
# Building a Foundation for Location Detection & Management

digby®

The advent of mobile profoundly changed the retail industry. 43% of Americans participated in showrooming in 2012,[1] browsing for products in stores and buying them online for less from a competitor. Savvy shoppers are out-innovating retailers, conducting informed product research via mobile while in stores, gathering social validation through Facebook or Twitter and guaranteeing the best price by comparison shopping. In contrast, retailers' brick and mortar stores have fewer, less informed associates per square foot who struggle with ever-increasing product breadth.

Despite this changing environment, 95% of shopping still occurs in physical stores[2] and 28% believe marketing could be made more relevant through location.[3] By leveraging mobile to send the right message to the right person at the right place and time you can drive conversion, increase foot traffic and improve customer satisfaction.

## Localpoint®: Digital Engagement for the Physical World

Localpoint®, an enterprise-ready mobile software, harnesses the power of location to help you achieve your strategic omni-channel goals – to drive store traffic through location-relevant marketing, engage with consumers in the brick and mortar store and provide web-style analytics for the physical store – all through your own branded mobile experience.

Localpoint® is composed of a lightweight SDK that is easy to embed in iOS or Android apps and a web-based marketer's console that provides intuitive setup and management of store and other locations, location-sensitive customer messaging and detailed analytics of store visits and other key information from across your app installed base.

## Location Detection & Management: The Foundation of Localpoint®

Adding a very basic level of location awareness to a mobile application is not hard to do, but implementing accurate location detection capabilities that are battery friendly, protect privacy and account for the highly variable environmental conditions around a location is very difficult, requiring significant technology investment over a period of years.

Digby® has invested millions of dollars in research and development to:

**Create** a patent-pending geofencing algorithm that leverages all of a smartphone's location detection capabilities. Our algorithm ensures accurate location detection with minimal battery impact while protecting users' privacy.

**Design** a methodology and diagnostic tool set for geofence network implementations that guarantee precise analytics and premier marketing performance. Our software optimizes individual geofence radius by evaluating cellular network availability, tower density, geographic terrain and manmade features.

**Build** an extensible, cloud-based platform designed for the enterprise. Localpoint® includes an SDK which is embedded into a brand's rich application to make the app "location aware" and a powerful web-based console for scalable management of locations, location-sensitive dynamic campaigns and deep analytics. The Localpoint® platform is designed to be optionally integrated into an enterprise's infrastructure of marketing automation or loyalty systems, enabling you to respond when a consumer steps into a store or other key location. .

*Katie Deatsch, "43% of U.S. adults participated in showrooming." Internet Retailer, December 10, 2012, http://www.internetretailer.com/2012/12/10/43-us-adults-participate-showrooming.* [1]

*Y-Charts, "U.S. E-Commerce Sales as Percent of Retail Sales," accessed June 12, 2013, http://ycharts.com/indicators/ecommerce_sales_as_percent_retail_sales.* [2]

*OnDevice Research, "Mobile Phone Shopping Diaries," May 2012, http://www.iab.net/media/file/Mobile_Phone_Shopping_Diaries_FINAL_100512.pdf.* [3]

# Buying or Building, and Why Building is Difficult to Do

Once you decide to make your mobile app location-aware, the first task is to determine whether to build or buy the technology.

At first glance, location detection seems fairly straightforward: a device only requires a call to its operating system to understand its location. Once the terrain is explored, however, you will find that the world of location detection and management is highly complicated for the following reasons:

**Built-in mobile operating system position detection creates difficult tradeoffs for accuracy, battery and consumer privacy.**

Creating geofences requires multiple sources of location information and must be battery and privacy conscious. A developer can use cell tower triangulation, GPS and Wi-Fi with varying degrees of accuracy, but he or she must keep in mind the challenges of each technology.

Greater accuracy typically means more power use: a poor location implementation can drain a smartphone battery in a matter of hours. Complicating the matter further, pinpointing location is a privacy concern and mobile users do not like being "tracked."

**No two geofences are alike.**

Network availability, cell tower density and geographic characteristics are just a few of the environmental factors that affect geofence performance and all of these factors change over time. As a result, optimizing a geofence requires powerful diagnostic tools and engineering experience. A simplistic geofence implementation will only work in ideal environmental conditions and renders a large percentage of locations useless from an analytics and marketing perspective.

**Connecting geofences to business value is a difficult process.**

A geofence's technical performance is one thing, but what about business performance? Enterprise users require a platform built by engineers who know how a location-aware mobile app affects analytics, marketing and customer experience and create a platform with the right tools for an invaluable business experience.

# Building a Geofence: Accuracy, Power, and Privacy

### Accuracy Considerations

Cell tower triangulation is the first type of technology a phone can use to detect location. It is also the least accurate. Cell tower triangulation is only accurate within 1000 meters and is often employed by carrier-based location marketing technologies.

Onboard GPS is the second, more accurate technology. GPS is accurate within 30-50 meters in many places, but less accurate in unique environments where line of sight to the sky is not ideal, like inside buildings or in urban areas such as Manhattan.

Wi-Fi network is the third and most accurate technology. Since Wi-Fi broadcast ranges are usually fairly tight, a device can only connect to W-Fi inside or just directly outside the location; unfortunately, Wi-FI is greatly limited by the fact that it functions differently on Android and iOS operating systems. Wi-Fi network detection functions differently on Android and iOS operating systems. On Android, devices can passively see Wi-Fi networks. On iOS, devices must connect to the Wi-Fi network in order to access the technology. This difference greatly limits Wi-Fi detection.

The algorithmic optimization of these three technologies to give the "best accuracy" is not straightforward and requires substantial field-testing and engineering experience.

Digby® has invested in the research to create a highly accurate and seamless integration for our customers.

**Power and Privacy Considerations**

Complicating the accuracy algorithm are the unwanted implications of device power usage and privacy. Since these considerations affect the end user more than the developer they are often overlooked, resulting in poor reviews and bad press.

Accessing a device's GPS chip uses significant power, so location detection technology should access GPS as infrequently as possible. Less sophisticated approaches use GPS liberally and constantly, causing an app battery to drain quickly. App users quickly realize when a recently downloaded app is draining their battery and promptly uninstall the culprit.

More concerning than battery are the privacy issues related to location data. Less sophisticated approaches will also assume that if a user has opted-in to Location Services, he or she has knowingly consented to having their location constantly tracked and recorded by an app. This is a very dangerous perspective and could lead to a public relations disaster.

Telecom carriers were recently censured broadly for their use of CarrierIQ's technology, which performed constant tracking of carrier data, and the technology giants were pressured to discontinue the practice. It is well documented that users only want to hand over their location when it is relevant to the brand's app function and adds value to the user experience.

Digby's® technology employs an event-driven methodology that best approaches these concerns. Localpoint® obtains the best accuracy and drains the least amount of battery through a complex algorithm that integrates cell tower triangulation, GPS and Wi-Fi. Further, Localpoint® does not share or record location data when a user's device is not located within a geofence.

# Building a Geofence Network: Implementation and Optimization

Location detection and management technology is complicated enough when considering just one geofence. However, location awareness becomes significantly more complicated when you consider the broad network of geofences that a typical enterprise will create across stores, venues, neighborhoods and regions, each with their own physical topologies, mobile networks and consumer behaviors.

Environmental factors become a major challenge when maintaining multiple geofences and these factors include:

*Network speed and availability at locations (4G vs. 3G vs. 2G)*

*Local geographic features (mountains, canyons)*

*Local manmade features (tall buildings, highways)*

*Density of cell towers (urban vs. rural)*

*Wi-Fi availability at locations*

Since these environmental factors can heavily impact a geofence's performance, Digby® conducts an optimization phase with every customer as part of our geofence network implementation. A critical and unique characteristic of Localpoint® is our experienced team of technology experts. Aided by flexible technology and diagnostic tools, Digby® is experienced in perfecting geofences.

# Connecting Location Technology to the Enterprise

Location-aware mobile apps are still relatively new and can often feel like a science experiment if business outcomes are not considered. Localpoint® is created for specific

and powerful enterprise use cases that result in tangible ROI for marketing, research and customer service.

The Localpoint® Marketer's Console ensures business users get the most out of location technology without needing technical intervention and provides users a constant, user-friendly connection to their application install base. Rich analytics help marketers learn and adapt in real-time to location traffic patterns and campaign results.

Digby's® experienced team and optimized technology makes Localpoint® the first enterprise-ready location-based marketing and analytics platform available today.

## About Digby®

Digby® leverages mobile and location technologies to help brands achieve their strategic omni-channel goals – to drive store traffic through location-marketing, engage with consumers in the brick and mortar store and provide web-style analytics to the physical store – all through their own branded mobile experience. Though the Localpoint® Mobile Platform, Digby® delivers hosted software, rich mobile application SDKs and full-service, turnkey mobile solutions designed for smartphones and mobile websites, allowing brands to attract, influence and own the relationship with their customers. Digby®, powering millions of apps in thousands of locations around the world, has been enabling top brands since 2006 including HP, Cabela's, RadioShack, Orvis and many more. Learn more about Digby® at www.digby.com.

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