



Alcatel-Lucent OmniAccess Stellar Location-based Services

An overview of Alcatel-Lucent Enterprise's location-based services network solution and components



Brochure

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May 2018

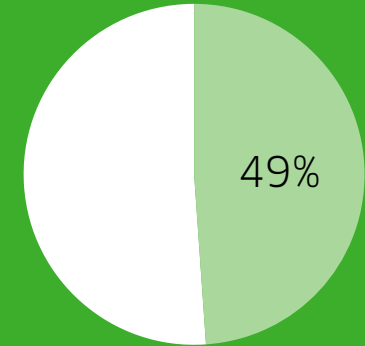
Growing customer mobile engagement

People around the world are using their mobile phones everywhere for everything, including in the venues they visit. The number of people using a mobile phone is also forecasted to surpass five billion by 2019 (2018 Statista Mobile phone users worldwide 2013-2019 report.) Businesses are taking advantage of these trends by looking for additional ways to engage with their customers as well as enhancing their customers' user experience.

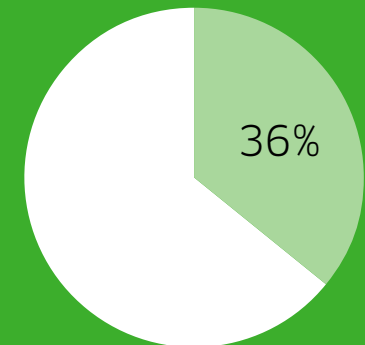
Location-based services (LBS) allows businesses to offer users unique new services such as easy-to-use facility navigation in an office building or hospital or even across a university campus. This makes visitors comfortable when walking into an unfamiliar environment.

Another business option is for target marketing in a non-traditional way. Instead of sending special offers by email or text message, targeted messages can be sent to consumers approaching an area near a business of interest. Research has shown that customers are more likely to buy when messages are tailored for them and the environment they are in. These services and targeted offers improve engagement with everyone who enters the premises or campus, whether they are students, patients, visitors, or even travelers in an airport.

An additional benefit of providing location-based services is information generated on behavior and usage patterns. That data is analyzed to show businesses their customers' behaviors such that they can then optimize the offers and services they provide. The result is an increase in revenues, a reduction in costs, or both.



49% of consumers disregard a brand if it bombards them with ads or is irrelevant



36% are more likely to buy from a brand that sends them tailored messages

- Digital Connections, March 2016



Addressing business challenges with LBS

Businesses face financial, operational and security challenges every day. For example, in:

- Healthcare: 40% of patients and visitors depend on hospital staff for wayfinding assistance
- Transportation: 50% of airport revenue comes from parking and retail
- Hospitality: More than 50% of hotels want to improve digital customer engagement and loyalty
- Education: All institutions, from K-12 to higher learning, want to provide a safe campus for students
- Government: Requires real-time event awareness and response coordination for office staff

These challenges can be addressed by LBS from different perspectives including:

1. User experience
2. Optimizing operations/reducing expenses
3. Increasing sales revenues
4. Mobilizing/locating staff

User experience

Businesses are looking at different ways to better engage with customers to develop more loyalty, a better brand image and expand their customer base. One way to achieve this goal is to provide customers with an experience that is relevant to their needs. Using LBS, a business can provide information about new products, special offers or discounts. An enhanced experience also includes walking into an unfamiliar environment where you can feel comfortable navigating, such as through a shopping mall, a hotel, an airport, a hospital, or a university campus being guided with an up to the moment location map.

Optimizing operations and reducing expenses

In many cases, the value of LBS to a business is learning the behavior and patterns of their customers. You want to know how many visits people make or spend in certain areas - such as:

- Retail outlets in an airport
- How many visitors/guests in a hotel lounge
- Average duration of students in a lecture hall
- Patient wait times at a hospital

Knowing this information helps optimize the offers and services that an organization can deliver. By understanding customer/patient/student/public behavior, an organization can further optimize their operations by streamlining workflows, and in turn can reduce expenses - a goal for every enterprise.

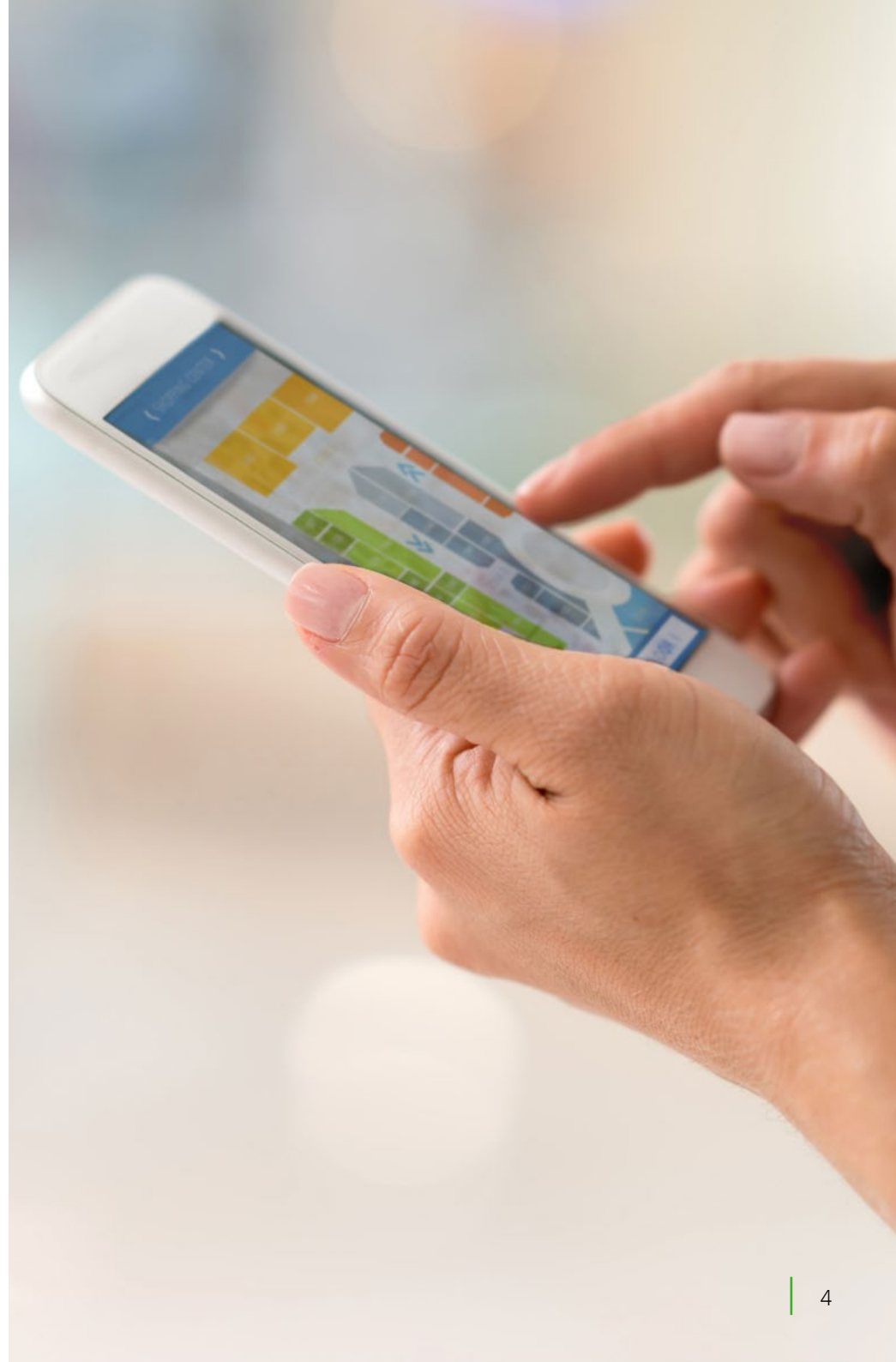
Now that we have a better understanding of some of the challenges associated with businesses and how LBS can help, we'll take a more detailed look at the various services provided by Alcatel-Lucent Enterprise (ALE) LBS.

Increasing sales revenue

The goal of every business is to offer products and services that customers want in a manner that allows a business to thrive and be profitable. The more relevant the user experience is for customers, the greater the likelihood that customers will return and talk about their positive experiences to others, which will drive sales growth as the customer base becomes more loyal (returning customers) and expands (new customers).

Mobilizing and locating staff

There are situations where you'll want to know where specific staff members or security are located to mobilize them if necessary. For example, a hotel might need to locate the closest maintenance staff to a hotel room which has a plumbing issue, or finding a specific doctor in a hospital during an emergency, or quickly mobilizing security in an airport due to an unattended piece of luggage. There are a variety of reasons why knowing where your staff are located within a building is important, it could even be for a lifesaving situation.



Alcatel-Lucent OmniAccess Stellar LBS

[Alcatel-Lucent Enterprise Location-Based Services](#) (LBS) enable businesses to better engage with customers, improve customer loyalty, optimize business processes and refine services which ultimately can boost revenues and reduce operating costs.

Alcatel-Lucent OmniAccess® Stellar LBS provides more than navigation inside airports, hospitals, hotels, and university campuses. It is the foundation for offering multiple innovative services such as:

- Proximity marketing for restaurant and retail promotions
- Automated information messages and emergency notifications
- Smart parking
- Location sharing
- Points of interest with turn-by-turn directions
- Staff mobilization and coordination

These services are obtained by leveraging geolocation, wayfinding and geofencing. Additionally, OmniAccess Stellar LBS provides insightful analytics that help you make better business decisions.

Indoor positioning (Geolocation)



Indoor positioning is a key feature that provides an “indoor GPS” into your mobile app. It helps you create valuable services in your mobile app such as:

- Way finding
- Turn-by-turn navigation
- Friend finders
- Remember my parking spot
- Share a point of interest, and more

ALE technology has been optimized for a wide range of use cases. It implements a unique hybrid technology - the powerful fusion engine - intelligently combining all sources of data and smart phone embedded sensors:

- Bluetooth
- Wi-Fi
- GPS
- Accelerometer, magnetometer, gyroscope, barometer
- Location map

This technology adapts to multiple types of environments, provides seamless transition from indoor to outdoor location (important for large areas, such as a university campus), and minimizes the use of cell phone batteries.

Geofencing



Geofencing provides the ability to create a virtual boundary around a specific zone or item, such as a retail shop in an airport, the waiting room in a hospital, or the area in front of a painting at a museum.

Geofencing sends an alert to a mobile application based on the user's location. Geofencing alerts can be triggered by different events such as when the user enters, exits or remains in a defined zone. With the OmniAccess Stellar LBS suite, geofencing areas are simply drawn on the map from the Cloud Manager platform then synchronized and executed by the Stellar LBS SDK inside the mobile application.



Some typical examples of geofencing services include:

- Proximity marketing - Push notifications on a mobile phone allow you to engage with visitors easily, without the visitor having to make a special effort. The visitor can simply opt in to benefit from associated coupons, promotions, and download specific offers.
- Delivering content or information - When the user is near a point of interest, the geofencing service makes it possible for an organization to engage with the user (share content and description associated with a product, a site, a work of art) using contextualized, targeted, relevant messages.
- Zone entrance and exit detection - The powerful location engine embedded in the SDK, combined with the placement of a few ALE beacons

in strategic locations, allows very accurate detection of visitor entry and exit from virtual zones. This type of service allows better management of movements and optimized traffic management. When implemented in corporate venues to monitor room occupancy, entrance and exit detection, it can produce high added value.

Analytics



The indoor location data generated by OmniAccess Stellar LBS is an opportunity to gain full control of the business environment. The Cloud Manager platform stores and organizes every data point supporting your organization for accurate analysis and process optimization. ALE's Stellar LBS geolocation and geofencing services give you access to actual visitor and employee location data, empowering you to maximize the information's value.

The location SDK embedded in your mobile application periodically sends data collected to the Cloud Manager platform. The analytics aggregated in this platform provide a variety of metrics (such as number, duration, frequency of visits) to support relevant strategic decisions and optimize your ROI by:

- Enabling you to analyze the behavior of your users - evaluating traffic, monitoring movements, studying flows

- Managing the flows within an enclosed space such as an office or meeting room and its use to optimize and tailor your products and services provided
- Measuring the impact of your mobile marketing campaigns
- Optimizing and adapting your floorplan or space as part of a continuous improvement strategy.

OmniAccess Stellar LBS components

The OmniAccess Stellar LBS solution includes beacons, location SDK, and management tools.

OmniAccess Stellar BLE Beacons

The OmniAccess Stellar LBS solution beacons use BLE technology. Smart phones, that have the OmniAccess Stellar LBS SDK installed, receive static location information from beacons that are nearby.

[OmniAccess Stellar LBS beacons](#) come in three form factors:

- A self-contained, standalone device with a military grade, built-in battery for power
- A USB dongle which can be plugged into any static device, such as a wireless access point, that supports USB power. No communication is needed between the BLE dongle and the device containing the USB port.
- A wireless access point, such as the OmniAccess Stellar AP1230, which contains an integrated BLE beacon.



OmniAccess Stellar LBS Beacon



OmniAccess Stellar LBS Dongle



OmniAccess Stellar AP1230

OmniAccess Stellar LBS SDK

The [OmniAccess Stellar LBS SDK](#) is a software development kit that needs to be integrated with a mobile app, such as a hotel or airport loyalty app. This software, that resides on a smart phone, captures the location signals from the beacons and translates those into real-time location information.

The SDK algorithm leverages technologies that are in the mobile devices themselves, such as Bluetooth and Wi-Fi, and other sensors like the magnetometer for direction (compass), barometer for elevation, accelerometer for speed and motion and GPS from satellites for outdoor locations. The combination of all this information by the SDK algorithm is called fusion technology, which delivers one of the most precise location algorithms in the market.

An important differentiator of Alcatel-Lucent Enterprise LBS is that all of the location calculations are done within the smart phone. The SDK does not need to talk to a server in the cloud to do the location and direction calculations, and then wait for the data to be sent back to the smart phone. All the information is already in the mobile device. By using ALE fusion technology, location information is calculated quickly and precisely.

Additionally, the OmniAccess Stellar LBS SDK gathers analytics information and BLE beacons operational status (battery life). This collected information is periodically communicated to a cloud management application, OmniAccess Stellar LBS Cloud Manager, via Wi-Fi or 3G/4G/LTE.



OmniAccess Stellar Management Tools

Management tools are used to:

- Help with the installation and calibration of the beacons
- Set up geonotifications (notifications based on proximity to a location or zone/geofence)
- Monitor the overall solution
- Collect and display all analytics

There are two tools that help you accomplish these tasks - the [OmniAccess Stellar LBS Installer](#) and the [Cloud Manager](#).

OmniAccess Stellar LBS Installer

This simple smart phone app is an essential tool that helps you:

- Calibrate the indoor location service
- Evaluate location accuracy
- Test geo-notifications
- Indicate beacons locations
- Check a beacon's life status in real time
- (Re)configure beacons



OmniAccess Stellar LBS Cloud Manager

The Cloud Manager is an all-in-one platform that was designed to make the implementation, operations and maintenance of an indoor location service easy. It provides you access to all available resources, whether for one unique venue, a large campus, or a whole smart city with multiple buildings. The OmniAccess Stellar LBS Cloud Manager provides unprecedented scalability and simplicity.

The Cloud Manager enables remote definition and management of indoor location needs with:

- Setup tools - map import, map geo-referencing, generation of positioning database, tech analysis toolbox
- Beacons management - monitor the beacons and their battery life
- Synchronization of positioning databases
- Geo-notifications campaigns: Define geofences (virtual areas) and the expected actions
- Employees tracking: Identify where employees are and their flow (requires the Stellar LBS Tracker app running on employees' smart phones)

- Location analytics: It allows the user to easily visualize flows, visit times, and occupancy rates of defined places and zones, depending on the criteria selected
- Access to all technical documentation



Setup tools:
Do-it-yourself!



Beacons management



Sync of positioning databases



Geonotification campaigns



People & asset tracking



Indoor Location Analytics

Brochure

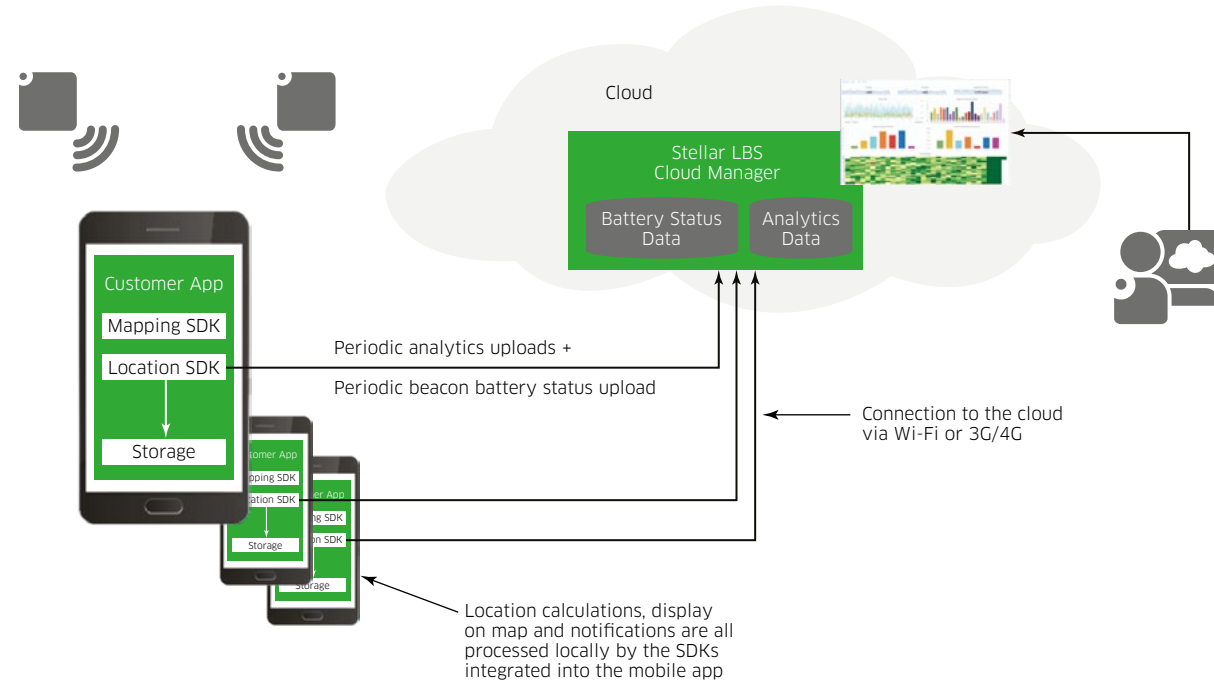
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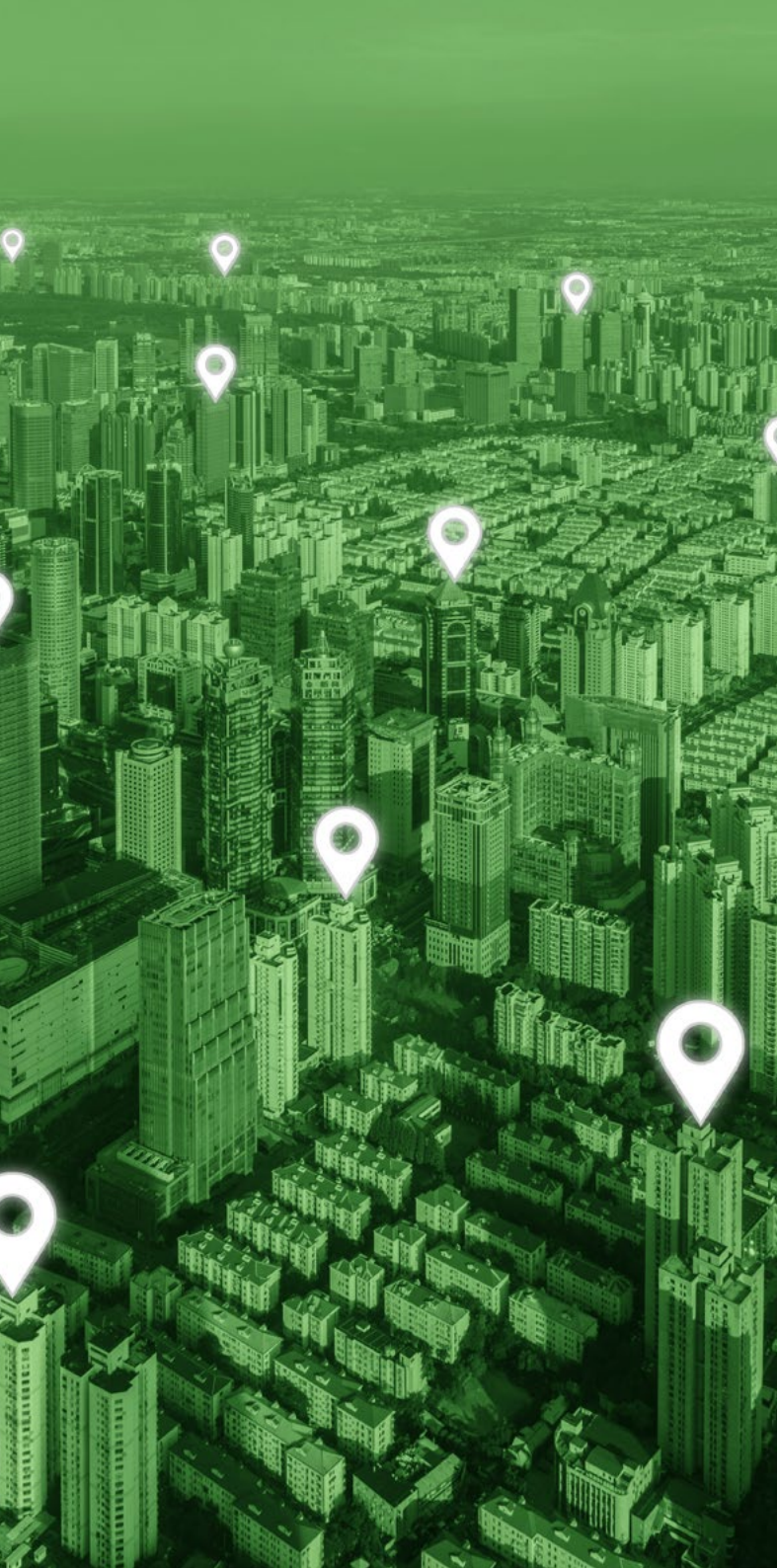
Putting all the pieces together in an LBS solution

For Alcatel-Lucent Enterprise LBS components to work together and deliver indoor LBS services, it is necessary to install and calibrate all the beacons and, most importantly, to integrate the Stellar LBS (location) SDK and a mapping SDK into a customer app, which is used to engage with a customer or end-user.

The location SDK, provided by ALE, uses fusion technology to provide real-time location information. The mapping SDK, generally developed by an ALE ecosystem partner or other third party, provides a vector-based map of the indoor areas (such as floor plans) and outdoor areas (such as parking lots), that are to be covered via LBS and ensures that the location information is accurately identified on a map.

The adjacent diagram provides a simplified view of the interoperability between the smart phone, LBS/mapping/customer apps and the cloud, which make this solution possible.





The customer app (integrated with LBS) running in a user's smartphone keeps receiving information for the BLE beacons in its proximity. Using the fusion algorithm, it calculates the position and displays it on a map. It is important to note that all the information needed to run location-based services is locally available in the smartphone. There is no need to constantly communicate with the cloud. That being said, the LBS solution uses a crowd sourcing technique to periodically send information to the cloud whenever there is Wi-Fi or 3G/4G/LTE connectivity.

For example, the user's mobile device captures geofencing events, within a building, or a zone within a building, and stores the data in the user's mobile device until the data is uploaded periodically to the LBS Cloud Manager. The data can be displayed on a variety of analytics dashboards - overview dashboard, user's dashboard, visits dashboard, and a zones visits dashboard. The upload intervals can be configured and if there is an internet connection service interruption, the device will continue to capture and store the

geofencing events data. Once the internet connection service is up and running again, the device will automatically upload the data to the LBS Cloud Manager to update the analytics. Access to analytic dashboards can be given to any user.

Another important piece of information that is periodically transmitted to the Cloud Manager is the beacon battery status. As smart phones move around a building, they collect information received from the beacons, which includes their battery status. Through a crowdsourcing approach, the LBS system acquires up-to-date status of all beacons in a building and keeps track of which beacons may need service, or a software upgrade, which can be performed through the air using BLE technology.

The combination of having all the information locally available in the smartphone to calculate location and the crowdsourcing technique to collect operational and analytical information in the cloud provides a state-of-the-art solution that is highly scalable, very accurate and extremely simple to operate.

Conclusion

Alcatel-Lucent Enterprise's location-based services helps your business by enhancing your customers' experiences from the warm welcome they receive upon entering your campus or facility, to the guidance they receive from navigating unfamiliar indoor locations, until they leave with a message of gratitude.

The ALE LBS Solution enables you to offer new services such as wayfinding and geonotification. Wayfinding helps a person find their way from where they are to where they want to go in your building. Geonotification, sends an alert to a mobile application that is triggered by a user approaching a zone, such as a waiting room in a hospital or in front of a painting in a museum. That alert could contain marketing offers such as coupons, promotions, or an option to download an application to help promote a business. The helpful information is contextualized, targeted and relevant to the person's activity while their location can be identified to them.

In return, your business gains access to visitor and staff location data that empowers your business to maximize the value of this information. Through comprehensive analytics – which includes behavior analysis, management of flows within a geographic area, measurements of mobile marketing campaigns – you are able to optimize and adapt your environment for maximum results, whether it be to generate more revenues, reduce operational costs or increase customer and visitor satisfaction.

ALE's LBS improves the services you can offer and everyone's experience who enters your facilities, whether they are staff, students, patients, travelers, hotel guests or even government personnel. Contact a local Alcatel-Lucent Enterprise representative today for more information or for an LBS demo.

Additional information

[ALE LBS Portfolio](#)

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We are ALE. We make everything connect
by delivering technology that works, for
you. With our global reach, and local focus,
we deliver networking and communications.
On Premises. Hybrid. Cloud.

ALE | **Where
Everything
Connects**