Implementing a Simple and Centrally Child Monitoring and Tracking System using Software as a Service(Saas) Cloud

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Abstract— The Child Monitoring System uses a simple tracking technique which is used to keep track of kids by their parents for safety purposes. Modern tracking systems are often costly needs extra hardware and sometimes manpower. The Child monitoring system uses a simple interface through which any parent can keep track of their kids without requiring to have any extra knowledge about tracking or any other devices. It only requires an active internet connection. It uses the cloud storage to transfer the location of kids to the parents. It uses a simple tracking technique which requires a small amount of memory. The Software as a service (SaaS) cloud architecture is used to deploy the system. An android Software application is used to track and monitor via the mobile and a centralized control authority or an organization for children can use this to monitor the movement's kids in real world.

Keywords—Software as Service(Saas),Child monitoring System, Android application

I. INTRODUCTION

The Child monitoring system is a dedicated a software that is used to keep track and monitor of kids by their parents and other surveillance organizations for security purposes. Cloud Computing has made it possible to create an application that combines with simple backend software and an front end application that can easily store location details and transport them easily. Other essential features of cloud computing that make the project feasible are:-

1. Massive Scale
2. Geographic Distribution
3. Virtualization

4. Rapid elasticity
5. Service orientation
6. Broad network access

Using a backend software mass surveillance of movement of kids across an area can be done. Using another application a simple User Interface can be made so that the parents are able to keep track side by side. The Software as a Service (SaaS) architecture cloud helps to combine the parent held user interface to the cloud. The backend software helps in keeping a centralized monitoring system which any organization can use to keep track the kids. Schools can keep track of children who are having issues and are skipping school. They can notify the location of children to the parents in case of truancy.

II. THE SYSTEM COMPONENTS

A. Highly augumented android process

To track a single target using the mobile, we just introduce a process in the android which has 3 main things. They are ID, latitude and longitude. These will be sent continuously for every 2 seconds. The memory of data sent is less and can reduce the tracking cost. The accuracy of a location of target is upto 95%. Alternatively to calculate the geo location we can just augment the Google location service available on the android. The ID is something that is used to identify the target. It is a 13-digit binary coded ID that is securely used by the target parents and the central monitoring team to monitor the movements of children.
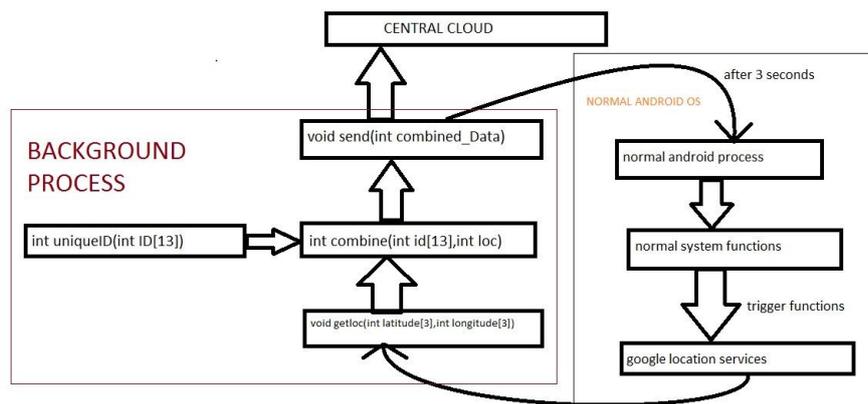
B. Back end support and parent UI

Simple software can be used to get the coordinates from the cloud. As the cloud sends the specific ID and the coordinates, they can be loaded in GPS or maps such as Google maps. Since the target's location generates a new data for every 2 seconds, the system needs to update data from cloud for every 2 seconds. A centralized monitoring system can track multiple targets at a given time. Mass surveillance on the movements of the kids can be done very easily by installing a huge computer and a screen and then connecting it to a wide area network. Apart from centralized monitoring, the parent is offered a user interface which is easy to understand. It works the same way as mentioned in centralized monitoring. It shows a map and pointer showing where their kids are located. The user interface is simple application that can be installed in any tablet, pc or a mobile. All it requires is an active internet connection.

C. Cloud maintenance and configuration

The cloud stores all the necessary data and information of the targets. It provides the data for the parent user interface as per the request. Since it uses the SaaS type of cloud, any software can easily be deployed and combined with the cloud. The cloud maintenance doesn't require much maintenance. Using the three cloud tools such as the "Cloudhub" , the "chef", and "Mule ESB" the cloud can be maintained and integration can be done. "CloudHub" and "Mule ESB" are built on open source technology to provide quick, reliable application integration without vendor lock-in. The tools offers CloudHub, a cloud-based integration platform as a service (iPaaS) for connecting SaaS, cloud and on-premise applications and APIs; and, Mule ESB, an open source enterprise service bus for connecting enterprise applications on-premise and to the cloud.
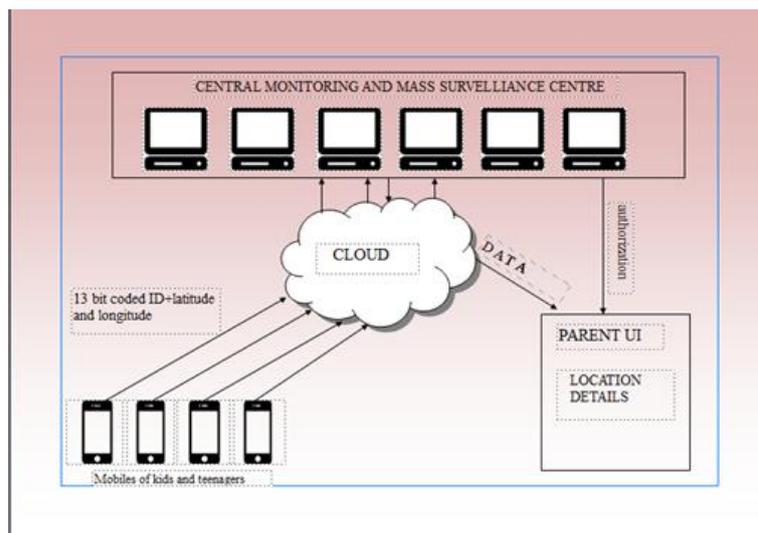
III. ADVANTAGES OF CHILD MONTORING SYSTEM OVER CONVENTIONAL TRACKING SYSTEM

Here we will compare the techniques of conventional tracking system over the child monitoring system. Some of the advantages have made the project low cost and easy to understand, so that any parent or an organization can easily buy and use the system. Let us see aspects of child monitoring system:

A. Equipment

Conventional tracking system requires a small device to be carried all the time by the target. Sometimes satellites are deployed and transmitting data from there to other places are often too costly. The child monitoring system just uses a simple android application or an android process that runs on the mobile. We use the mobile to determine the location. The children of the forthcoming generation will be using mobile wherever they go.

B. Data

The data used by the Child monitoring system is very less. Only latitude, longitude and ID are used for tracking. The conventional tracking system has many other parameters to calculate location. For example: let us consider tracking via mobile towers, the data required would be cell area, last tower location and then latitude and longitude is calculated. Since it doesn't employ cloud technique of sharing data, it has to be sent over long distances which decrease transmitting speed.

C. Overhead charge

The overhead charge for the child monitoring system is low as transmitting data using cloud is used. The information only travels two points i.e. one to the centralized monitoring system and other to the parent. So basically, overhead charge is very less.

D. Accuracy

Using the highly augmented android process the location of the target is continuously calculated for every 2 seconds, so even if the target is moving in a car, the pinpoint location will be accurate to about 95%.

E. Security
Since we are using a 13-digit binary coded ID for tracking kids, the network is highly secure. Only the central monitoring team and the parent only know the location of the kid. Each of kid (target) has unique 13-digit binary code which are encoded. So it's nearly impossible for illegal tracking agents to get info about targets.

IV. COMPARISON OF GOOGLE LOCATION SERVICES AND CHILD MONITORING SYSTMEM
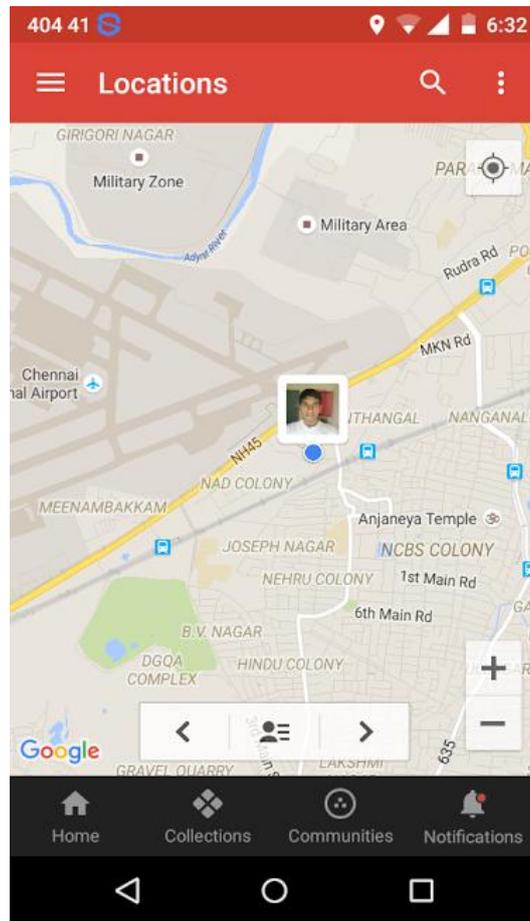Google+ and google location services offfer the same service to users,however there a lot diffrences between them.

TABLE I. COMPARISON

S.No.	Tracking and quality comparison		
	features	*Google+ and Google location services*	*Child monitoring system*
1.	Pinpoint Accuracy and static targets	Accuracy is not as perfect as child monitoring system as the location is calculated with erratically and pinpointing is difficult.	The child monitoring system uses a highly augmented android process that calculates pinpoint location for every 2 seconds. Hence its accuracy is 95%
2.	Tracking moving targets	Though, moving targets maybe tracked using location sharing in Google+, it is difficult to get a smooth moving target picture as accuracy is not perfect.	Combined with augmented android process and the cloud services, tracking moving targets is very easy and we would get a clear and a smooth picture of moving target.
3.	security	In Google+ all the user has to do is just share location with a person present in any circles. Security is not bad; however some can hack and steal the history Google location which would pose a very big threat to the target (kid).	In child monitoring system a unique 13-digit ID is assigned to each kid (target). The codes are coded. So even if the cloud is attacked and data is stolen it is very difficult to get information as each of these are locked under ID.
4.	Central support	There is no central support except contacting the Google support	The child monitoring system offers centralized tracking team that gives 24*7 support. Any problem can be easily addressed

S.No.	Tracking and quality comparison		
	features	*Google+ and Google location services*	*Child monitoring system*
5.	User interface	The interface in Google+ is quite same as the one in child monitoring systems.	The interface is very similar to Google+ location sharing system ,however it is designed for parents to easily understand the mechanics without having to require extra knowledge
6.	Mass survelliance and masking the tracking ability	Mass surveillance is possible however masking the tracking process is not possible as one has enable location in phone to send location co-ordinates.	Mass surveillance is very much possible. The android process can be masked in a way that the target has no idea that geo locations are calculated and sent over a period of time.

V. CONCLUSION

In this paper we have discussed the structure and working of the project child monitoring system. We provide a simple and commercially cheap solution for tracking and mass movement surveillance. We have seen the tracking comparison between Google location services and the child monitoring system. The project is primarily aimed for the parents and the government based child monitoring agencies.

ACKNOWLEDGMENT

REFERENCES

[1]   Pankaj Aroroa, Rubal Chowdhary,Er. Satinder Pal Ajuah,"Cloud computing security issues in Infrastructures as Structutres" ,ISJARCE research paper,,ISSN:1277 128X,volume 2 Issue 1, January 2012.
[2]   Greg Boss, Padma Malladi, Denis Quan, Linda Legregni, Harold Hall, "CloudComputing",http://www.ibm.com/developerswork/websphere/zones/hip ods/library.html, October 2007, pp. 4-4.
[3]   "http://www.networkworld.com/article/2164791/cloud-computing/top-10-cloud-tools.html" , Top 10 cloud tools.
[4]   "https://www.mulesoft.com/" , CloudHub open source Tool.
[5]   Steve liles, "Asynchronous Android".
[6]   Anders Groanson, "Efficient android threading".