

SECURED WI-FI BASED ORGANIZATION INTERCOM SUPPORT SYSTEM

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Abstract

This paper outlines an Android based mobile application for an intra-organization environment, which allows employees to communicate on real-time through voice calls, text messaging and file sharing over short range wireless network mainly Wi-Fi technology. The system validates whether an employee is connected to organization's Wi-Fi network; if not then an employee receives messages through text messages. It also provides hourly basis notification to employees for their schedule.

In this application, dynamic database utility is delivered which retrieves data or information from a centralized server. The centralized server is responsible for maintaining a database which helps to identify the registered users.

Keywords: - Wi-Fi, Smart phone, android, call, message, notifications.

1. INTRODUCTION

Technology has enhanced a lot and thus the whole world pursues a convenient and well-organized way of communication. In the organization, communication channels play a vital role for employees to be connected with each other. In view of all these specifics, it is essential to advance organization with such a system which is easy to deploy, run and access.

This paper outlines the requirements and benefits of switching to a Network using Voice over Internet Protocol. It presents an advanced network architecture through which an employee can communicate within their organization by connecting to a centralized server.

This Android-based mobile application is for the organizations, which allows the employees to communicate through voice calls and text messaging. The user or employee can also share files through this application. To achieve this two Android devices, Wi-Fi router and a centralized server are required, to communicate with each other using the User Datagram Protocol. The centralized server in our system is responsible for maintaining the database which helps us to identify the registered users.

This application consists of the information about the employees such as employee name, contact details and email id. In this application, the terminal at employee end is an Android mobile and the centralized server is maintained by the administrator, which is used to store employee details, and employee's weekly schedule.

2. REVIEW OF LITERATURE

This Section presents the review of the previously used technologies.

2.1 Android

The Android operating system is a developing OS these days owned by Google, which is being used in Android phones. This operating system is being used in millions of smartphones and tablets. Android was launched in 2003 and it's being occupied by Google in 2005. On September 2008 first version was released. Cupcake (v1.5), Donut (v1.6), Eclair (v2.0) in 2009. Froyo (v2.3), Gingerbread (v2.4) in 2010. Honeycomb (v3.0), Ice cream sandwich (4.0) in 2011, JellyBean (4.1 to 4.3) in 2012 and KitKat (4.4) in 2013. Lollipop (5.0) in 2014, Marshmallow (6.0) in 2015, Nougat (7.0) in 2016, Android 7.1.1 in Dec 2016 [1], [2].

Android platform is widely used on different devices when compared with other competitors such as iOS, Microsoft, RIM and others. Android apps can be developed and easily made available to users for download from google play store. As compared to the competitors Android has the largest user base; hence, we choose an android platform for our application [2]. Below depicts the volume of android users as compared to other operating users:

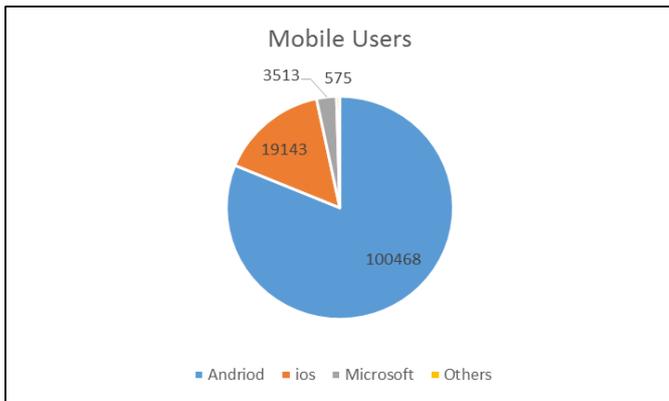


Fig 1: Android users over other users [2]

2.2 Architecture

The Android OS is a Linux based and the following figure shows the Android architecture. The applications are present on the top layer.

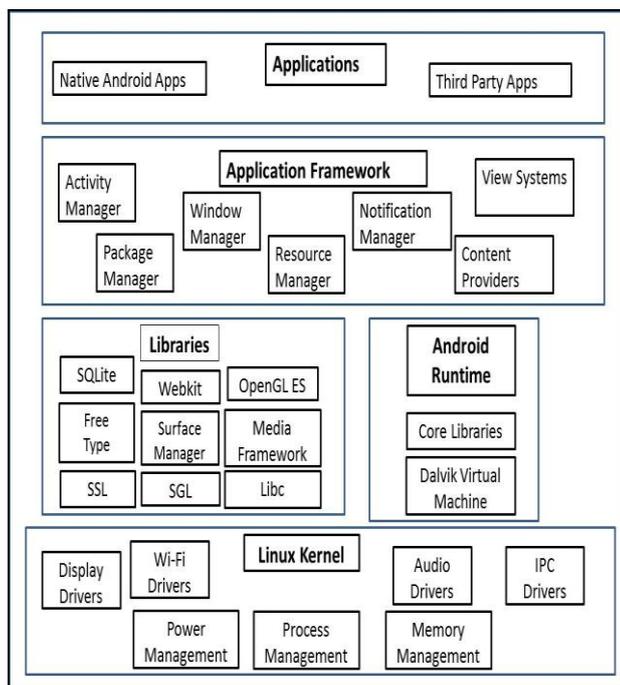


Fig 2: Android Architecture [1]

2.3 Libraries

This layer contains all the Android libraries. Libraries are usually written in C/C++ and offer competencies same as an application layer, which is placed on the above of kernel. These libraries consist of:

- **SQLite:** Database engine used for integrating database.
- **Surface Manager:** Display and compositing window-in manager.
- **Media Framework:** This library provides Audio and video formats and codecs, which also includes playback and recording.
- **OpenGL ES Libraries:** 2D and 3D graphics which is used for file sharing [1].

The development of an Android mobile application which allows voice communications via Bluetooth and Wi-Fi is being discussed in [3], [4]. However, the application features limits to voice calling. The design of an android application which provides real time communication through instant messaging and voice calling is being conversed in [5]. File sharing through android application between the two devices with the help of hotspot is being conferred in [6]. But users have to provide IP address to share files which is difficult to remember. Employee monitoring system for a company using android mobile application is being developed in [7] which helps manager to monitor employee details through centralize server, by using android technology. It is just a monitoring app which does not provide other assistance to users.

However, this paper provides the complete solution for the organization by providing all the features calling, messaging, file sharing, notification alerts to employees about their schedule in one application, which will work within the private network of an organization.

3. PROPOSED SYSTEM

The main objective of our application is to provide employees with real-time communication within an organization. Android devices, centralized server and Wi-Fi router only will be required for the implementation. In order to communicate with each other through android devices User Datagram Protocol is used.

This system is cost efficient, as two mobile devices, a centralized server and router are the only hardware components which are required. This application can be considered as a substitute, when there are network issues, i.e. failure of a mobile tower. In this application, if employee mobility is not detected on same Wi-Fi network, then application automatically sends a text message to an employee. The centralized server in our system is responsible for maintaining a database which helps to identify the registered users, to map the call and also maintains the database of employee's weekly schedule.



Fig 3: Proposed system

System Specification

Following are the requirements for application

1. An operating system is needed (Windows/Linux) which will act as a server.
2. Clients will be an Android Handsets.
3. Java programming language and android SDK, JDK.
4. MySQL for database.
5. For database access from central server JSP/SERVLET is used.

4. METHODOLOGY

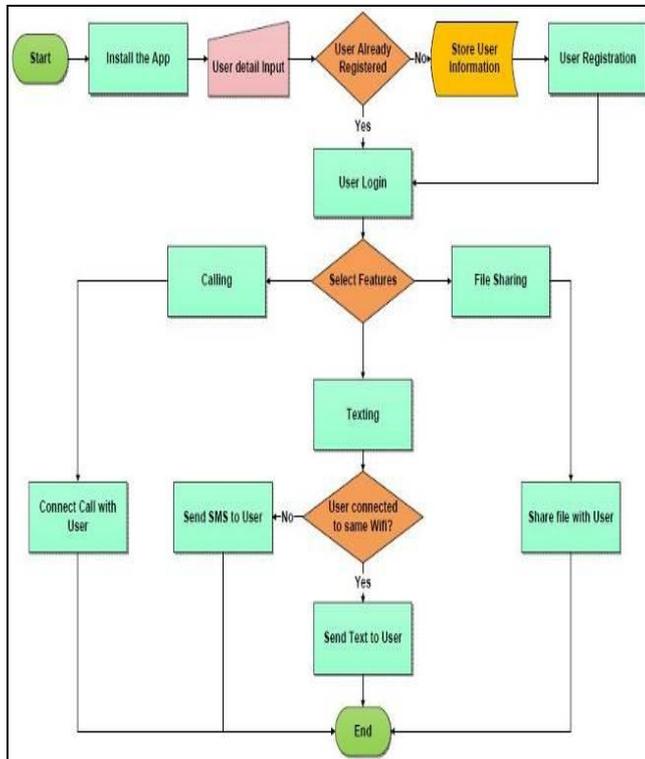


Fig 4: Methodology

Our System consists of two basic entities. An operating system which will act as a server. Clients will be an Android Handsets.

The API'S which are required to build this application are as follows:

- i. Android.os
- ii. Android.view
- iii. Android.app
- iv. Android.net
- v. Android.media[8]

4.1 Module Description

This work deals with the following modules:

1. Installation: The user or an employee will have to install an application.
2. Registration: The user or an employee will be required to register using the android application so that the server understands that the user is active.



Fig 4.1: Registration form

3. User: Once the user is registered, he will have to login and will have the options available to call, text or to check the notifications.

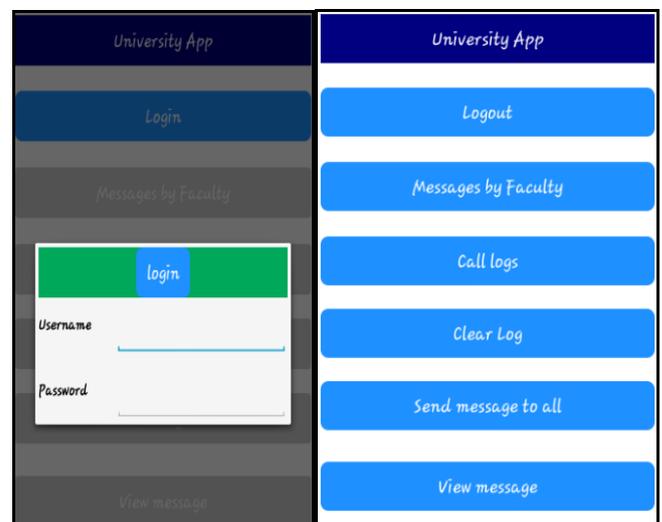


Fig 4.2: Login details

a) Voice Calling

- i. In this application, we developed a communication system which allows an android based smartphone users to communicate over the Wi-Fi range using User Datagram Protocol (UDP).
- ii. Proxy-server receives requests from a caller and calls destination client on behalf of the caller.
- iii. Using User Datagram Protocol, application will establish the communication between the devices.
- iv. The figure given below illustrates call initiation process.

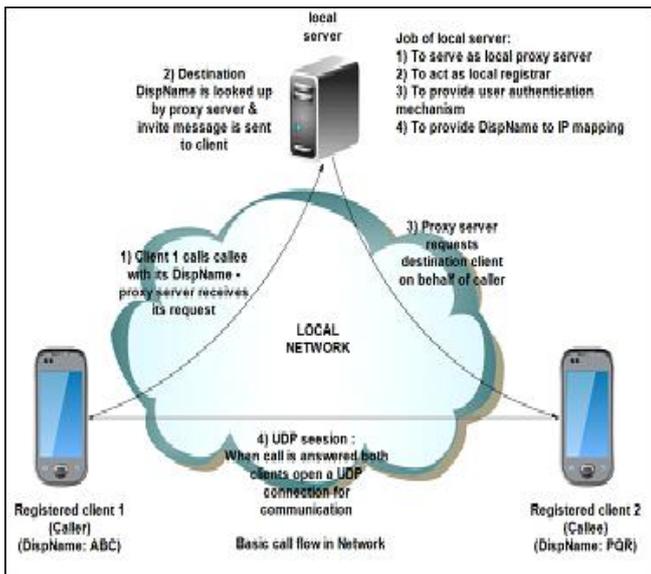


Fig 4.3: Call flow

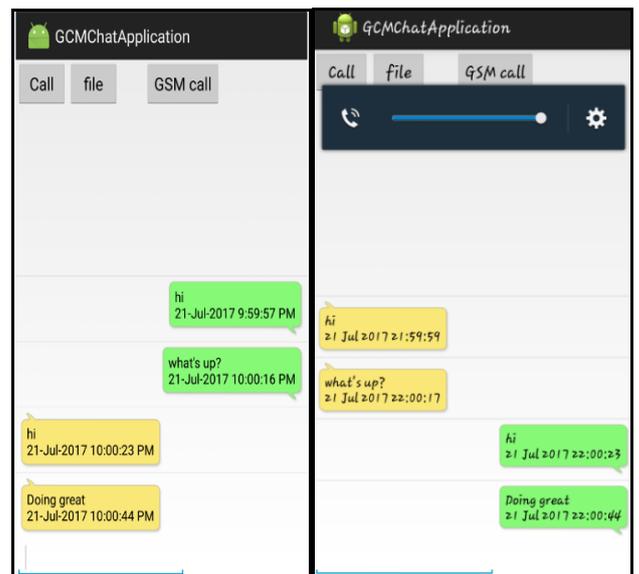


Fig 4.5: Text Messaging



Fig 4.4: Call Initiating

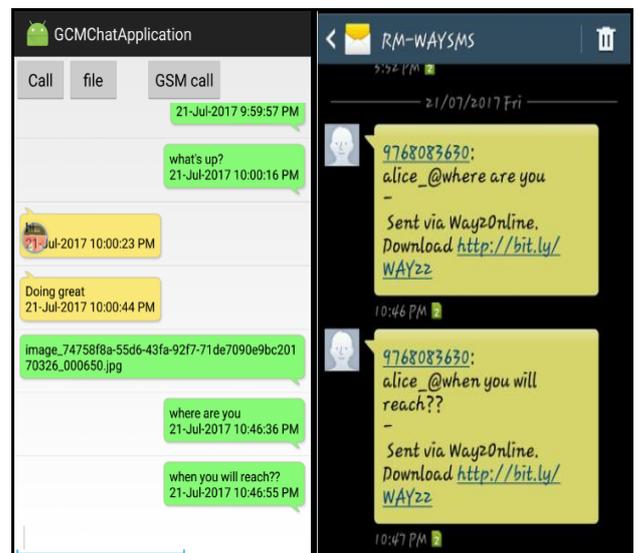


Fig 4.6: SMS

b) Text Messaging

- i. In this application, we developed a system which allows android based smartphone users or employees to send and receive messages over the same Wi-Fi network range.
- ii. When a user or employee sends a text message to another employee, this message goes the server.
- iii. Server will first verify whether the user is connected within the same Wi-Fi range.
- iv. Then server sends this message to the other employee.
- v. If server found that the other user is not in same Wi-Fi network then server sends this text message as an SMS.
- vi. Same procedure is followed at the receiver end i.e. when receiver wants to send a reply.

c) File Sharing

- i. In this module employee can share data or file between two android mobile terminals easily, when these two terminals are present in the same Wi-Fi network.
- ii. When an employee send a file to another employee connected in same Wi-Fi network then it is first sent to the server.
- iii. Server on behalf of an employee sends the file to the user at the receiver end.
- iv. The file is received by the receiver and file will be located in the folder named as "uploadftp41".

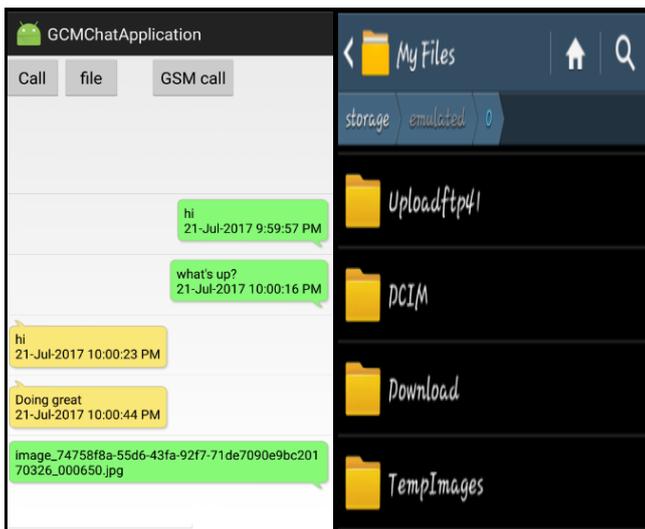


Fig 4.7a: File sharing

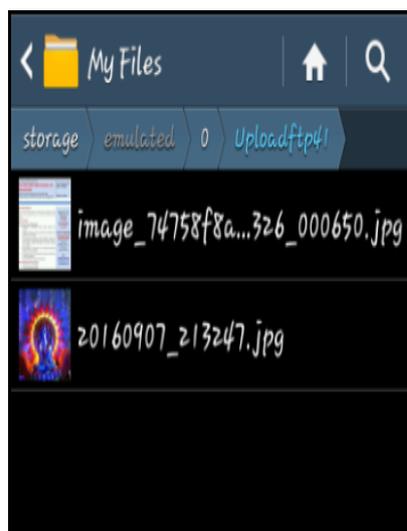


Fig 4.7b: File sharing

d) Timetable Notification

In this module, the server sends a notification to the registered users about their schedule on an hourly basis.

5. CONCLUSION

The developed application will be used by an organization for their internal communication through Wi-Fi. It would also reduce the cost of 3G and 4G data connections and will provide additional features like file transfer, text messaging and hourly basis notification about the schedule of a user. This application provides the complete solution which will meet the organizational instant communication requirements. In future, it will be possible for an organization to track an employee in the vicinity and user will be able to broadcast voice message and text messages to multiple users and it can also be further implemented through multiple routers and call handoff will be performed which will allow the user to cover enormous area without any interference.

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