Android Walkie Mesh
Vision & Scope

by

CIA

Create, Improve, Accomplish

Clark Fourie 10243926

Ivan du Toit 29363412

Adriaan Louw 11205637

22 October 2013

Version 2.0

Change Log

Version	Date	Comment
0.1	07/05/2013	Initial draft
1.0	09/05/2013	First revision
2.0	22/10/2013	Updated and finalized

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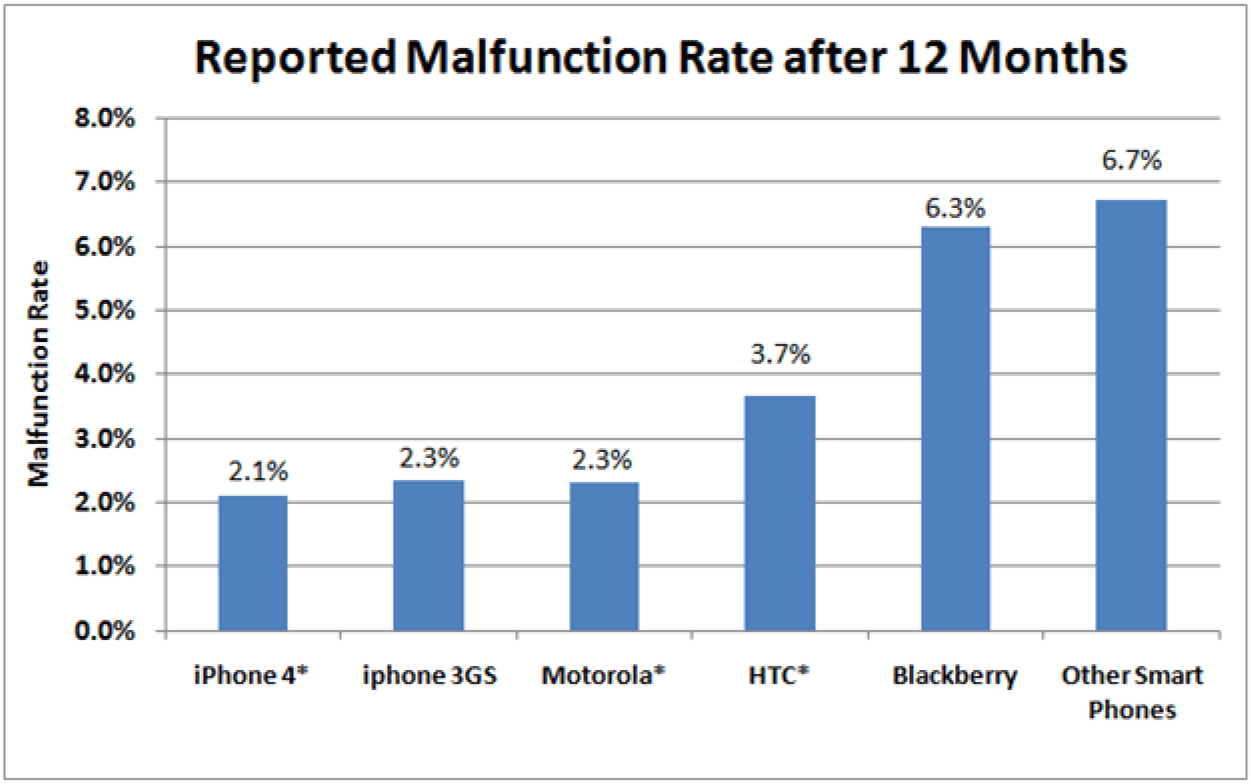
1. Introduction

PTT (Push to Talk) first revolutionised communication in 1940 in the form of the Motorola SCR-300. Even though it was initially designed to quickly convey messages through the battlefield PTT was modernised to aid communication throughout a wide variety of situations such as business, public safety, outdoor recreation and many more. With the incredible growth of cellular technologies PTT has almost become a forgotten practise - a primal form of communication if you will. As cellular costs sky rocket and more reports of malfunctioning cellular devices (Cell Phone Comparison Study Nov 10) at crucial times PTT again becomes a feasible option.



2. Business/client perspective

The needs of the client are simple: An application to communicate information to one or more colleagues in a **quick**, **simple**, **cost effective** and **reliable** way via an Android device. An easy to use interface, automatically displays all online users in range of the wireless network. Selecting an online user and holding in the PTT button sends a verbal message via VOIP (Voice Over Internet Protocol) in real time - no dialling necessary! By using VOIP over a wireless network this process is free. It is reliable in the sense that the system is not dependant on cellular network of any kind - only a Wi-Fi connection (which can be generated as an adhoc network by most devices).

A long term vision would be to have a seamless, platform independent application to send out urgent business related information to co-workers in real-time. Also to hold meetings in different boardrooms and be able to concurrently communicate and debate important topics that require input from more than one limb of the corporate body.

2.1 Background

Many PTT (Push to talk) VOIP (Voice over IP) applications exist today that allow users to communicate over an Internet connection instead of making voice calls on proprietary cell networks. The call quality is very reliant on a good connection by all parties to the VOIP server. 3G networks fail to provide a reliable service more often than not and the only alternative is to have all users connect to a private network which requires infrastructure setup and availability. Wi-Fi mesh networks form a network by connecting all devices together and using them as hop points without a network backbone or infrastructure (No sim-card, Access point or Internet connection required).

The goal of this project is to create an Android mobile application that will turn the device into a Walkie-Talkie. It will use the device’s Wi-Fi radio to build a mesh network of all devices that have the application installed and allow any connected device to talk to another on the network.

3. Vision

The project will deliver a single Android application that will turn the mobile device into a walkie-talkie. The Android application will need to utilize an existing framework to build a self-configuring infrastructure-less network of mobile devices over Wi-Fi. It will then provide a VOIP (voice over IP) service over this network, also based on an existing framework. It will also need a GUI (Graphical User Interface) to manage connections and provide the following features:

1. The application should automatically connect to a mesh network if it is connected and inform the mesh that it exists.
2. PTT (push to talk) VOIP functionality over speakerphone.
3. Contacts available on the network (Friendly aliases / names for each device).
4. Contacts status (available, off-line).

Bonus Features:

5. Group channels / conference call support
6. Blocked list / blacklist contacts
7. Ability to make bi-directional real-time VOIP calls

The client requested that the interface should also be described in this document to ensure that the ease of use and operability is captured from the start:

- The application should open on the contacts screen showing the network status of each contact as well as the contacts status.
- You should then just select the contact to go to the call screen where you use PTT to communicate with the contact. Terminating the communication should return you to the contacts screen again.

4. Scope and limitations

The first release of the application should demonstrate mesh building and routing by showing all the other devices that the current device can connect to through the network and also show their status.

Further incremental features will then be added to the application in the priority order set out in this document or as requested by the client.

5. High-level non-functional requirements

1. The application should work straight after installation without configuration. This requirement takes precedence over others.
2. The VOIP framework should be implemented in such a way that alternative codecs can be implemented without impact on the rest of the project.
3. The application should be native android 4.0.3-4.2.
4. The application should be able to perform comfortably on a 1Ghz dual core Android with up to 10 devices connected to the network.
5. The VOIP communication should be encrypted. The encryption used should be a modern standard but could be part of the VOIP codec or framework.
6. Ease of use (most inexperienced users should be able to use the application without training outside of the help given in the application).

6. Project success factors

A simple 4-level prioritization scheme is used:

1. Driver: A driver is a critical aspect the system needs to address and which is not currently addressed by current systems - the drivers are the reasons for doing the project.
2. Constraint: A constraint is a feature of the system which is also critical, but might be addressed by current systems. To be at all useful, the system needs to provide the “constraint” features.
3. A feature labeled Important is a feature which provides quantifiable benefit to the client.
4. Nice-to-have: A feature for which the value cannot be quantified i.e. the client has specified it as a requirement but did not quantify the business benefit of the feature.

Drivers:

- Zero Configuration. (NF1)
- Ease of use. (NF6)

Constraints:

- Form a mesh network with other devices. (FR1)
- Provide PTT VOIP communication over speakerphone (FR2)
- Encryption of VOIP (NF5)
- Native android application (NF3)

Important requirements:

- Contact Status (FR4)
- Network status (FR3)
- Implementation independence (NF2)
- Scalability (NF4)

Nice to haves:

- Groups (FR5)
- Blacklisted contacts (FR6)
- Bidirectional VOIP (FR7)

7. References

Cell Phone Comparison Study Nov 10 | SquareTrade. 2013. *Cell Phone Comparison Study Nov 10 | SquareTrade*. [ONLINE] Available at:http://www.squaretrade.com/cell-phone-comparison-study-nov-10. [Accessed 07 May 2013].