

Location Based Services for Enterprise / Consumer

Introduction

Location Based Services (LBS) have been making foray into enterprise applications, thanks to the rise in smartphone ownership and the phenomenal ascent of social media sites such as Facebook, Foursquare and Google+. Notable growth in the number of social media users who include location in their posts has made technology companies scrambling to provide more mobile applications that tell people who and what is near them. Yet even as most smartphone owners use their phones' abilities to get location-specific information, data from surveys also shows that mobile users of all ages say they have turned off location-tracking features, such as GPS, WiFi & Bluetooth, due to battery drain and privacy concerns.

On the enterprise end, device location is becoming a greater part of its CRM. While consumer-based mobile apps allow users to broadcast their location to private social networks and communities, enterprise application developers are typically attempting to locate a device or use device location as a productivity tool such as mobile workforce management, BYOD strategies, and authentication against fraud.

For LBS to be really usable by enterprise, irrespective of the positioning technology, it has to be a seamless and transparent process and made available under most environments and to within acceptable accuracy and delivering highly relevant features and consumer-oriented content based on where they are.

Until recently, mobile apps running on smartphones utilising location tracking features were the only solution for location application developers. Now there is the option of native location tracking feature in the form of a residential applet in the SIM card, we call it XimLoc. Moreover, it is a network based location technology where location fixes is conducted using the MNO's network information. APIs are available for developers to easily locate any device on any mobile network operators (MNO). Locating a device with network location has minimal to no effect on a device's battery life and works without a data connection (via SMS) or app download. Because the device's location coordinates originate from the carrier's network infrastructure, location fixes cannot be spoofed or modified by the end user, providing critical authentication in financial services and mobile gaming use cases. Even devices without GPS can be located making network location services a much more universal location detection technology. XimLoc has extended LBS to featured phones and M2M devices.

This paper addresses the quality and factors in choosing XimLoc for enterprise/consumer level location based services.

Review of Current Location Technologies

Global Navigation Satellite Systems (GNSS)

Global Navigation Satellite System (GNSS) receivers, using the GPS, GLONASS, Galileo or Beidou system, are used in many applications to obtain location information. Such a receiver determines its geographic location from signals it receives from several satellites in earth orbit. GNSS receiver requires clear sky view to obtain a device location making it effective for navigation but limited in its accuracy for urban areas and indoors. GNSS is a form of terminal-based location technology as location computation is carried out using the processor or co-processor on the handset via a device application, so a user is required to download an app and keep the receiver active in order to get a location fix. GPS can get a location fix quickly in hot start mode once it gets the satellite signals, while the initial fix from cold start can take 1-2 minutes.

In order to improve the startup time or time-to-first-fix (TTFF) performance of GNSS receiver, an assistive technique frequently known as A-GPS is adopted. Essentially such as assistive form of technology utilises the MNO resources to “jump start” the location engine within the receiver. The network operator deploys an A-GPS server to supply the orbital information (or almanac) for the satellites. The MNO can provide precise timing information to speed up the acquisition of satellites. The benefit of A-GPS will be more significant in urban areas where the satellite signals may bounce off buildings, be weakened by atmospheric conditions and suffer from multipath propagation. Availability of such assisted technology varies by carrier and the device must be capable of supporting A-GPS functionality.

Cell ID

Cell ID locates a mobile device by identifying the serving base transceiver station (BTS) to which the device is connected. The mobile network operator (MNO) can then return the position or sector of the device using the known physical locations of these cell/sector combination. Timing advance (TA) information, which essential is the round trip delay of GSM/UMTS networks, is made available in the Network Measurement Information. This will further improved the accuracy of a Cell /Sector location. MNOs can report the Cell ID based location of any device connected to its network with no dependency on the device capabilities. Cell ID can locate devices inside buildings and urban canyons where even A-GPS struggles, and a Cell ID location fix takes only a few seconds. Cell ID does NOT require mobile data access. The MNO holds the key to successful Cell ID –based location technology as it has total ownership and knowledge on the BTS location and the sector information.

Proximity Positioning System

Proximity positioning systems work by utilizing the Wi-Fi Access Points broadcast (BSS ID) information, and it takes advantage of the rapid growth of wireless access points. The location technique used for positioning with Wi-Fi access points measures the received signal strength and trilaterates the position utilizing the multiplicity of seen BSS ID's. Accuracy depends on the number of positions that have been received, but it usually provides location as accurate as 10 -20 meters. WiFi Access Point location is growing and changing quickly, so having access to a source that is up to date is important. By utilizing

trilateration of multiplicity of BSS ID's, the integrity and validation of the returned location is maintained.

Besides Wi-Fi, Bluetooth and RFID are new evolving candidates that hold great promise in LBS offerings. Example of these technology are BLE and NFC, with BLE being the low power version of Bluetooth while NFC is a form of RFID that holds great promise for mobile payments. Both technologies are progressive made available in mobile phone.

Access Types: Terminal-Based Vs Network-Based Location

All of the above discussed location methods can be categorised into 2 types namely terminal-based and network-based.

Terminal Based Location

Many smartphones have a GPS receiver to help them determine their location. Using the GPS receiver constitutes a form of terminal based location. It has the advantage of being easy to deploy for applications resident on the handset, enabling users to broadcast their location. For end users, it has the distinct disadvantage of increased processing time and more battery power drain. For brands and enterprises trying to reach broad audiences, device derived location is limited to smart phones (app capable) with onboard location capabilities. This means that handset based location is only available for smartphone or higher end feature phones. Secondly, to access handset-based location, the end user must download an app or access a preloaded application that can obtain a GPS fix using the device's on-board capabilities. This limits the reach of applications using this location method.

Because app based location relies on the phone and its location settings for GPS, it requires a reasonably unobstructed view of the sky to work. Even in ideal conditions, hand-set based GPS location can take several minutes to achieve a location fix.

Network Based Location

Network based location has access to the broadest forms of location and the broadest types of devices. Network location can find smart phones, feature phones, tablets, and M2M devices without draining the battery. The network location method works with or without cellular data connectivity, without any app download requirement or dependency on on-board GPS. Finally, to save battery power network location can be initiated by a web service and enterprise workforce management application without the handset location services enabled. It is possible to establish the phone's location, even if the local WiFi or GPS settings are disabled.

Introducing XimLoc - a Hybrid Location Based System

XimLoc is a locating technology that uses a residential applet in the SIM card to gather Network Measurement Information from the serving cellular network (2G/3G/4G). The information is sent to the XimLoc's cloud platform via SMS (with USSD option) where the location engine estimates the most probable location of the device using proprietary algorithm. It doesn't require any additional hardware to be installed in base stations and the end users also do not need to install mobile application on their devices. Moreover, its build-in geofencing and stealth capability enhances user security and convenience.

XimLoc is device, OS & network agnostic, as its SIM-based technology is compliant with GSM/3GPP standards. Morpho has played a pivotal role in developing the Java Platform Applet for W-Locate. With its expertise in the Smartcards arena, both W-Locate and Morpho leveraged on each other's experience to make it work on both smart and feature phones, therefore reaches out to the entire spectrum of cellular users. XimLoc works indoor and outdoor, it provides the best of both worlds in the current LBS offerings – a hybrid LBS system that will enhance productivity, efficiency and security.

As a network-based solution, XimLoc is not power hungry, like GPS, as the locating algorithm is done at the backend cloud platform. Hence the device will not have noticeable battery drain.

XimLoc cloud platform provides a intuitive dashboard with functionalities suited for various market verticals such as Workforce Management, LBS, Security, etc. It's OneAPI-compliant APIs benefit both the telcos and third party developers to propagate the location-based ecosystem.

Which LBS Technology Suites You?

When designing LBS for enterprise/consumer applications, there are some factors to consider (note that the device refers to mobile phone, tablet or M2M device) :

Accessibility

- Do you have access and control to the location sources on the device such as build-in GPS and WiFi receivers?
- Do you need to access the device's location at any time regardless of data connectivity or location settings on the device?
- Do you need your customers' acknowledgement to permit location use at every instance?

Geography

- Do you need to be able to track location ubiquitously, both indoor and outdoor environment?

Device Types

- Do you need to track all device types, including mobile phones, tablets and M2M devices running on various Operating Systems?

Location-based Authentication

- Do you need enhance security measure that is unspoofable by the end user?

XimLoc, Locate Smarter!

W-Locate supplies location platforms and solutions for enterprise. Contact us @ Mobile World Congress 2015 - Morpho Booth, to schedule a consultation to map out a location strategy that will move your LBS to the next level.

About W-Locate

W-Locate is the innovator behind the well-acclaimed products, FIND and XimLoc. FIND combines tracking technologies and tracking analytics to empower fleet and assets owners to remotely track, manage and protect its fleet and valuable assets. Most importantly with the analytics of FIND, fleet owners can leverage on FIND to increase the productivity of its fleet. FIND is remote vehicle diagnostics, incident detections systems, and fleet operation management all rolled into one. FIND is currently adopted by diverse fleet owners (more than 4000 veh), some of which are MNCs and public listed enterprises in Singapore and Malaysia.

First in the world, XimLoc delivers a SIM-Based tracking system that can accurately track any mobile handset in both indoor and outdoor locations. XimLoc is a proprietary technology, which uses information and signals that are available from the GSM (2G/3G) network to compute positions. XimLoc uses an applet (that resides in a SIM card) to send back to a backend XimLoc server, which will calculate the most probable location based on WLC's Patent-Pending algorithm. XimLoc has been vigorously tested and has been proven to be as accurate as GPS while addressing the limitations of GPS, i.e. inability to track indoor and heavy power consumption. W-Locate expect XimLoc to be deployed heavily for workforce tracking in Asia. XimLoc has already secured 2 major telecommunications companies to launch its services in South East Asia. Another 3 MNO had passed their UAT & in commercial negotiation. XimLoc is also currently conducting pilot with 5 more Mobile Network Operators in other parts of Asia.

About Morpho

Morpho, a high-technology company in the Safran group, is a market leader in security solutions. As a pioneer in identification and detection systems, and a major player in e-documents, Morpho is recognized for its excellence in key technologies, advanced skills and benchmark expertise. With integrated systems already deployed in over 100 countries, Morpho seeks to create a climate of confidence by contributing to the safety and security of individuals, businesses and countries around the world.

The security business is playing a major role in Safran's future development.

- €1.5 billion revenues
- 8,100+ employees in over 40 countries worldwide
- 85 subsidiaries and branches across 5 continents
- 10% annual turnover dedicated to R&D

The only company mastering each technology in the security chain

- No 1 worldwide in ID Documents integrating biometrics
- No 1 in the world for ABIS (Automated Biometrics Identification System) in fingerprints, iris and face recognition solutions
- No 1 in the world for Explosive Detection Systems (EDS) for hold baggage
- No 2 in the world for gaming and betting terminals
- No 3 in the world for smart cards
- World leader for Trace Detection Equipment