

BEACONY BLE FEATURES & APPLICATIONS

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POWERED BY

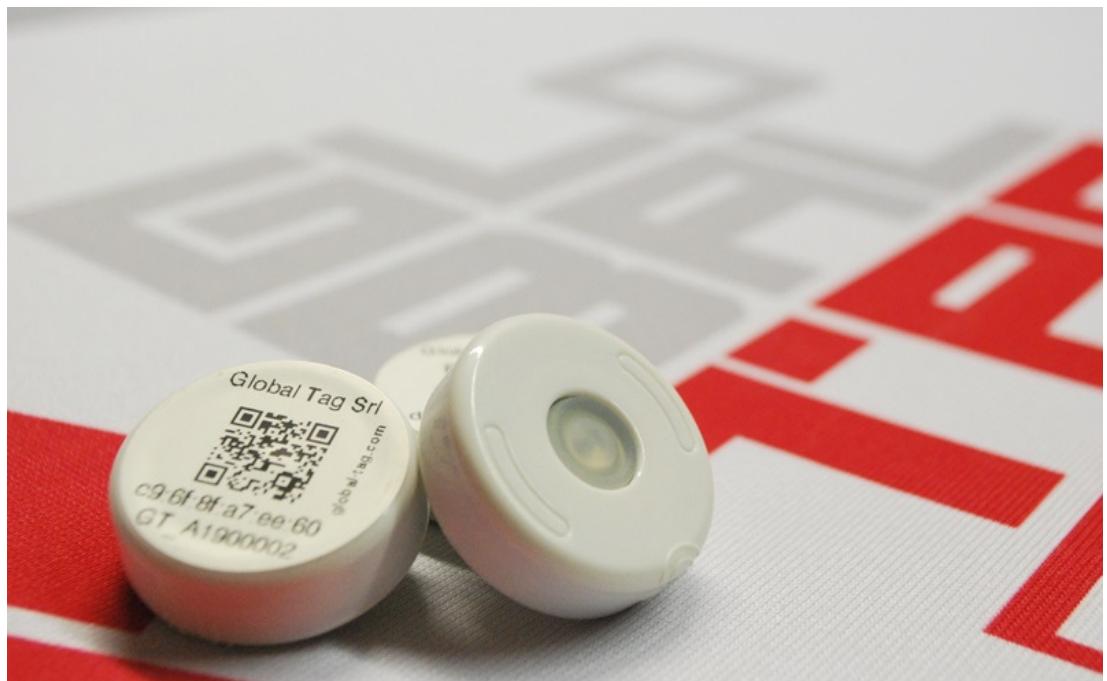


<https://www.global-tag.com/ble-beacon-world/>

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.

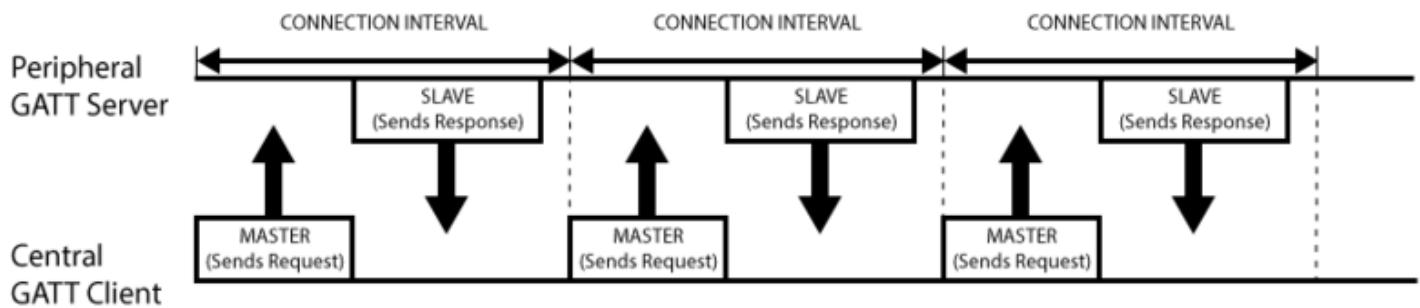
Beacons are battery-powered devices that send data packets (called Advertisement Packets) via Bluetooth in broadcast on the channel, so every device listening can see them.



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 transmission, 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.

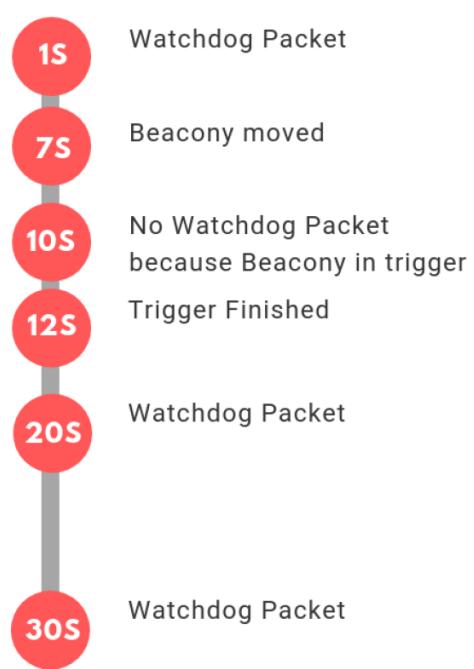
The packet sent by the Watchdog Mode will be an iBeacon packet with the Hexadecimal value of "WATCHDOG" written in the UUID.



Watchdog Tutorial



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.



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



01

Applications with Accelerometer Sensor (Part 2)

INDUSTRIAL LOGISTIC



There can also be projects where there's no need to track the exact moment the goods are being moved, but track them with an interval it's enough.

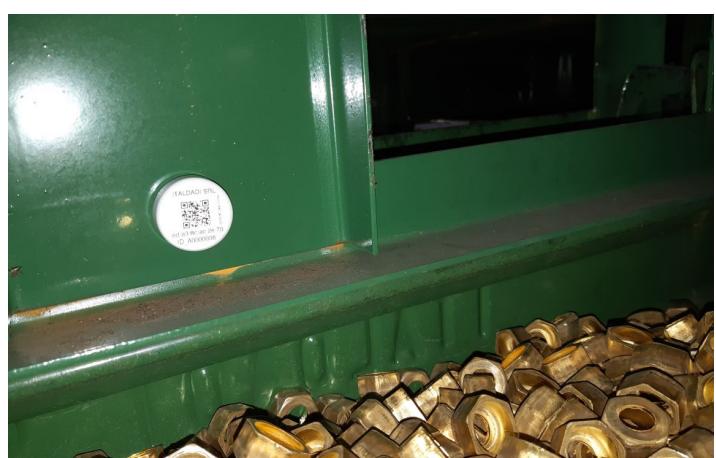
In this case there's no need to use the accelerometer: a normal Broadcast Interval will do the job.

We suggest to use a broadcast interval half the duration of the interval the software waits to update the goods list, to avoid packets loss.

With our Beacons the user can detect movements of the items on which the Beacon 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 Beacon, 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 go back to its previous state.

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

If the alarm is triggered (double-click) while an alarm is already working, its 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.

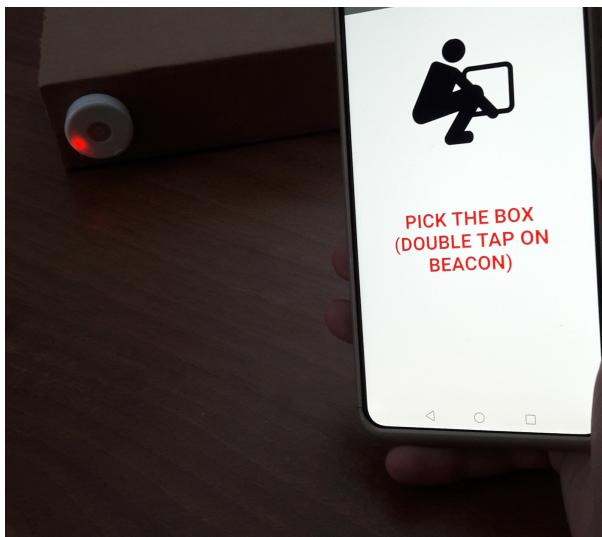
For turning off the RED ALARM is necessary to switch off the service that manages the alarm.



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 functionality 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.

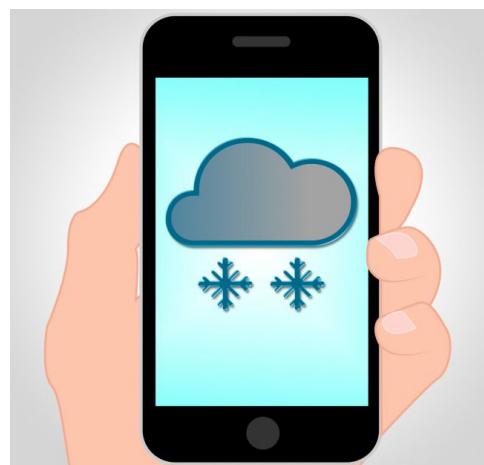
The accuracy range of the humidity sensor is $\pm 3\text{RH}$ in normal conditions, $\pm 4.5\text{RH}$ at extreme conditions(degradable).

NOTE: A prolonged 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.

The TLM format follows the advertising interval like other packet formats.



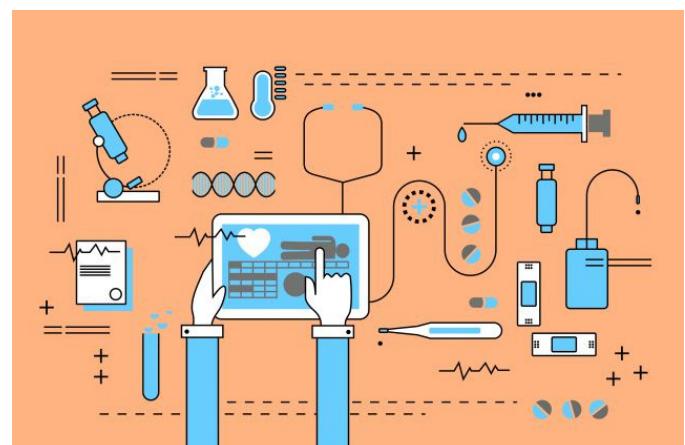
03

Applications with Temperature & Humidity sensor

TEMPERATURE & HUMIDITY TRACKING

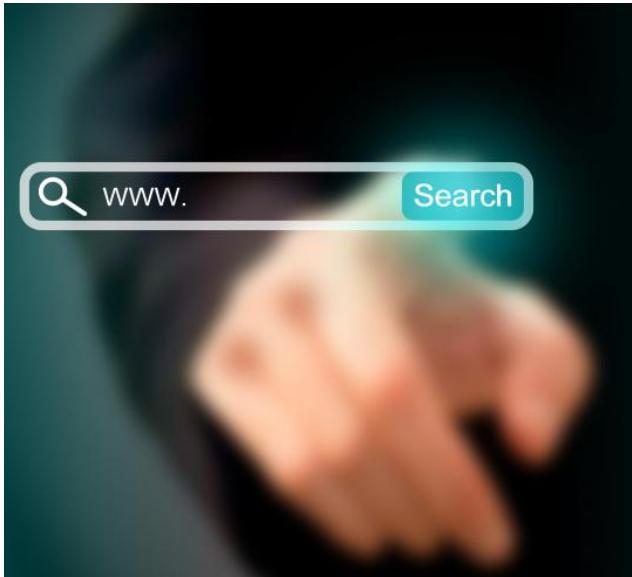
The temperature & humidity sensor allows the user to track the temperature & humidity values of the Beacony (for example in a room).

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



04

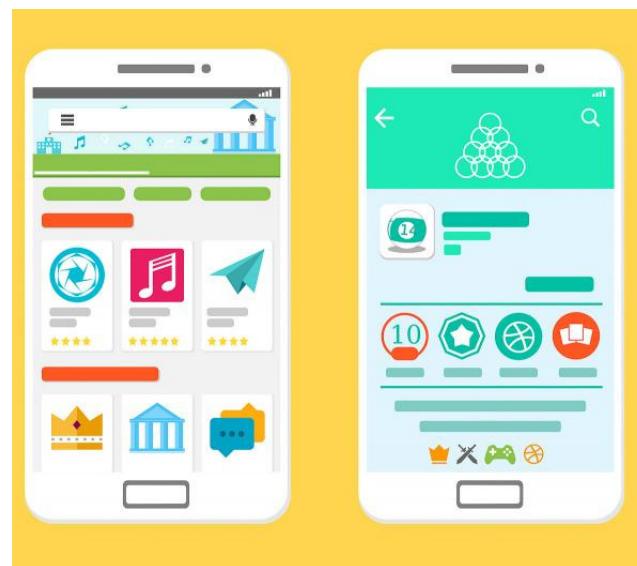
Eddystone URL



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

TOURISM IDENTIFICATION

A Beacon 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).

For some actions the two lights (blue and red) blink together:

- 1) Connection to the Beacony
- 2) Battery almost discharged (blink every five seconds).
- 3) Reset to factory parameters

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

Timing Function

The timing function allows the Beacony to turn itself 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 necessary to write the current time into the service. The ON/OFF intervals are in reality switch states, this means that if the Beacony is ON interval, it will turn OFF once the ON interval is reached, the same logic applies to the OFF interval.

06

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.



07

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".

07

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.



08

Contact Tracing Function

WHAT IS IT?



The Contact Tracing function is a set of functionalities which allow the user to detect nearby Beacons, and alert him in different ways:

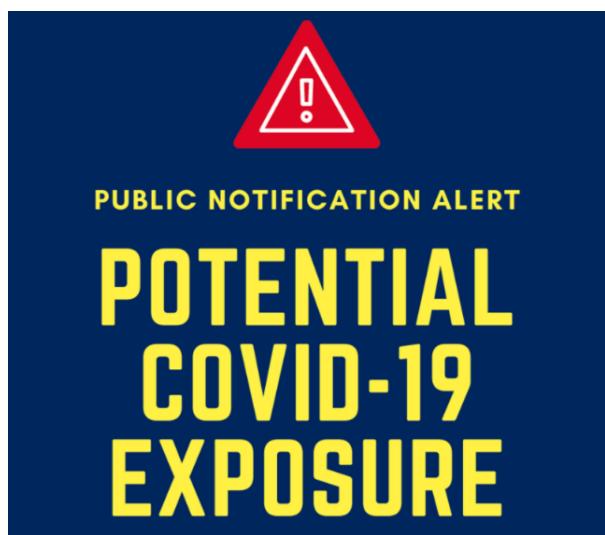
- Visible alert (Red LED)
- Buzzer alert (Buzzer sensor)
- Vibration alert (Vibration sensor)

This function is most used to manage COVID-19 inside offices/companies.

HOW IT WORKS?

The Contact Tracing function inside our Beacony allows you to set every parameter you need to create your own anti-COVID model:

- How much time has to pass before alerting an interaction
- The interval of the alert
- The minimum distance for an interaction



The Beacony can also save the MAC ADDRESS of the Beacons it came in contact with (up to 5000 ADDRESSES).

08

Applications with Contact Tracing

ADDRESS STORAGE



As said before, the Beacony can save the addresses of the beacons it came in contact with in its internal memory, and it can do this in a "silent way", without alerting the user in any way. This is used in environments where alerts can be distracting (for example during calls/meetings).

In these cases it is not necessary to know "Real Time" the contact, but it will be downloaded from the Beacony's memory after the activity/at the end of the job day.

SOCIAL DISTANCING

The Social Distancing alerts the contact when it's stored by 3 different sensors, that can be used simultaneously:

- LED
- Buzzer
- Vibration

This modality is used in environments where it is necessary to have a physical alert to tell the users that they are too close to another device, and so they should keep the correct distance between each other



In a factory, with machine noises, the Beacon (that can be placed on the wrist of the employee through a wristband), will vibrate during a contact. In this way the employee will know that he is too close to another employee, and that he needs to distance himself from nearby colleagues.

09

OTA (Over The Air) Function

WHAT IS IT?



Our Beacony supports the OTA (Over The Air) feature. This means that a firmware can be uploaded on the chip using Bluetooth communication. This function makes the update of several Beacons easier than before (when the upload of a new firmware required to physically pin the Beacony on a machine).

The OTA function also allows to maintain the previous configuration set on the previous firmware.

HOW IT WORKS?

This procedure can be done using one of our apps, called "Beacony Update". With this app you can easily choose the firmware that you want to upload on the Beacony (delivered by us as .zip file), and uploading it on several beacons one at the time.



10 WhiteList Function

WHAT IS IT?



Our Beacony also implements a function called "WhiteList".

This function allows the user to choose a list of MAC ADDRESSES (up to 20 devices), to be "avoided" by the Beacony that is using that list.

As long as an address remains in this list, the Beacony won't store the address of the Beacony contained in the list.

This list was introduced to avoid "obvious" contacts that are needed or unavoidable.

CAN I REMOVE THIS ADDRESS LATER IN THE FUTURE?

Yes, the list can be altered and also seen.

You can request to:

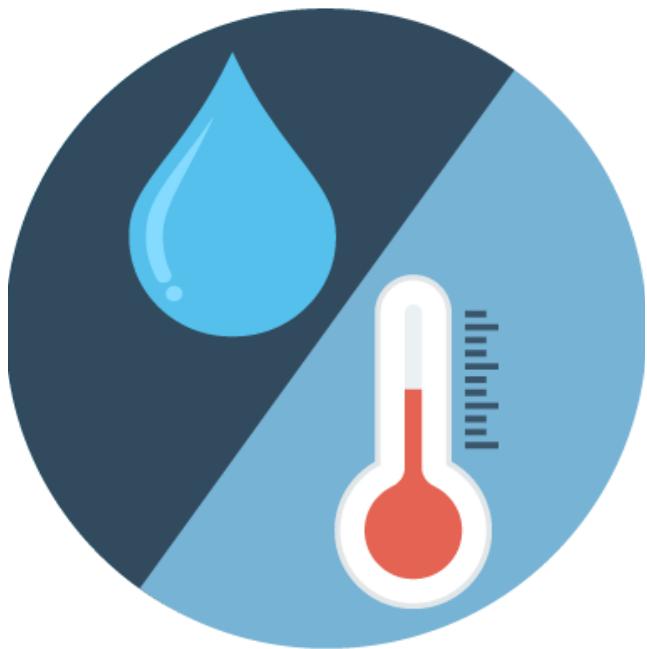
- Add 1 or more addresses to the list
- Remove 1 or more addresses to the list
- View the entire list



11

Datalogger Functions

WHAT IS IT?



Our Beacony has the datalogger function integrated to keep tracks of temperature and humidity. You can set the thresholds of both, and you can also set how long you want to register the data.

HOW IT WORKS?

If the temperature/Humidity registered by the Beacony exceeds the thresholds set by the user, that temperature/Humidity value will be stored in the Beacony's memory, along with the date and time.

These values can be downloaded from the memory and they can also be deleted.



Learn more about us

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