

ANDROID – A CLOUD COMPUTING FOR VEHICLE TRACKING SYSTEM USING GPS

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Abstract

Tracking systems were first developed for the shipping industry because they wanted to determine where each vehicle was at any given time. Passive systems were developed in the beginning to fulfill these requirements. For the applications which require real time location information of the vehicle, these systems can't be employed because they save the location information in the internal storage and location information can only be accessed when vehicle is available. To achieve Automatic Vehicle Location system that can transmit the location information in real time, Active systems are developed. Real time vehicle tracking system incorporates a hardware device installed in the vehicle (In-Vehicle Unit) and a remote Tracking server. The information is transmitted to Tracking server using GSM/GPRS modem on GSM network by using SMS or using direct TCP/IP connection with Tracking server through GPRS. Tracking server also has GSM/GPRS modem that receives vehicle location information via GSM network and stores this information in database. This information is available to android users over the internet

Keywords—GSM, GPS, GPRS, ANDROID

I. INTRODUCTION

The roots of Vehicle Tracking Systems lie in shipping industry. When large fleet of vehicles were spread out over the vast expanses of ocean, the owner corporations often found it difficult to keep track of what was happening. They required some sort of system to determine where each vehicle was at any given time and for how long it travelled. The need of vehicle tracking in consumer's vehicle rose to prevent any kind of theft because Police can use tracking reports to locate stolen vehicle. [2] Initially vehicle tracking systems developed for fleet management were passive tracking system. In passive tracking system a hardware device installed in the vehicle store GPS location, Passive systems also included auto download type that transfer data via wireless download but the system was not real time. Real time tracking system was required that can transmit the collected information about the vehicle after regular intervals or at least could transmit the information when required by monitoring station. Passive systems were developed that transmit vehicle's data in real time via cellular or satellite networks to a remote computer or data centre. [1,2]

In active system the user can get the real time vehicle location using the GUI based ANDROID APPLICATION with the help of stored information in the database.

II. OBJECTIVE

- Exploring GPS based tracking systems
- Developing Automatic Vehicle Location system using GPS for positioning information and GSM/GPRS for information transmission with following features: Acquisition of vehicle's location information (latitude, longitude) after specified time interval.
- Transmission of vehicle's location to the cloud database server after specified interval of time.
- Developing a GUI based ANDROID APPLICATION to display the requested information to end user along with displaying location of vehicle.

III. BACKGROUND

A. Study of GPS

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth, where there is an unobstructed line of sight to four or more GPS satellites. It is maintained by the United States government and is freely accessible by anyone with a GPS receiver. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include

- the time the message was transmitted
- precise orbital information
- the general system health and rough orbits of all GPS satellites

The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite. These distances along with the satellites' locations are used with the possible aid of trilateration, depending on which algorithm is used, to compute the position of the receiver. This position is then displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included. Many GPS units show derived information such as direction and speed, calculated from position changes.

Three satellites might seem enough to solve for position since space has three dimensions and a position near the Earth's surface can be assumed. However, even a very small clock error multiplied by the very large speed of light the speed at which satellite signals propagate results in a large positional error. Therefore receivers use four or more satellites to solve for both the receiver's location and time. The very accurately computed time is effectively hidden by most GPS applications, which use only the location. A few specialized GPS applications do however use the time; these include time transfer, traffic signal timing, and synchronization of cell phone base stations.

Although four satellites are required for normal operation, fewer apply in special cases. If one variable is already known, a receiver can determine its position using only three satellites. For example, a ship or aircraft may have known elevation. Some GPS receivers may use additional clues or assumptions (such as reusing the last known altitude, dead reckoning, inertial navigation, or including information from the vehicle computer) to give a less accurate (degraded) position when fewer than four satellites are visible.

B. Android

Android is a Linux-based operating system for mobile devices such as smartphones and tablet computers. It is developed by the Open Handset Alliance led by Google.[3][4] Google releases the Android code as open source, under the Apache License.[5] The Android Open Source Project (AOSP)

is tasked with the maintenance and further development of Android.[6]

Android has a large community of developers writing applications ("apps") that extend the functionality of the devices. Developers write primarily in a customized version of Java. Apps can be downloaded from third-party sites or through online stores such as Android Market, the app store run by Google. As of October 2011 there were more than 400,000 apps available for Android, and the estimated number of applications downloaded from the Android Market as of December 2011 exceeded 10 billion.

Android was listed as the best-selling smartphone platform worldwide in Q4 2010 by Canalsys with over 200 million Android devices in use by November 2011.[23] According to Google's Andy Rubin, as of December 2011 there are over 700,000 Android devices activated every day.

The Android Open Source Project (AOSP) is led by Google, and is tasked with the maintenance and development of Android. According to the project "The goal of the Android Open Source Project is to create a successful real-world product that improves the mobile experience for end users." AOSP also maintains the Android Compatibility Program, defining an "Android compatible" device "as one that can run any application written by third-party developers using the Android SDK and NDK", to prevent incompatible Android implementations.[The compatibility program is also optional and free of charge, with the Compatibility Test Suite also free and open-source.

C. Cloud Computing

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a metered service over a network (typically the Internet).[1]

The following image shows the sample cloud hosting server in which we use as a server:

Cloud computing provides computation, software, data access, and storage resources without requiring cloud users to know the location and other details of the computing infrastructure. At the foundation of cloud computing is the broader concept of infrastructure convergence (or Converged Infrastructure) and shared services.[2] This type of data centre environment allows

The screenshot shows the Google APIs Console interface. The browser address bar displays the URL: <https://code.google.com/apis/console/b/0/?pli=1#project:63836511324>. The user is logged in as jaikumar.axn@gmail.com. The dashboard is titled 'API Project' and includes a sidebar with navigation options: Overview, Services, Team, API Access, Billing, Reports, Quotas, Google Cloud SQL, and Google Cloud Storage. The main content area is divided into two sections: 'Project Summary' and 'Service'.

Project Summary		Service	Status
Name	API Project	AdSense Management API	No known issues
Project ID	jaikumaraxn	Audit API	No known issues
Owners	jaikumar.axn@gmail.com - you	Google Cloud SQL	No known issues
Current charges	Click here to administer your billing settings...	Google Cloud Storage	No known issues
		Google Maps API v2	No known issues
		Google Maps API v3	No known issues
		Latitude API	No known issues

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enterprises to get their applications up and running faster, with easier manageability and less maintenance, and enables IT to more rapidly adjust IT resources (such as servers, storage, and networking) to meet fluctuating and unpredictable business demand.

IV. EXISTING SYSTEM

All the vehicle equipped with only GPS antenna which is used to transfer the locations signal to GPS satellite. The GPS satellite receives the signal and transmitting to corresponding access point and server. The access points are connected with GSM modem which is used to interface desktop to GPS data. These data's then stored in a personalized web server.

The disadvantages of using personalized web server is as follows:

- The storage capacity is limited
- Maintaining is too tough
- Backing up data or transferring to another new server is difficult
- A human interface is needed every time
- Installing a new server and maintaining costs high

The tracking of vehicle in existing system is normally an windows based application or web based

which does not support much mobility and very tough to get the location of vehicle when the user is in roaming.



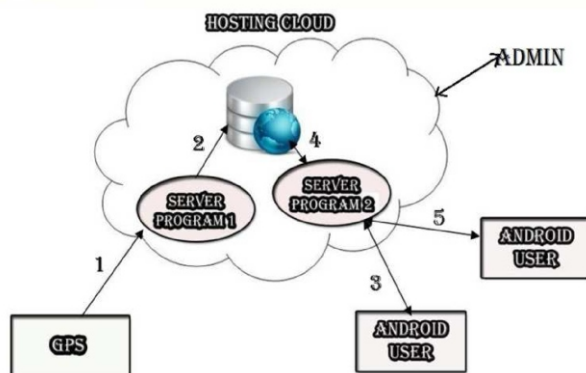
V. PROPOSED SYSTEM

The development of android is much rapid, the scope of android users increasing day by day, 7 lakh android mobiles are getting activated daily. For a technology with this much scope, it will be a much needed trend to incorporate a racking system for the android users.

The proposed system automatically gathered information using sensors and transmitting through GSM enabled device and GPS used to locate the

current location of the vehicle. The transmitting data are stored in server which is maintained in cloud infrastructure. The client ANDROID application is used to access the server data. The data are stored according to the vehicle identification number. Initially the vehicle registration is carried out. The administrator maintained the key list of the vehicle owner information and total number of vehicle. The administrator only can add and delete the vehicle identification number from server. All the vehicles are equipped with GPS antenna and GSM enabled device. The GSM enabled device connected with sensors for monitoring vital parameters. The GPS antenna communicates with GPS satellite for transferring the location details. The GPS satellite transmits the signal to specific access point. The base stations servers are maintained in cloud infrastructures. The server is maintained in Cloud infrastructure.

Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand. Centralized server is responsible for collecting all the data from devices.



For an application to show the vehicle location in a pleasant and easily recognizing manner we display it in a map. We signed in with Google and got their API for our project. This Google Maps API will be used to show the vehicles exact location.

VI. FUTURE ENHANCEMENT

- Our project is developed only for Android OS users
- Our project can be further enhanced by developing it for other operating systems like iPhone, Symbian, Java etc
- Since today most of the buses use electronic ticket vending machines with this sort of information we can even say the number of passengers inside the buses.

VII. CONCLUSION

In this paper, we propose a new tracking information system using both GSM and GPS. This has been discussed. The proposed tracking system based on cloud computing infrastructure. All the data transferred to the cloud server using a GSM-enabled device. All the vehicles are equipped with a GPS antenna to locate the place. Since this system is implemented in Android, this gives much more mobility and is user-friendly.

VII. REFERENCE

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