

# GSM Based LAN Monitoring System

Amol Poman , Mahesh Gundras, Prashant Pujari

Department Of Computer Engineering

GHRCEM, University of Pune

**Abstract** — This paper demonstrates a method which enables users to control their LAN network from remote place using a cell phone-based interface. To manage and monitor the control activities of network, the user should send an authentication SMS along with the required/desired function/action SMS to his/her server system via Global System for Mobile communication (GSM). Upon being properly authenticated, the cell phone-based interface would relay the commands to a server system that would perform the required function/action, and return a function completion SMS that would be sent to the administrator (user's cell phone).

**Keywords-** GSM, SMS, Remote Monitoring & Control, AT Commands, Password Security, Mobile phone.

## I. INTRODUCTION

The aim of the proposed system is to develop a cost effective solution that will provide controlling and monitoring of LAN network remotely and enable network security against intrusion in the absence of administrator in office. The system provides availability due to development of a low cost system. The LAN network control system with an affordable cost was thought to be built that should provide remote access to the LAN network and allow security using mobile. Most of the time, it is done manually by administrator in office. Now it is a necessity to control and monitor LAN network more effectively and efficiently at anytime from anywhere. In this system, we are going to develop a cellular phone (GSM) based LAN monitoring. This system is designed for controlling and monitoring LAN network [1], it includes a cell phone which connect to the server system via modem. To active the cellular phone unit a SMS is to be sent to server system via GSM modem in response the user would send a two/three digit password to access the system to control network. As the user sent the specific password, it results in authentication. After authentication the user sends action commands to system server through a SMS. The SMS parser converts a SMS into action events on server system. Security is preserved because these dedicated monitoring and controlling LAN network is owned and known by selected persons only [1].

## II. SYSTEM IMPLEMENTATION

This system can be developed in two ways. First one is that the targeted LAN network can be controlled by sending SMS sent by user. Another way is that targeted LAN network can be controlled by server machine.

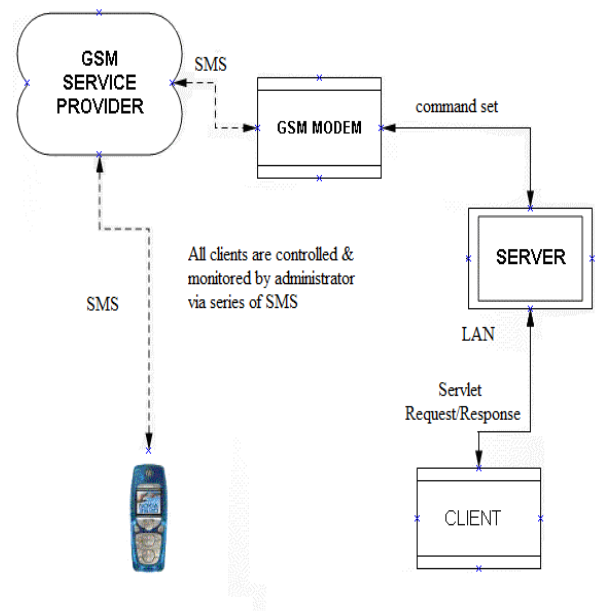


Fig 1: Block diagram of the system using Cell phone

### A. GSM IMPLEMENTATION PLAN

GSM Mobile based LAN monitoring and control is a tool used to monitor a LAN through a mobile device by the administrator when he is at a remote site.

This tool is installed on the node which has two independent parts. One is server application which works as a major process on the machine and offer the services to administrator for controlling and monitoring the LAN. The other is the client application which is the background process on the machine and controls all the activities of the client and gives feedback to the server.

The server application can control through registered mobile device.

Using that mobile device the administrator can perform following actions -

- 1) kill process
- 2) start process
- 3) open file
- 4) delete file
- 5) broadcast message

The client application retrieves the list of processes running on the machine and sends it back to the server application. The server keeps the list updated to check for live hosts. The server can contact to the particular client using his id.

Design of system characterized into three modules: *Client module, GSM Server module and Administrator* [2].

- **Administrator:**

Administrator is having an application installed on his cell phone, using this application he can send command using text message.

- **Client:**

The client or user on the network requests for information (kill, delete, create file) to access, requests for rights & privileges to access.

- **GSM Server:**

The requests received are analyzed by server. Then server performs the respective action as directed by the Administrator. Server and clients communication is performed by using sockets.

## B. SYSTEM ARCHITECTURE

Administrator sends his request through SMS using his mobile phone having Mobile Information Device Profile (MIDP 1.0) technology on his phone via GSM modem to the server. Server then recognizes the client machine which administrator is supposed to monitor and extract data from locally cached data buffer where latest 15 sec data of every machine is updated or stored and sends this info to the administrator as response [9].

Administrator is provided with a GUI based application to send command message instantly without the need to retype message every time. Server sends command to the clients like start process, shut down

process, kill process, create, delete, send task list, and compile code.

Through the GSM service provider the communication is done with the GSM modem which communicates with the server and the server communicates with the client. All clients are controlled and monitored by administrator via a series of SMS text messages for which a SMS parser is used to parse the SMS.

The administrator controls the LAN through his mobile even he is at the remote place. The clients cannot send back or communicate to the administrator the communication is unidirectional it is not two way. Only the administrator can give command to the clients.

The mobile used can be any mobile which has a GSM facility in it. Also the administrator can check the network load on the LAN by typing only a command.

## FEATURES CONTROLLED BY CELL PHONE

- **Net View:** Get in your cell phone, the list of entire client's in LAN. Keep ping every time to check the latest status of the PC's. Anytime, the PC goes offline, its name is removed from the list.
- **Process List:** Get the list of all the processes running on the remote machine.
- **Activate Process:** Activate different processes in either the server machine or any of the client's.
- **Kill Process:** Kill the desired processes on either the server or clients.
- **Read:** You can read the drives, folders, files of any of the client machines / the server machine from cell.
- **Open File:** A small text file residing in any of the client or the server machine can be opened in your cell phone.
- **Broadcast messages:** Broadcast messages to clients, Server from cell.
- **New File:** Create a new document in the cell phone and save the same in either the server or client machine.
- **Shut Down:** The client machines from mobile.

## C. GSM MODEM

A GSM modem [2] is a specialized type of modem, which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it may be a mobile phone that

provides GSM modem capabilities. A GSM modem could also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on computer.

Any phone that supports the "extended AT command set" for sending/receiving SMS messages, are defined in the ETSI GSM 07.05 In the proposed system we have used SIMCOM SIM300 GSM module. SIM300 [12] is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz. SIM300 provides GPRS multi-slot class 10 capability and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in your application, such as Smart phone, PDA phone and other mobile device. The SIM300 is designed with power saving technique, the current consumption to as low as 2.5mA in SLEEP mode. The SIM300 is integrated with the TCP/IP protocol Extended TCP/IP AT commands are developed for customers to use the TCP/IP protocol easily, which is very useful for those data transfer applications [3] [9].

### III. TESTING AND ANALYSIS

#### A. Successful Authentication with GSM Network

The GSM receiver has tested for successful communication with network. This test will includes automation and consistency of the connection and will be conducted in the following way [2]:

- 1) The cellular phone sends SMS to the GSM receiver's modem number.
- 2) Once connection is established SMS will be sent to the GSM receiver.
- 3) The GSM receiver will send SMS asking for password. The password received will be observed on end to verify its authentication.

The GSM receiver and mobile both established a successful communication over GSM network [6].

#### B. Successful Implementation to monitor Client

- 1) A client in LAN network is monitored by administrator using his mobile phone.
- 2) A SMS "KILL" to delete a process from clients list is send by the administrator to GSM modem which communicates with Server.
- 3) Server further decodes the message into action event to kill respective process.
- 4) A task completion message is sent by the server to the administrator.

- 5) Similar SMS such as create, start, read, shutdown, log activity, delete, message received, list files are successfully implemented by administrator using GSM mobile.

#### C. Factors to be considered to implement the system

- 1) The receiver must reside in a location where a signal with sufficient strength can be obtained.
- 2) The only person who can communicate with the control module is the person who will be successfully authenticated.
- 3) The GSM modem must have a power source (12V) attached at all times.
- 4) Operation of the controlling unit is only possible through a cell phone [6].

#### C. Advantages

GSM networks are most popular and widespread wireless communication media across the world, having a wide customer base.

- Offers greater portability and mobility where the user can move terminals around his plant.
- The user does not have to fund the infrastructure costs of putting up significant masts and installing antennae.
- "Quick" and "Easy" to implement if the GSM service exists in the area of installation [4].

#### D. Limitations

- The security model and algorithms of GSM were developed in secrecy and were never published.
- The GSM security model is broken on many levels and is thus vulnerable to numerous attacks targeted at different parts of an operator's network [4] [8].

#### E. Applications

- LAN monitoring at the university/college level can be used for monitoring, logging and retention of network packets that traverse university networks.
- LAN Monitoring at the office level can be used to monitor the office LAN by the administrator

at any time if at a particular point he/she cannot be present there.

**Applications can be found in almost any segment or environment such as:**

Security, Agriculture, Automatic meter reading, CCTV, Vending machines, Water Treatment, Elevators and escalators, Pollution Control, Process Control, Personnel Monitoring, Cargo tracking, Access control [2] [7].

#### IV. CONCLUSION

The system has provided a low cost, secure, accessible, remotely monitored and controlled solution for LAN monitoring using GSM is been introduced. The use of a mobile, GSM modem, Server provides exciting possibilities. However as far as the industrial applications are concerned this can be viewed as a low cost, customized wireless LAN monitoring system. Thus this solution can be customized to suit any other industrial requirement related to monitoring and controlling LAN network. The approach discussed in the paper is novel and has achieved the target to control LAN network remotely using the GSM SMS-based system satisfying user needs and requirements. GSM technology capable solution has proved to be controlled remotely, provide security and is cost-effective as compared to the previously existing systems. Hence we can conclude that the required goals and objectives of the system have been achieved.

#### FURTHER STUDY

In its current version of the software, we have included basic functionalities to assist network administrators in their job. Network administration though, includes a wide range of responsibilities. In the future version to come, effort can be made to include as many functions of a network administration is possible.

The system can be further implemented to add the following modules:

- Chatting application.
- Provide Application for Mobile handset.

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#### REFERENCES

- [1]. "The Architecture of a Novel Tool for Network Management Using GSM/GPRS Mobile Devices", IEEE paper.
- [2]. "Network Handle by mobile" in *International Journal of Computer Trends and Technology-May to June Issue 2011*
- [3]. "GSM Interception" by Lauri Pesonen, Helsinki University of Technology, 2009
- [4]. "The GSM Standard (An overview of its security)", by SANS Institute.
- [5]. "Java Complete Reference" by Herbert Schildt
- [6]. GSM SYSTEM SURVEY, Student text, EN/LZT 1233321, R5B revised upgrade edition. p. 192.
- [7]. Coskun and H. Ardam, "A Remote Controller for Home and Office Appliances by Telephone", IEEE Trans. Consumer Electron. , vol. 44, no. 4, pp. 1291- 1297, November 1998
- [8]. Daldal Nihat, "GSM Based Security and Control System" (In Turkish), M.Sc. Term Project, Gazi University, Ankara, 2003.
- [9]. E. Wong, "A Phone-Based Remote Controller For Home And Office Automation", IEEE Trans.Consumer Electron., vol. 40, no.1, pp. 28-33, February 1999.