

Citybeacon: connecting cities with their citizens

As cities get smarter, the fragmentation of connectivity solutions and platforms is a growing problem for local authorities, who need a single platform to communicate with citizens and businesses, and to improve local services.

The Citybeacon kiosk blends state-of-the-art technology into a single smart city platform that connects cities, citizens and businesses

Executive Summary

Cities are busy places, and they're getting busier. But they're also getting smarter.

Connected technology is being applied to anything from traffic management and street lighting to improving air quality. Yet, as cities get smarter the fragmentation of connectivity solutions and platforms is becoming a problem for local authorities when it comes to:

1. Communicating with citizens
2. Ensuring the safety and security of public spaces
3. Growing the local economy by fostering business and commerce
4. Using data to enable smarter decision making
5. Providing reliable and robust connectivity

The Citybeacon* (Figure 1) street-side kiosk addresses each of these five challenges by blending state-of-the-art connectivity, security and communications technology into a single platform that connects cities, citizens and businesses to reduce infrastructure fragmentation.

It offers end-users a familiar touch-interface, while a simple, browser-based cloud management platform overcomes most integration challenges and makes unit management, content scheduling and publishing quick and easy.

For hundreds of years, beacons have been used at sea as signals, warnings and guides. Now the beacon has been brought to the city and, with Intel Inside®, it marks the way to smarter, more liveable urban environments.



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Figure 1. The Citybeacon, next generation smart infrastructure.

Challenge: Creating a Great Citizen Experience

Connectivity is becoming increasingly important to the way we engage with each other and how we experience our surroundings. But the technology infrastructure of metropolitan areas is becoming more and more fragmented as their populations expand and private enterprises battle for consumers' attention with proprietary networks and solutions.

This presents a challenge for local authorities whose responsibility it is to communicate with citizens, ensure public safety, grow the local economy, and make increasingly data-driven decisions while providing reliable and affordable connectivity. Integrating separate technology platforms to deal with each of these is impractical or costly for most local governments.

At the same time, local municipalities are often operating with less visibility than they would like into what is really going on in their cities, either on a day-to-day or – even better – in real time.

How many tourists are in the city at a given moment, and what information or services do they need to make their stay a memorable one? Understanding the answers to questions like these would empower local authorities to improve the experience of these tourists and in turn boost the local economy.

Consider too environmental factors such as air quality or UV levels. The ability to collect and analyze data relating to these and other ambient conditions would allow local municipalities to try to manage or limit them and make their cities better places to live.

And if there was an emergency, either city-wide or locally, how would the authorities communicate with people in the affected areas?

If you know your city, you can grow your city. So local municipalities would benefit from a single, open technology platform that allowed them to keep the local population informed and engaged with each other, with public services and local businesses, while also helping the authorities gather the data they need to make smarter decisions.

Inform, Connect, Protect and Engage

The Citybeacon kiosk and the underlying platform deepen the engagement between cities, local businesses and citizens by bridging the digital and physical worlds.

In doing so, it enhances the way residents and tourists experience cities as well as the service that local municipalities can provide.

Inform: Providing the latest and most relevant information

- Find out more – A 32-inch touchscreen lets users find out more about nearby points of interest and entertainment, as well as hyperlocal services and products, and uses familiar app store-like interfaces. Payment and ticketing module enables on-the-spot purchases.
- Engage, explore, enjoy – Maps, real-time transit schedules, weather reports and community information keep citizens up to date and enrich the experience of visitors and tourists. For residents, local news, events, real-estate and job listings or school information can also be made available.

- Citybeacon in your pocket – A free mobile application lets users take this information with them. It also opens up the opportunity to create individualized user experiences with the possibility of targeted reward systems, or to refine and optimize the system based on usage data.

Connect: Transforming access to mobile services

- Connect and share – Free-to-use Gigabit+ WiFi means citizens and tourists can chat, share and 'like' without incurring network operator charges or using untrusted WiFi connections. This is protected by industry-leading network security.
- Mobile payments – NFC and RFID reading capabilities enable integration with the latest payments technologies. These can be used to pay for local services and products, or parking, for example.
- Free calls – Integrated microphone and camera allow for VoIP calling and posting photos on social media.

Protect: Enhancing local public safety services

- Help at hand – The microphone also enables two-way communication with the emergency services.
- Local or city-wide announcements – Speakers and the large upper screen can be used to broadcast public service announcements, either locally through individual CityBeacons or in groups/city-wide.
- Safety and security – The integrated camera lets local authorities monitor public spaces.
- Smart decision making – Air quality, UV-level and audience analytics sensors can collect the data local authorities need to make smarter decisions.

Engage: Hyperlocal marketing and commerce opportunities

- Targeted – Publishing content kiosk by kiosk means businesses can offer hyperlocal promotions and advertisements to make themselves and their services more relevant to consumers.
- Interactive – The touchscreen enables businesses to publish interactive marketing content, and learn more about their audience.
- Innovative – The open software platform allows businesses and third parties to develop new and innovative services.

Solution Value: A Single Platform, a Smarter Society

Citybeacon solves the challenges faced by local municipalities when it comes to communicating with citizens, ensuring public safety, growing the local economy, collecting data and providing reliable connectivity. Cities lease the units, spreading costs and sparing them the maintenance burden.

With a blend of the latest technology, Citybeacon provides reliable connectivity for end-users and through its familiar touch-interface offers a highly accessible way to engage with their surroundings. For local authorities, a simple, browser-based cloud management platform overcomes most integration challenges and makes content scheduling, publishing and unit management quick and easy for non-specialists. And for businesses the Citybeacon offers a smart, hyperlocal marketing and communications channel – local cafes can offer discounts on hot drinks when it's raining nearby, for example.

Data collected from the city (including footfall, gender and age split by location, environmental factors, and traffic counting) can be analyzed using a portal provided by Citybeacon. This cuts the cost of data gathering and analysis, and opens up new opportunities for cities to commercialize big data. The solution also has an SDK, which enables third-party developers to create apps for both use on the kiosk and the connected mobile devices (these can also make use of the sensors and data collected from the platform).

Meanwhile, inside the Citybeacon, Intel's latest Internet of Things processors, networking and SSD storage solutions provide the performance and reliability required to enable the kiosk's innovative use cases. And in the public cloud, Intel® Xeon® processors power Citybeacon's data analytics.

Solution Architecture: The Simplest Way to a Smarter City

To deliver the smart city experience and benefits to local municipalities and the businesses and citizens they serve, the Citybeacon uses several key technologies:

- Gigabit+ WiFi; LoRa*/SigFox*, low power wide area network (LPWAN); small cell radio and cellular 3G/4G/LTE
- NFC/RFID
- 55- and 32-inch digital displays
- Microphone and speakers
- Security camera

- Air quality, UV-level and audience analytics sensors
- Intel IoT and WiFi-enable CPUs, as well as networking and SSD storage solutions
- Smart lighting that adjust to conditions, based on proprietary city-aura technology
- Windows 10* for IoT operating system

Communication with and through the CityBeacon is completely IP-based so requires no new infrastructure.

The management platform: CityBeacon Operations System (CBOS)

The cloud-based CityBeacon Operations System (CBOS) is an intuitive interface that makes it simple to schedule content and messages to be displayed on the Citybeacon from any device with a browser and an internet connection. Citybeacon's marketing inventory is managed through an intelligent cloud-based proprietary booking and smart scheduling application called CMS+.

In the case of emergencies, scheduled content can be overridden by users with the appropriate levels of access and important announcements and information can be delivered to the affected areas.

As a fully open platform, CBOS creates a favorable environment for a thriving ecosystem of new applications and services from third party developers, allowing the Citybeacon-enabled smart society to continually evolve with new technology.



Figure 2. The core technologies that make up the Citybeacon kiosk smart city solution.

Hyperlocal Marketing in Action

For businesses the Citybeacon is a smart, hyperlocal marketing and communications channel. But its real power is realized when an integrated approach is taken.

For example, a local movie theatre could display a trailer on the Citybeacon's large screen in combination with a buy-one-get-one-free ticket promotion. A movie lover and her friend can take advantage of the promotion by purchasing tickets via the smaller screen with their mobile-payments-enabled smartphone, and downloading them to their device.

Then, fifteen minutes before the movie is due to start an alert is sent to their phones and their map application guides them to the cinema. Once they arrive, an iBeacon notices their presence and triggers welcome messages with further promotions for products they might be interested in.

This level of engagement deepens connections with consumers and enables local businesses to create a truly memorable user experience.

Conclusion

Infrastructure fragmentation is making it increasingly difficult for local municipal authorities to connect and communicate with citizens, to ensure public safety, help grow the local economy and collect the data they need to make better decisions.

Meanwhile, in the digital age, local businesses (valuable contributors to municipal economies) would benefit from access to hyperlocal marketing opportunities beyond traditional media. And citizens and tourists expect to be able to engage with each other and their surroundings wherever they are and through a growing range of devices.

The needs of these three stakeholder groups are diverse but satisfying each will benefit the whole of society, and local municipalities are in a unique position to take the lead. The Citybeacon offers these municipalities a single yet open platform that enables them to use the latest technology to improve the sustainability and liveability of their towns and cities, and improve communication with citizens, visitors and local businesses.

Explore the Citybeacon further [here](#) or contact [Dion Ubert](#), Strategic Business Development Manager, Northern Europe, Intel Corporation (dion.ubert@intel.com) for further information.

Solution Provided By:



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