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Qualcomm Retail Solutions Inc.

THE CUSTOMERS ARE IN THE BUILDING. GIVE THEM A MORE ENGAGING EXPERIENCE.

An Overview of Proximity Detection for Retail Using Beacons with *Bluetooth*® Smart Technology

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Qualcomm Retail Solutions, Inc.

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Summary

The consumer experience has evolved from traditional brick-and-mortar retail through ecommerce to the current era of omni-channel convergence, fueled primarily by the rapid consumer adoption of smartphones and tablets.

As the digital experience that your customers have with your brand moves increasingly away from a PC or laptop toward mobile devices, the need to know user context increases. This is a new ball game for leading brands that want to deliver rich experiences to their customers and followers in environments as varied as retail, social, entertainment and sports venues.

Contextual awareness is the ability to know the context of your customer so that you can deliver content and experiences that are personalized, timely and valuable; for example, sending a coupon to a customer's mobile device when she is near your store and predisposed to purchasing from you. It enables developers to create applications that are more relevant and useful. It helps brands deepen their knowledge of their customers and it gives retailers the opportunity to increase customer loyalty through personalized content, offers and promotions.

Knowing your customers' location and interests and tailoring their experience accordingly are important steps on the road to delivering context-aware applications. With the level of accuracy typical for geopositioning with smartphones, your mobile application could include functionality that detects when your customers are within 50 meters of your place of business. But the trick lies in knowing where they are once they enter your store.

Proximity beacons are an emerging micro-location technology paving the way for more sophisticated, context-aware customer experiences. These experiences can include personalized content as customers move among departments, sections and aisles; more enjoyable shopping as they compare products or brands; and yet-to-be-discovered opportunities based on the presence of a valued customer in your place of business. Proximity is a powerful tool indoors, outdoors or anywhere you want to reap the benefits of greater customer engagement and detailed analytics on customer behavior.

This paper, developed by Qualcomm Retail Solutions, makers of the Gimbal™ context aware platform, introduces retailers and brands to the power of proximity beacons and also describes their technical aspects at a high level. Readers will take away insights and selection criteria they can evaluate for giving their customers a more engaging and satisfying onsite experience.

Main Takeaways

- *Micro-location technologies are evolving as a valuable tool for retailers and brands to enrich the experience of their customers and prospects in environments such as retail, social, entertainment and sports venues.*
- *Enabling customers inside the store to have a more engaging experience requires a method for detecting proximity. Bluetooth® Smart (also known as BLE or Bluetooth Low Energy) proximity beacons are ideal for this use case.*
- *Brands and retailers building their proximity strategy should assess different products in light of cost, performance, security, and ease of installation and maintenance.*

How Do I Engage the Customer?

Delivering an engaging and personalized customer experience can benefit three main audiences:

- **Brands** seeking to deepen their name recognition and relationship with customers.

- **Retailers** looking for new ways to increase customer loyalty through updates and useful content.

- **Developers** trying to differentiate their applications by rolling new technologies into them.

Meanwhile, all three audiences have their eye on the best ways to answer a few simple questions:

- What are the demographics, interests and habits of my customer?

• What is my customer looking for?

• How can I tailor my promotions to the interests of my customer?

• How can I make sure that I engage my customers in the right place at the right time?

• How do I address consumer concerns about privacy of information?

Obtaining (and updating) the answers to these questions can be difficult for brands, retailers and developers alike.

Location – An important part of contextual awareness

Businesses that have these answers are able to respond quickly and anticipate customer needs. The desire and ability to collect big data and turn it into actionable insight has accelerated in recent years among leading retailers and brands as online channels have matured and mobile technologies have become more widely adopted. However, we are in only the early stages of tailoring the in-store experience based on consumer insights. The ability to deliver an appropriately personalized shopping experience will drive strategic differentiation among retailers and brands and will enable physical stores to compete with online-only merchants.

Smart businesses are turning to both macro- and micro-location technologies within their mobile applications and places of business as a way of delivering a better user experience. Retail solutions that use these technologies equip retailers and brands with the ability to tailor digital and physical experiences in real time.

Geopositioning vs. proximity

Geopositioning, one option for macro-location, uses GPS (including Assisted GPS, Wi-Fi®, a mobile network and other technologies) to allow a device to determine its location. A business can create a 'geofence', or virtual perimeter, that corresponds to a geographic area in the real world; for example, a store, a specific street address, a parking lot or a plaza (see Figure 1). When a smartphone user crosses ("breaches") the geofence with a context aware application running in the background, the application wakes and triggers a notification or experience.

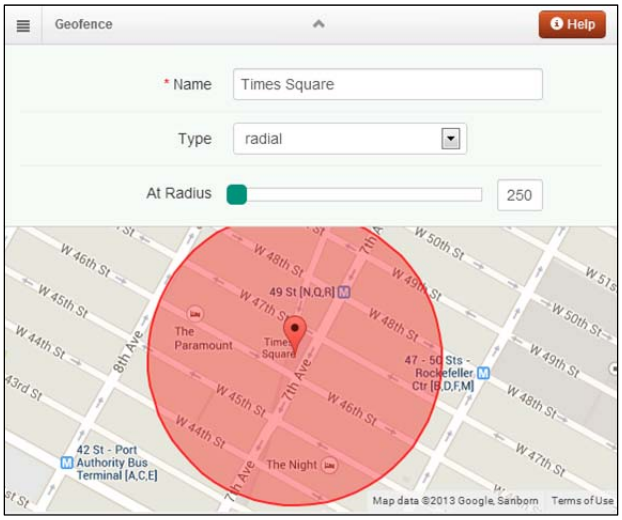

Figure 1 - Gimbal Radial Geofence

Proximity beacons go one step further. They complement GPS by allowing devices and applications to derive their proximity to beacons at a micro-level not currently afforded by GPS technology on consumer devices – from about 50 meters down to a few inches.

A business can place an always-on proximity beacon in a physical location that presents an opportunity to engage customers, such as an end cap, a magazine stand or a departure gate. Each beacon transmits information that allows a business' application running on a customer's smartphone to know when it is within proximity of the beacon's physical location (see Figure 2).

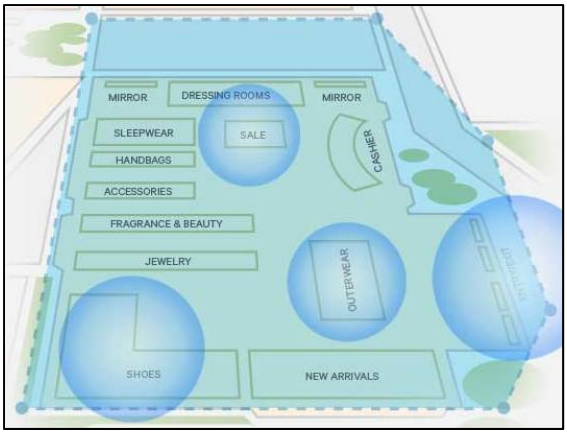

Figure 2 - Proximity beacons

An application can then be enabled to look for a beacon's transmission. When it is within physical proximity to the beacon and detects it, the application can notify the customer of location-relevant content and promotions or offer checkout using a mobile device.

What is the Potential for Proximity Engagement in Retail?

Consider the potential use cases when a business knows that a customer is near a specific beacon:

• Traffic generation – On the way to his seat at a baseball game, a fan gets a buy-one-get-one meal coupon on his mobile device. The coupon suggests the nearest concession stand and is valid for up to five meals, in case he has brought his family.

• Cross-promotion – Later, the same fan receives a greeting from his home baseball team when he enters the location (e.g., auto dealership, bank, casino) of one of the team's sponsors.

• Additional product information/research – As an art museum visitor studies a Renoir, she receives a link to a multimedia clip about the painting and a discount on prints sold in the gift shop.

• Digital signage – A video display in a drug store shows ads for shaving products when men walk by and promotions on beauty products when women walk by.

• Real-time targeted messaging – Five minutes before departure time, an airline can sense that an outbound passenger is still in the lounge. The system notifies an attendant to look for and remind the passenger.

These and similar scenarios emphasize three advantages of proximity detection for retailers and brands:

• Operational efficiency – Businesses can stop wasting time, money and effort on fruitless, scattershot promotions to the wrong audiences.• Customer engagement – When customers and prospects receive the right content in the right place at the right time, they are far more likely to act on it.• Consumer insights – Managers can capture and analyze data on how customers behave inside their place of business, then adjust digital content and physical environment accordingly.

These advantages revolve around knowing their customers and their customers' location. The use of proximity beacons is an important part of contextual awareness, especially indoors.

What Are *Bluetooth*® Smart Proximity Beacons?

How do proximity beacons work, and what technologies do they use? Why has this market suddenly exploded with new ways for retailers to design customer engagement?

At the heart of proximity beacons is *Bluetooth*® Smart.

Bluetooth® Smart technology

For years, many radio-frequency technologies have been competing in short-range wireless communication. *Bluetooth*® technology has established itself prominently in mobile devices mostly by solving one problem well: helping phone and accessory manufacturers provide consumers with a way to use their mobile phones hands-free. First with wireless earpieces and then through integration in vehicles, *Bluetooth*® has become the de-facto standard for hands-free mobile phone usage. Its importance has increased with legislation banning handheld phone use while driving (now in force in almost half of the states in the U.S., for example).

Bluetooth® technology has found broad acceptance as a standard for discovering and moving data among

items such as computers, keyboards, mice, mobile phones, fitness devices, tablets, headsets, smart watches, automobiles and medical devices.

In 2010, the *Bluetooth*® v4.0 specification (often referred to as *Bluetooth*® Low Energy, BLE, and more formally since 2011, as *Bluetooth*® Smart) was completed. It includes not only the classic and high-speed standards, but also new functionality and a low power feature.

Products using *Bluetooth*® Smart technology – such as accessories, health devices, wearables and even proximity beacons – communicate with *Bluetooth*® Smart Ready devices like smartphones and tablets to open up whole new opportunities.

Bluetooth® Smart characteristics

Several characteristics of *Bluetooth*® Smart make it optimal for proximity beacons:

• Most new smartphones are *Bluetooth*® Smart Ready and can communicate with beacons enabled by *Bluetooth*® Smart.

• A proximity beacon designed for *Bluetooth*® Smart need only transmit; receiving signals is not necessary. Combined with the low energy feature in *Bluetooth*® 4.0, such a beacon consumes only a fraction of the power of a typical *Bluetooth*® product, translating into extremely long battery life (see Gimbal Proximity Beacons in Figure 3 and Figure 4).

• A *Bluetooth*® Smart Ready smartphone or tablet can detect a Bluetooth Smart device such as a proximity beacon without the traditional need to pair (e.g., pairing a headset and a mobile phone). This enables more passive discovery, spontaneous interactions and new methods of customer engagement for retailers and brands.

• Listening for *Bluetooth*® Smart transmissions has minimal impact on the battery life of a customer's mobile device. So smartphones, tablets and proximity-enabled applications running on them can listen for transmissions all the time without undue battery drain.

• *Bluetooth*® usage is increasing along with the variety and functionality of available devices. This encourages smartphone users to keep *Bluetooth*® enabled, as they do location services.

• With *Bluetooth*® Smart, a transmit-only proximity beacon can use one of three dedicated channels allocated in different parts of the wireless spectrum. This prevents interference from nearby 802.11/Wi-Fi® signals.

Figure 3 - Example of Gimbal Proximity Series 10 Beacon

Figure 4 - Example of Gimbal Proximity Series 20 Beacon

Conclusion and Recommendations

With their low cost threshold, low energy feature and strong technical fit, proximity beacons using *Bluetooth*® Smart technology are an ideal approach for retailers and brands looking for ways to give onsite customers and prospects more of the engagement they want. In smartphones and tablets, high-level operating systems like iOS®, Android™, and Windows Phone continue to release improvements that lend increasing credibility to this approach, and small companies have sprung up with point-solutions that support it.

Implementation of a context aware platform takes most retailers outside of their core business. For brands and retailers exploring an implementation of proximity

beacons based on *Bluetooth*® Smart, recommendations include:

• Choosing a reliable partner. Businesses should select a partner with extensive experience in wireless technology to source and advise on deployment options.

• Questioning battery life. While *Bluetooth*® Smart provides for much longer battery life than traditional Bluetooth, poorly designed beacons can easily deplete batteries even while transmitting quickly. Beacon providers should be prepared to state how long their battery lasts when transmitting ten times per second and explain the testing behind their figures.

• Requiring enterprise-grade products. Smaller providers may claim to get proximity detection right, but given the sensitivity of beacons, it is important to ensure that products are suited to especially the retail environment. Providers should be able to prove that they have taken care to build a high-quality, well-designed product.

• Confirming availability. Some providers of beacons claim pending trials and demonstrate prototype hardware. Well-established companies should have finished product ready, with sufficient quantities in stock. They should also stand behind the reliability and performance of their beacons.

• Looking for advanced features. Some beacons make available features that can only come from experience. Implementation in retail may require complex antenna designs, specialized mounting capabilities or weatherproof enclosures.

• Considering a platform. While important, beacons are only one piece of a contextual awareness landscape that includes manageability, scale and ease of application development. Without a viable platform, brands and retailers will find themselves with basic, non-scalable offerings that fall short of true contextual awareness.

• Checking certifications. Ensure that solution providers and technology partners have obtained appropriate certifications. Every country has different requirements governing technology specifications such as radio frequency transmissions, specific testing, performance benchmarking and privacy/security (e.g., TRUSTe certification).

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The Gimbal context aware platform for Android and iOS enables application providers to deliver more timely, personalized and relevant content to mobile audiences. Follow us at gimbal.com.

For more details on Gimbal, see “Gimbal™ – Digital Insights into the Physical World,” a white paper at gimbal.com.

Also visit the Qualcomm Developer Network (QDN) for developer tools, announcements and support. Find us on YouTube, Facebook, Twitter and other points of contact on the Web.