objectives of the system achieved. The screenshots of the system are given below.
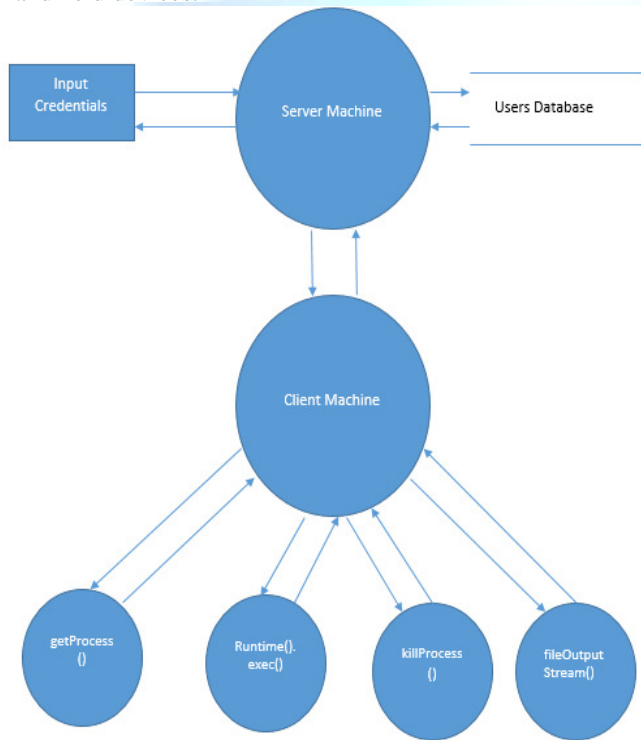

Fig. 3. Screenshots of the Login Page and Display of initial options of System

Fig. 4. Screenshots of display of list of processes and option to enter the process to be started

4. Conclusions

This system can be used as a simple application to monitor the activities being executed on a LAN. This will give amazing options to the user/administrator to quickly monitor the network coming under their control.

5. Future Enhancements

This system can be modified accordingly to sense the temperature of the machine, processes which are consuming lot amount of processor cycles and kill the processes which are a burden to machines [6][7].

Acknowledgments

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