UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF TRANSPORT INFORMATION SYSTEM USING PUSH NOTIFICATION

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer Systems) with Honours

by

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I hereby, declared this report entitled "Development of Transport Information System Using Push Notification" is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree Bachelor of Computer Engineering Technology (Computer Systems) with Honours. The member of the supervisory is as follow:

………………………………….
(Project Supervisor)

ABSTRACT

Mobile application is the latest and rapid growing technology available for all user or customer in today market. An enormous increase in the end user acceptance has been experienced in the past few years. This project will be developed to provide transport information system using push notification. This push notification uses the Google Cloud Messaging (GCM) as platform that enables developers to end messages to the smartphone user. This project also proposes an mobile phone application gives information and integrate map interface in the application. Mobile application requires an open source development which is probably the most feasible and present user friendly approach. This project deals with location based services. Which are used to track current location of the bus as well as give an estimate remaining time for tracked bus to reach its destination using the client server technology. Also, it displays the required maps with the help of Google map. The purpose of the project provides the bus information about buses, bus numbers as well as bus router. Other than that, using database SQLite to displays the schedule of the bus. Lastly, gets information using push notification between servers to the mobile phone.

ABSTRAK

Aplikasi mudah alih adalah teknologi terkini dan pesat berkembang disediakan untuk semua pengguna atau pelanggan di pasaran hari ini. Peningkatan yang besar dalam penerimaan pengguna akhir yang telah dialami pada tahun-tahun kebelakangan ini. Projek ini akan dibangunkan untuk menyediakan pengangkutan sistem maklumat menggunakan "Push Notification Service". pemberitahuan push ini menggunakan Google Cloud Message (GCM) sebagai platform yang membolehkan pemaju untuk menamatkan mesej kepada pengguna telefon pintar. Projek ini juga mencadangkan aplikasi Telefon mudah alih memberikan maklumat dan mengintegrasikan peta muka dalam permohonan itu. Aplikasi mudah alih memerlukan pembangunan sumber terbuka yang mungkin pendekatan mesra pengguna yang paling layak dan masa kini. Projek ini berkaitan dengan perkhidmatan berasaskan lokasi. Yang digunakan untuk mengesan lokasi semasa bas serta memberi baki masa anggaran bas dikesan untuk sampai ke destinasi dengan menggunakan teknologi pelayan pelanggan. Juga, ia memaparkan peta yang diperlukan dengan bantuan peta Google. Tujuan projek ini menyediakan maklumat bas mengenai bas, nombor bas serta router bas. Selain itu, dengan menggunakan SQLite pangkalan data untuk memaparkan jadual bas. Akhir sekali, mendapat maklumat menggunakan pemberitahuan menolak antara pelayan untuk telefon mudah alih.

DEDICATIONS

Alhamdulillah, praise to the Almighty Allah S.W.T

This project is dedicated to:

My parents,

My beloved family,

My Supervisor,

My lecturers,

And all my friends

Thanks for their encouragement and never end support.

ACKNOWLEDGMENT

I would like to express my gratitude towards the following groups of people which not only given me continuous support and guidance throughout the entire course of this project. First and foremost, I would like to thank Allah SWT for the great health and ability in completing this paper. I would extent my deepest appreciation to my beloved parents who have never fail to support me from the beginning. To Mr Mohd Saad Bin Hamid, my supervisor who not only guided me but also provided me the knowledge about coding, teach me how to use each of software and experience that help in this research project. To my supporters which include friends, classmate and housemate who assisted me with care plus giving me a link to refer with to insert in database project. Last but not least, thank you to everyone that directly and indirectly involved in helping me finishing this Finale Year Project report. Thank you.

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B4A	-	Basic 4 Android
DBMS	-	Database management system
IDE	-	Integrated Development Environment
IP	-	Internet Protocol
JVM	-	Java Virtual Machine
OS	-	Operating system
PC	-	Personal Computer
POIINav	-	Points of Interactive Interest Navigator
SDLC	-	System Development Life Cycle
SQL	-	Standard Query Language
WYSIWYG	-	What You See Is What You Get
VM	-	Virtual Machine

CHAPTER 1

INTRODUCTION

1.0   Introduction

This chapter introduce brief the idea of the project and focus to problem statement, objective and followed by the scope and limitation of the project.

1.2   Background

Mobile application is the latest and rapid growing technology. A mobile application is a software app developed specifically for use in, small wireless computing devices such as smartphone, tablets or laptop. The mobile application is design to take into account the demands and constraints of the device and also take advantage of any special ability that they have. Although know mobile application used for device application. When selected open application, the operating system (OS), it running until system close. Any mobile application can be accessed and hold of any mobile device such as a phone, music player or tablet.

The popular mobile devices these days are mobile phone, tablets and personal computer, through many mobile devices have been introduced in the market today. The main features of this mobile device are that it can be enabled to use a variety of communication technologies such as Wi-Fi, Bluetooth, RFID and third generation. This growth in technology makes digital lifestyle. From people live in these statistics, the result show the user with more than one mobile phone has increased in Malaysia. The difference between users has a mobile phone in 20014 and 2010

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decreased by 15.6%. Meanwhile, for users also increased 3.4%. Figure 1.1 shows the percentage of users with a variety of mobile phone in Malaysia.
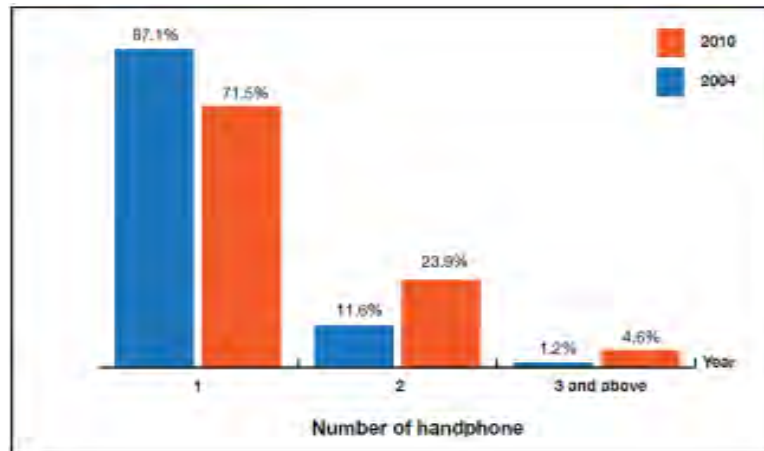

Figure 1.1: Percentage of User with Multiple Hand Phone (MCMC, Cyberjaya 2011)

1.3   Problem Statement

Generally, everyone is in a hurry to reach their destination. In this case to waiting for the bus cannot be trusted. People who are really in the public their main concern is to find real time location of buses in which they were waiting and time required to get the bus stop. This information helps people in making better travelling decisions. This information gives a great challenge in the public transport system and discuss various approaches to manage it wisely. The current location of the bus is obtained by integrating the GPS device on the bus and coordinate buses sent by either the GPRS service provided by the mobile application. GPS enable device on the tracking and the information sent to the central control unit or directly at bus stops using RF receiver. The information also can used Bluetooth to detect bus coming when bus connect into the range. The system is integrated with an average speed of any segment of history. This is done to improve the accuracy by including factors such as traffic, track in each segment, the day and time of day. The public can track information using Android software. GPS coordinate are sent to the bus when the centralized servers where algorithms are used for various estimated arrival time using its speed.

The problem regarding in the transport information system are to track the system anytime a system that can connect the information about the bus timing and schedule. The main problem that must be solved is how make the system able to send the data only when the owner wants to track the bus.

1.4 Project Objective

The objective of this project is:

- To study on vehicle arrival time estimation method
- To provide real time bus location information on the mobile application
- To integrate Map interface in the mobile application

1.5 Workscope

The work scope of the project is to study the bus tracking system using the Bluetooth reader that can give the current position of the bus. The range of Bluetooth system is about 10 meter. The Bluetooth reader also sends the data into database to collect the data of the bus such as bus stop and time arrival.

This project also has mobile application to developed using Android and IOS Apple platform. Other than that, the project has push notification that allows sending data from the server to user Android mobile devices using Google cloud message.

The Figure 1.2 and Figure 1.3 shows the block diagram of the whole system and Bluetooth reader system to development of transport information system using push notification. In this case, the system has following features:

1. Information exchange on transport system through mobile push notification
2. To estimate of transport using Google Maps
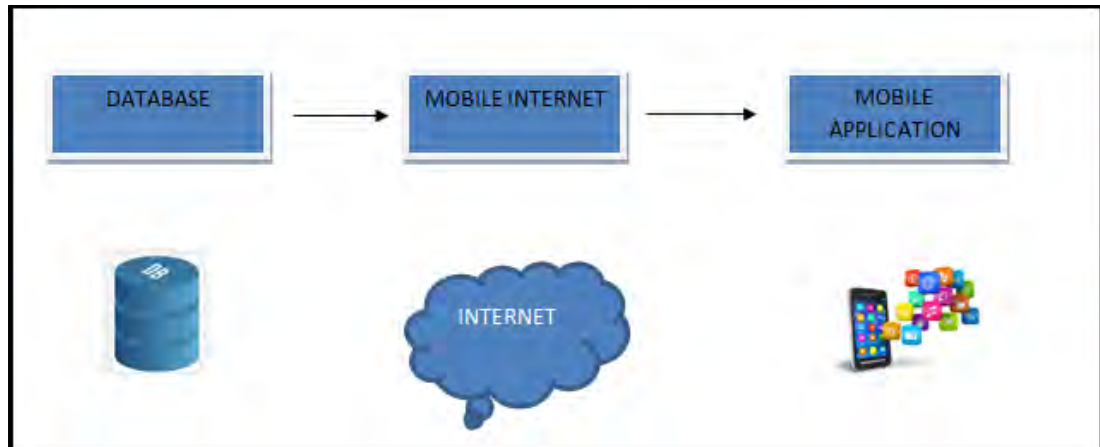3. The schedule of the bus

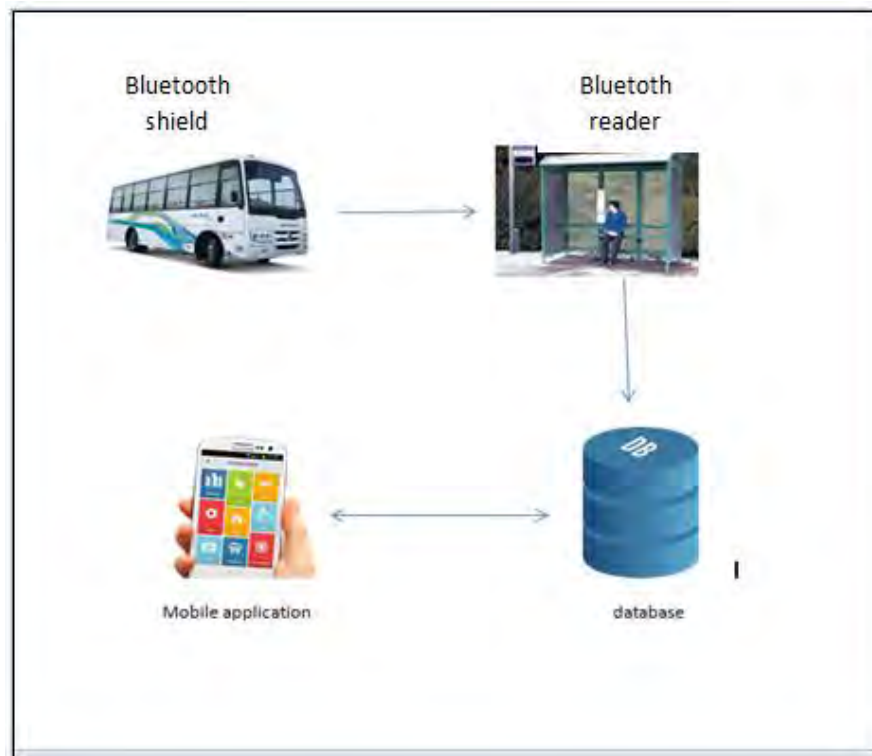Figure 1.2: Block Diagram with Proposed System

Figure 1.3: Bluetooth Shield, Bluetooth Reader, Database and Mobile Application of Transport Information System

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CHAPTER 2
LITERATURE REVIEW

2.0   Introduction

In this chapter will be discussed on the background of relevant research in the project. In this chapter the information was collected from many sources such as book, journals and internet. Information as a guide to make sure this project is done in time given.

2.1   Transport Information System

Tracking of organization buses while moving on highway is a crucial task. A person patiently waiting for the bus may want to enquire about the position of current location of the bus. Phone discussion is not always possible due to traffic disturbances. Further it involves variant costs due to the calls and message service over phone and the person in the bus may get annoyed if he gets multiple calls from people boarding that bus. Mobile based Bus Tracking System provides a solution to this problem which helps anyone to retrieve the location of the bus without calling or disturbing the person travelling in the bus. The people boarding the bus and the coordinators of the bus should own an android driven mobile phone with internet connectivity.

The Global Positioning System (GPS) supports in area following with backing of Global Standard for Mobile (GSM) in cellular telephone to report transport area information again to the servers. Continuously, this shows where transports are on a guide and evaluation the entry time and separation with reference to holding up stop

by utilizing propelled gimmicks of Internet. The function of proposed system is to provide an economical, flexible and reliable system for bus tracking.

Chew et al. in 2006, proposed A Hybrid Mobile-based Patient Location Tracking System for Personal Healthcare Applications. They proposed a crossbreed portable based area system using the worldwide situating framework (GPS) and cell convenient framework establishment is used to give the range after fitness using modem. Lenain et al., in 2006 proposed Mobile robot control in vicinity of sliding which is an Application to agrarian vehicle way tracking.

Varandas et al., in 2010 proposed an tracker which is a Mobile Tracking Application for Pervasive Environment created for cellular telephones. Through the known geographic position, this requisition empowers the client to track a cell phone and send cautions on the off chance that it is out of the span around an investment point, long ago characterized by the provision chairman. Donko et al., in 2012 proposed Implementation of tracking mobile application and analysis of spatial data. This model presents utilization of existing aspects of global navigation and global position system (GPS), and visualization of Earth using satellite images, in order to gather and store particular data.

2.1.1 Bus Module

This module is installed inside the bus. In a user interface it consists of the driver, location, control unit and GSM module. User interface have push button which is used to give the information or logic high signal to the control unit. The driver also required to use this simple switching like a push button an arrival at each bus station. Inside the bus also has indicator LEDs which are used to show status module. Next, for the emergency case it has reset button to reset or starting the whole module.

Saujatha (2014), the control unit consist of Atmega8 microcontroller circuit to find the current position, bus number and has also has unique word for which is to be send to the coming bus stop. GSM module transmit the serially control and has connection between bus and bus station. It also sends the control work by the control unit as text. Figure 2.1 show the block diagram of the bus module.
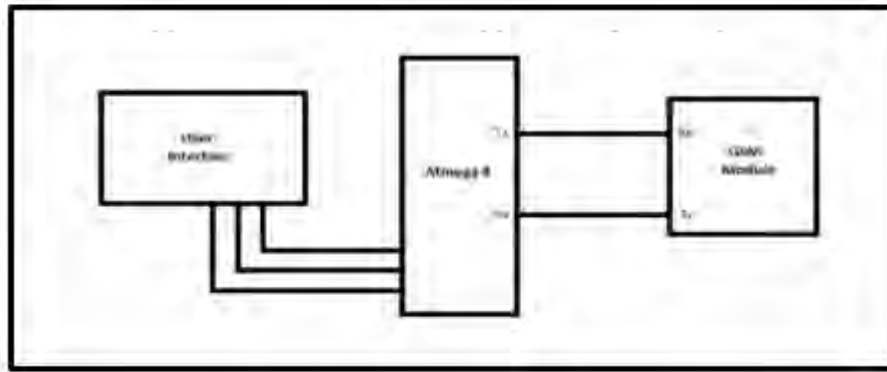
Figure 2.1: The Block Diagram of The Bus Module (Saujatha,2014)

2.1.2 Station Module

This module is installed inside bus station and consists of a GSM module, control unit and LCD display. The GSM receives the control unique send by bus module and also send by signals the control unit. Atmega8 microcontroller is used to control unit. After that, GSM module sends command throw the message which store in the SIM card present in the GSM module. The LCD will be displayed based on the control unit that show the bus number and the its position.
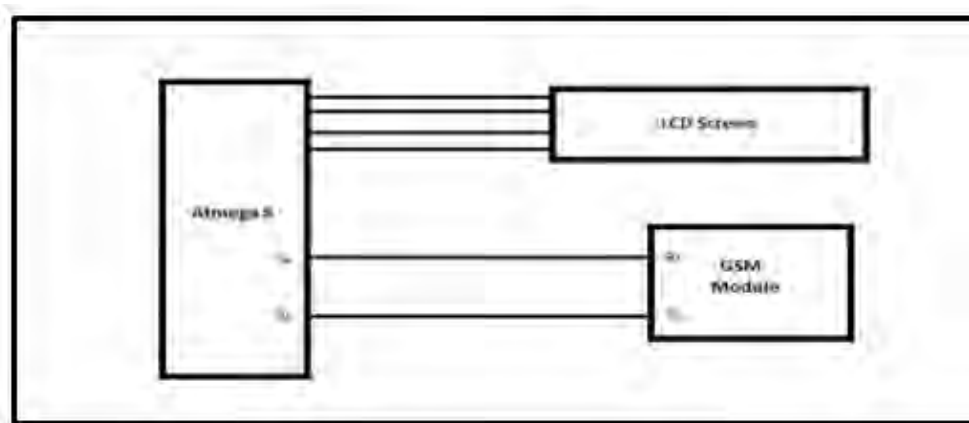

Figure 2.2: The Block Diagram of The Station Module (Saujatha, 2014)

Therefore, when bus moved in the certain route the transmitter module detected in it. The transmitter module send the data of the location bus and the expected time that will bus arrive. Transmitter and receiver have their own unique number that used in GSM module. Figure 2.3 show the example of the bus route of Coimborate City. The route display map of the four points bus stop such as bus stop

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A,B,C and D. Point A is the starting point of bus, the bus driver used push button to provide in the transmitter module inside the bus and continues of other point bus. For the particular location it will increment a variable. This variable is now sent as a text message bus stops B, C and D. When the bus reaches point B, the bus driver again push button and this will increment the variable correspond to point B. The information of the bus will display in the LCDs when the bus has now reached. This increment will continue until the bus reaches the point D. The figure 2.4 show the estimate time that bus reached.

Figure 2.3: Bus Route of Coimbatore City (Yasha, 2014)

Figure 2.4: LCD Display Show The Estimate Time of Bus (Yasha, 2014)

2.2   Geolocation Data Transmission

Stated simply, geolocation is a technology that uses data acquired from an individual"s computer or mobile device (any type of radio or network-connection-enabled device) to identify or describe the actual physical location. It is one of the most popular manifestations of the current development of information technologies and is recently experiencing a significant rise in popularity.

Geolocation software services are used to support the business objectives of private and public enterprises. Geolocation data generally are used for three purposes:

1. Geo-referencing or positioning - Ascertaining the physical location of an object or person relative to a coordinate system (map) to access specific information later.
2. Geo-coding - Searching for information regarding objects or services on a map.
3. Geo-tagging - Adding geographic information to an object, such as a photograph, by incorporating the geolocation data in the photograph"s metadata.
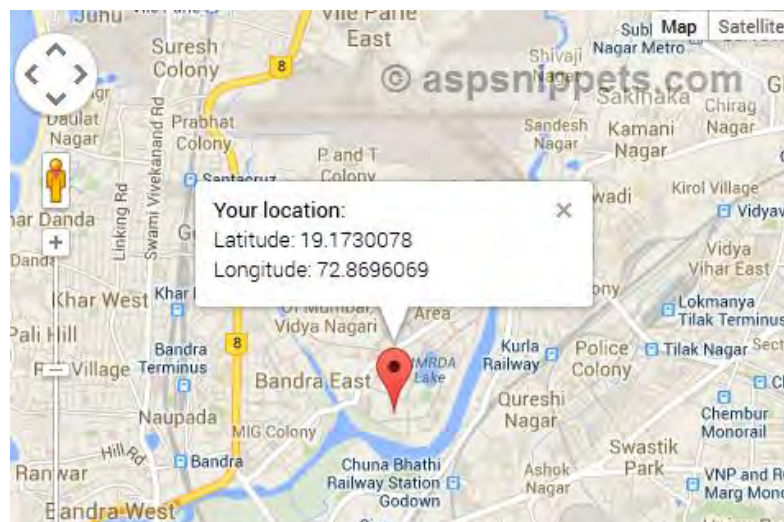

Figure 2.5: Geolocation (A. V. Prabu, 2015).

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2.3 Location-Based Application

A Hybrid Mobile-based Patient Location Tracking System for Personal Healthcare Applications was proposed by Chew et al. They proposed a crossbreed portable based area system using the worldwide situating framework (GPS) and cell convenient framework establishment is used to give the range after fitness using modem. Lenain et al., in 2006 proposed Mobile robot control in vicinity of sliding which is an Application to agrarian vehicle way tracking.
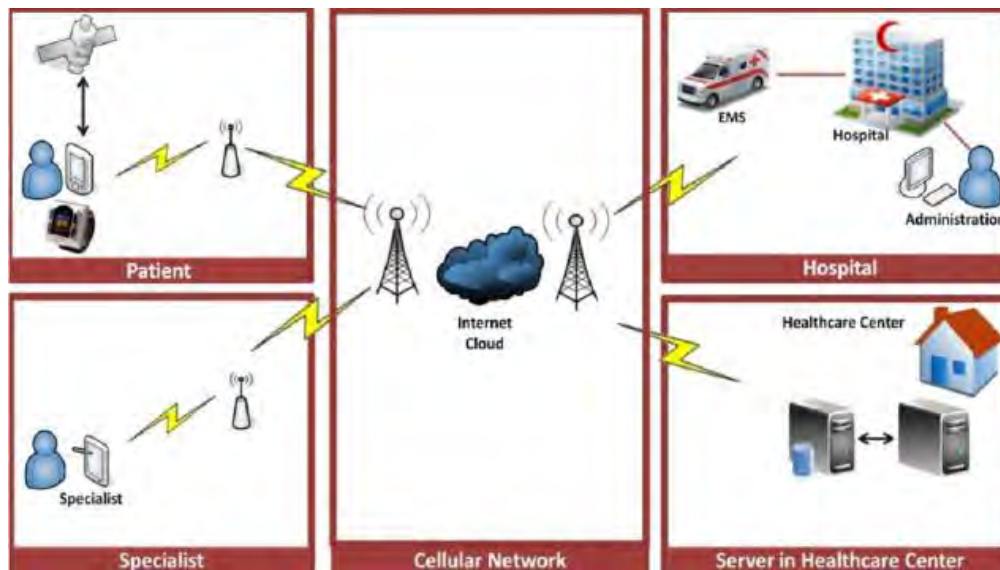

Figure 2.6: A Hybrid Mobile-Based Patient Location Tracking System (Chew, 2006).

Varandas et al., in 2010 proposed an mtracker which is a Mobile Tracking Application for Pervasive Environment created for cellular telephones. Through the known geographic position, this requisition empowers the client to track a cell phone and send cautions on the off chance that it is out of the span around an investment point, long ago characterized by the provision chairman. Donko et al., in 2012 proposed Implementation of tracking mobile application and analysis of spatial data. This model presents utilization of existing aspects of global navigation and global position system (GPS), and visualization of Earth using satellite images, in order to gather and store particular data.

Figure 2.7: Mobile Tracking Application for Pervasive Environment (Varandas, 2010).

2.4 Wi-Fi Network

WI-FI accuracy is about up to 5 m. The advantage of this system is the use of existing IEEE 802.11 infrastructure that results in a reduced cost of use. However, in multi-story floor and compact indoor environments makes the performance of the system decreased because the signal reflections and dynamic network conditions may affect the signal readings. If the technique used Finger Print, analysis and calibration of the site is required. However, minor changes may require recalibration of the whole location system.