BEACONY BLE FEATURES & APPLICATIONS

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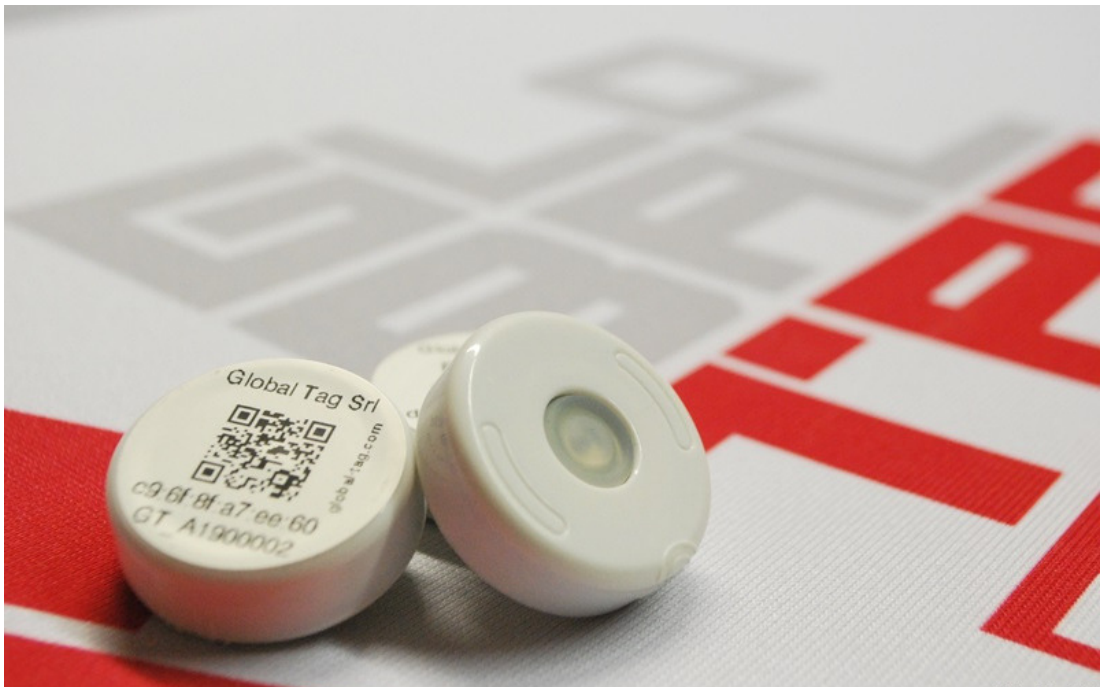
POWERED BY

https://www.global-tag.com/ble-beacon-world/

BLE technology introduction

The BLE (Bluetooth Low Energy) is a branch of the Bluetooth Technology for the Wireless Data Sending with a low consume of energy.

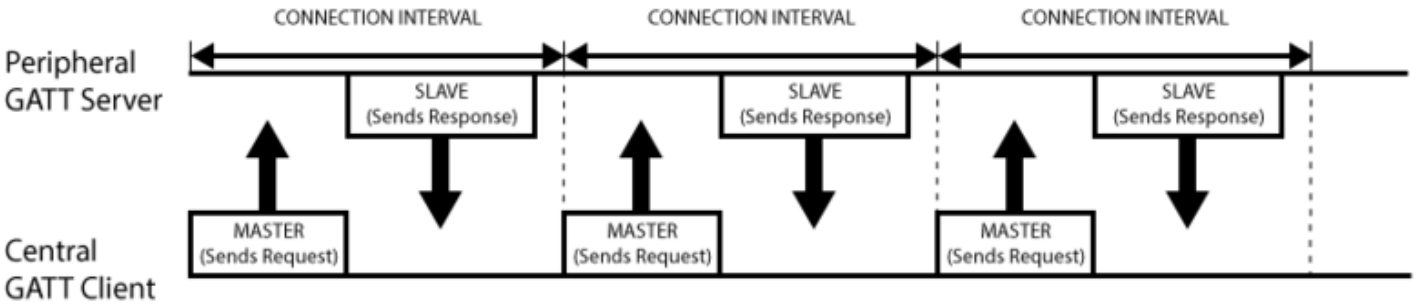
Beacons are battery-powered devices that send data packets (called Advertisement Packets) via Bluetooth in broadcast on the channel, so every device listening can see them.



The way they send those packet is managed by services called "GATT Services". Depending on the Beacon, it is possible to choose,for example, the frequency of transission, the power signal, the type of packet, the device name etc...

BLE technology introduction

The connection to the Beacon occurs through the Master/Slave principle. (the same principle used by Bluetooth Classic). The Master has the job to handle the communication (start, synchronization, end), while the Slave only performs the Master orders. The Master can open multiple connections with Slaves at a time, but a Slave can be connected with only one Master at a time.



An example of Master/Slave architecture is the communication between Smartphone and Beacon: The smartphone (Master, with a Bluetooth 4.0 chip or higher) keeps listening to the channel where the Beacons (Slave) send their own Advertising. Once it receives an Advertising, the Smartphone can perform a connection with one or more Beacons at a time (maximum 8).

Right below will be described some of the most useful features and application of our Beacon, called "Beacony".

01 Accelerometer Sensor

Our Beacony Tag has an accelerometer sensor which can detect different type of movements:
1) Light movements
2) Running
3) Strong movements / Falls

With the Trigger Mode implemented in our firmware, our Beacony can be dormant when is stationary and trigger himself when a movement has been detected, sending an advertisement packet including the spatial coordinates detected.

IT CAN ALSO SEND A WATCHDOG (KEEP ALIVE) PACKET WHEN IT'S STATIONARY

Another useful feature is the Watchdog Mode, which allows our Beacony to send a special packet with a settable time interval when the Beacony is stationary, to remind the user that the Beacony is still working.
The packet sent by the Watchdog Mode will be an iBeacon packet with the Hexadecimal value of "WATCHDOG" written in the UUID.

Watchdog Tutorial

WATCHDOG PACKETS TIMELINE

If for example we choose 1s Broadcast Interval and 10s Watchdog Interval, with the GSensor in Trigger Mode of 5s, when the Beacony is not moving it will broadcast the Watchdog Packet every 10 seconds, but if the Beacony is moving it will broadcast the normal packet for 5seconds.

- 1S — Watchdog Packet
- 7S — Beacony moved
- 10S — No Watchdog Packet because Beacony in trigger
- 12S — Trigger Finished
- 20S — Watchdog Packet
- 30S — Watchdog Packet

01 Applications with Accelerometer Sensor (Part 1)

DETECT BYCICLES/PEOPLE MOVEMENTS

Beacony + Wallmount on Bike

By tying the Beacony to the spokes of the bike, the sensor can detect if the bike is moving or not, allowing the user to know if it's being stolen, to track movements in a race and for bike sharing.
The same logic can be applied to people running (with the Beacony put on people wrists with a wristband, which is a silicone accessory available in our store).

DETECT STRONG MOVEMENTS / FALLS

With the lowest sensivity of the sensor the Beacony can detect strong movements/falls of people/objects.
For example it can detect if a box has fallen of the shelf, if a worker has fallen of stairs/forklift, if a patient in the hospital has fallen from his bed etc...

01 Applications with Accelerometer Sensor (Part 2)

INDUSTRIAL LOGISTIC

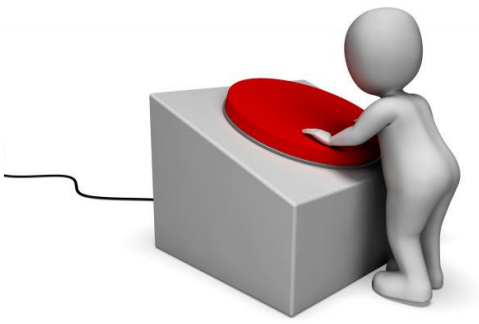
With our Beacony the user can detect movements of the items on which the Beacony is put.
For example, if the goal is to keep track of specific items in a warehouse, the solution can be to assign to every item we want to track a Beacony, which is universally identified by a MAC Address, and with the accelerometer sensor we can see if the item is moving and if it has left the warehouse.
The iBeacon packet comes in help for this kind of work, by having two fields called Major and Minor where, for example, the user can store the number of the building in the Major and the number of the building's room in the Minor.

02 Alarm Function

Our Beacony has the alarm function, which allows the user to send a number of alarm packets (number settable by service) after double-pressing the button on the Beacony.
No matter what type of advertisement packet the Beacony was sending before or the broadcast interval value it was working with, when the alarm is triggered (and for all the number of packets that the user have set) the iBeacon packet will be sent with the hexadecimal value of "ALARM" written in the UUID and a broadcast interval of 100ms.
When Beacony is done sending alarm packets, it will automatically going back to it's previous state.

THE ALARM CAN BE ALSO "PERMANENT" (RED ALARM)

If the alarm is triggered (double-click) while an alarm is already working, it's state changes in RED ALARM.
In this state, the Beacony will send only alarm packets with the hexadecimal value of "RED ALARM" written in the iBeacon UUID, with a broadcast interval of 100ms (just like the normal alarm), until the user will turn it off.
For turning off the RED ALARM is necessary to switch off the service that manages the alarm.



02 Applications with Alarm Function

PICK TO LIGHT

Pick To Light application with Beacony App by Global Tag

By setting the LED continuous (see feature 05) it is possible to turn it off by triggering the Alarm.
This action creates the functionallity called "Pick To Light", that can be very useful in many cases, for example if the Beacony is attached to a box in a warehouse and the employees need to pick it up, a software can turn ON the LED with a continuous value so that the employees can see which box needs to be picked up. When the employee pick the box, by double tapping the button of the Beacony the alarm will be sent and the software will see that the box was picked, and by triggering the alarm, the LED turns OFF.

HELP FOR THE ELDERLY

The alarm can be very useful in nursing homes.
By equipping the elderly with a Beacony on their wrist, for example, if they need any sort of help they can double-tap on it to send an alarm that can be seen by nurses/doctors.

03 Temperature & Humidity Sensor

Our Beacony Tag has a sensor which can detect the temperature and the humidity of himself.

The operating range of the temperature goes from -40°C to +125°C, with an accuracy tolerance of ±0.3 °C.
Yet the ranges in which the battery of the Beacony can operate are -30 and +60.

The accuracy range of the humidity sensor is ±3RH in normal conditions, ±4.5RH at extreme conditions(degradable).

NOTE: A prolunged exposure to extreme conditions may affect the values of the detection, or worse, it can damage the sensors

TEMPERATURE WITH EDDYSTONE TLM

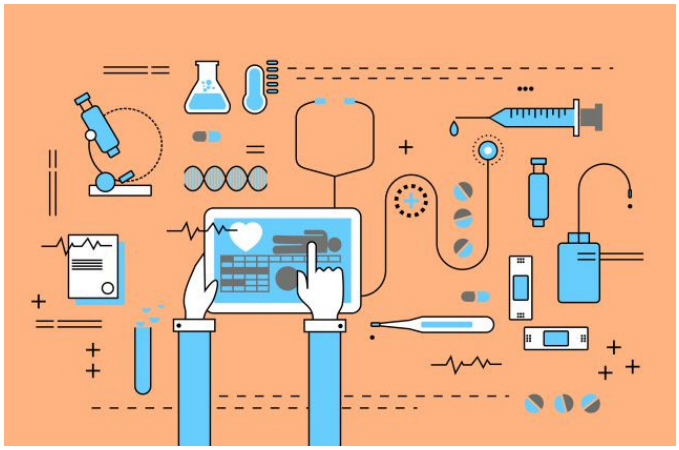
Our Beacony can also broadcast the temperature value in the Eddystone TLM format.
If we choose this format, the packet will be sent every 10 seconds.

03 Applications with Temperature & Humidity sensor

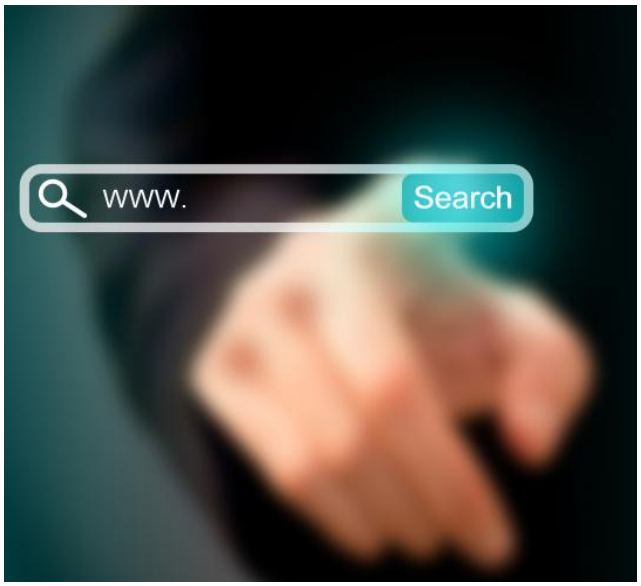
TEMPERATURE & HUMIDITY TRACKING

The temperature & humidity sensor allows the user to track the temperature & humidity values of the Beacony (for example in a room).

Tracking these values also allows the detection of edge's exeeding, for example if the Beacony is located in a refrigerated room and the temperature in there become too hig or too low, a message can be sent with a custom app that tells the employees to check the problem.



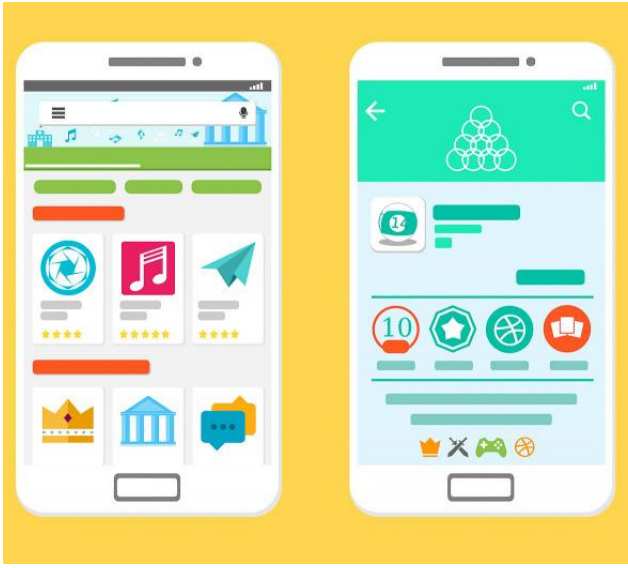
04 Eddystone URL



Our Beacony supports the URL format developed by Eddystone, so it can send an URL via Advertising Packet.

THE URL CAN BE CUSTOM

The user can write whichever URL which links to whatever he wants, for example his site's URL, a Youtube video, a Facebook profile etc...



04 Applications with Eddystone URL

RETAIL PURPOSES

A Beacony can be set to trasmit in Eddystone URL the link of your own shop site where you can highlight the offers of the day/sales.

TOURISM IDENTIFICATION

A Beacony can be located among strategic/historical places/monuments where it can be set to broadcast the URL of the page in which, for example, that place/monument is described. With Eddystone URL tourists can read about what they're looking at with their smartphone (for example).

05 LED Function

Our Beacony integrates a LED on board with two different colors: red and blue.

The blue light is triggered when the Beacony is turned ON.
The red light is triggered when the Beacony is turned OFF, when the alarm is sent and for the LED function.

The LED function is managed by two services:
One that turns it ON/OFF
One that set the time interval (in seconds) in which the led has to blink (it can be also set to continuous light).

Fo some actions the two lights (blue and red) blink together:
1) Connection to the Beacony
2) Battery almost discharged (blink every five seconds).

05 Applications with LED

TEMPERATURE NOTIFY

The LED function allows the user to have a physical and immediate response to an action.

For example, if the Beacony is situated in a room where the inner temperature/humidity doesn't have to exceed a certain value, if this values is going to exceed a software can switch ON the LED to blink every second, and if the temperature/humidity has reached the edge, the software can switch can make the LED continuous.

FORGOTTEN GOODS

The LED can be also used to "mark" objects that are being forgotten.

If the Beacony associated to a specific object is in trigger mode with a watchdog packet, a software can keep count of the Watchdog packets received from that Beacon, and if they are too many received in a row (without receiving any accelerometer packets in between) it could mean the objects wasn't moved in a while. The software can turn ON the LED continuous to warn employees that maybe that specific item was forgotten to be shipped.

06 Frame Interval

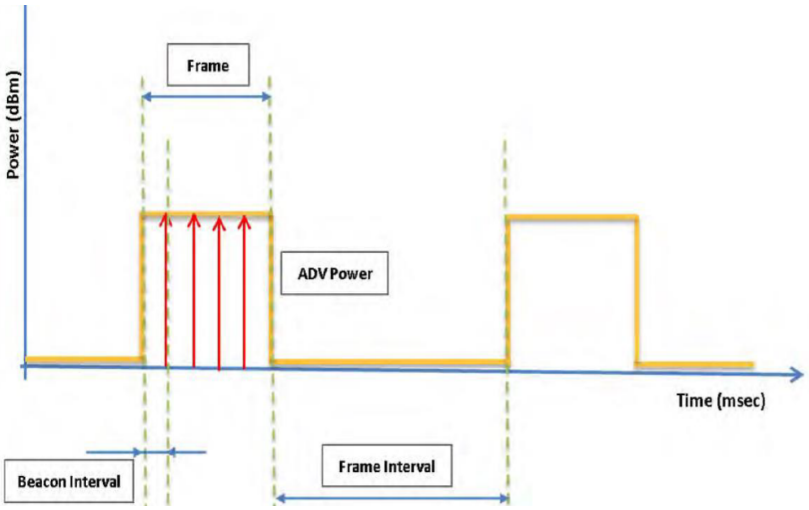
The Frame Interval is a feature that allows our Beacony to send a settable number of packets between a settable time interval.

It is composed by two services:
1) Frame Interval: allows to set an interval between sending packets (from 1 to 3600 minutes).
2) Frame Adv Packets: allows to set the number of packets sent after the frame interval (from 5 to 100).

NOTE: The frequency of the packets sent by this feature is managed by the broadcast interval set on the Beacony (this is also settable).

The shorter the Beacon interval is, the shorter the interval of the Frame will be. We suggest to keep the Beacon interval as short as possible, to be sure to receive the packets after the Frame Interval has finished.

This Graphic shows an example of how the Frame Interval works



06 Applications with Frame Interval

DETECT LESS IMPORTANT OBJECTS ONCE IN A WHILE

The Frame Interval is the best option for objects/people/animals that need to be detected less often than others, but is necessary to locate them.

With this feature the user can set a specified Beacony to Broadcast every hour, and to broadcast n packets (settable by service) at 100ms (also settable by service), to be sure to receive at least one of them, so knowing that the object/person/animal is there.

This method leads to a minor consume of the battery and keeps the channel clear for other beacons that need to broadcast every few seconds.

07 Timing Function

The timing function allows the Beacony to turn himself ON/OFF at a specified time (settable by service).

The service that manages the time allows the user to:
1) To set hour and minute to turn ON the Beacony
2) To set hour and minute to turn OFF the Beacony
3) To decide if the Beacony has only to turn ON/OFF, or both.

NOTE: The Beacony has not an internal clock, so it can't know the current time, so it's necessaty to write the current time into the service.

07 Applications with Timing Function

KEEPING THE BEACONY ON BETWEEN WORKING HOURS

By settings the ON/OFF time of the Beacony is possible to make it work only during the predetermined time. This makes the battery of the Beacony last longer because it won't consume when it's OFF.

OPENING/CLOSING GATES/DOORS AT SPECIFIED TIME

The user can control a gate/door via Bluetooth.
For example, if the Beacony is sending packets that means is ON, so people are allowed to open the gate/door.
If the Beacony is not sending anything that means is OFF, so people aren't allowed to open the gate/door.

08 OFF Blocked Function

The OFF Blocked function allows the user to decide if the Beacony can be turned OFF by pressing the ON/OFF button or not.
If this service is active, the only two ways to turn OFF the Beacony are:
1) Removing the battery
2) Writing in the service "Power OFF", that automatically turns OFF the Beacony

NOTE: The possibility to turn ON the Beacony will remain the same, no matters the value in the service "OFF Blocked".

08 Applications with OFF Blocked

AVOIDING UNINTENDED SHUTDOWNS

It's possible that the user can accidentally turn OFF the Beacony by, for example, leaning on it.
The OFF Blocked service erases this problem, allowing the user to press the ON/OFF button without turning it OFF.
This function can be useful in applications that target childrens, which are less careful than adults.

AVOIDING INTENDED SHUTDOWNS

As for the unintended ones, this function can be very useful also with the intended shutdowns by people that want to do arm to a Beacony project.

Learn more about us

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