

WHITEPAPER

Asset Tracking with Bluetooth Low Energy

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Bluetooth Low Energy

Bluetooth Low Energy (BLE) is a variant of the Bluetooth technology commonly used in wireless consumer electronics. It supports short-range communication, low energy, low cost, and compatibility with gateways, cellphones, laptops, etc. It is an excellent technology for asset tracking. This paper explains how it works and the related use cases.

1. Bluetooth Beacons, Tags or Labels:

- Bluetooth tags are attached to small or lower-value assets. These tags periodically advertise beacon signals (configurable interval and TX power).
- The tag does not require a SIM or data plan, and the battery life can be years, depending on the battery capacity and advertisement interval.
- Tags can also report sensor information, like temperature and humidity, water level, etc.
- Bluetooth gateway devices, cellphones, or other Bluetooth devices receive the signals from Bluetooth tags.



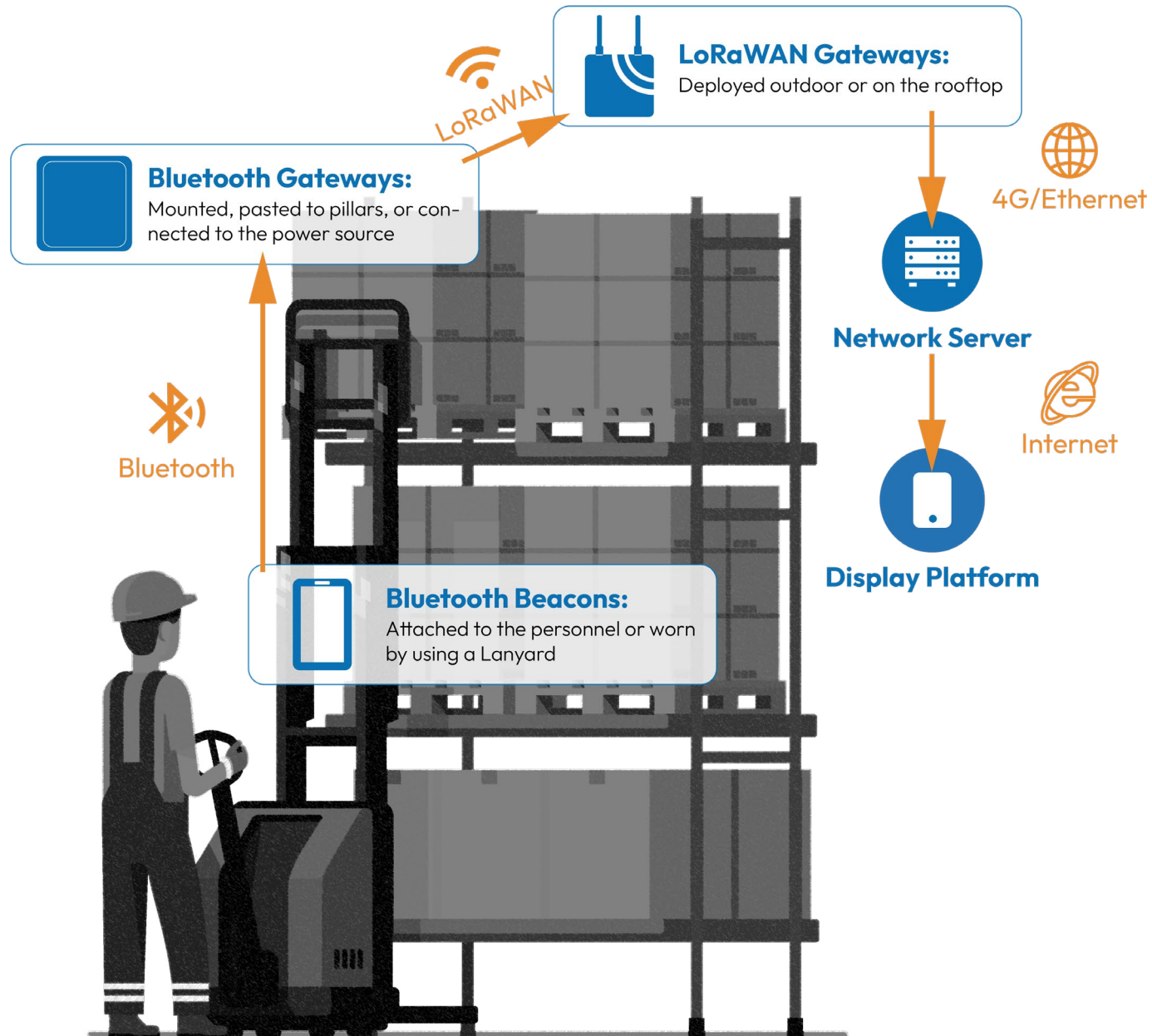
2. Bluetooth Gateway Devices:

- Gateway devices house Bluetooth 5.0, LoRaWAN, NB-IoT, LTE-M, Wi-Fi, or Ethernet.
- When a signal from a Bluetooth tag is received, the gateway sends a list of nearby tags to a central tracking platform. Lansitec Bluetooth gateway supports filtering data in a BLE payload. So, the gateway can filter and send the tag's ID, battery level, temperature or sensor data and RSSI.
- Bluetooth gateways require long-range connectivity to transmit data.



3. Platform:

The platform uses RSSI, the Received Signal Strength Indicator to calculate the distance between the beacon and the gateway and then display the position and other data.



Several factors influence the accuracy of distance measuring with BLE RSSI

1. Shadow Effect: signals are reflected by walls and glasses around many times during the transmission. If an object moves due to diffraction, the signal path will be changed, making the signal strength received unstable.
2. There are many devices on 2.4G, WIFI, Bluetooth, and Zigbee. The signals may overlap with each other, and this makes the signal strength received unstable., etc.
3. We have run tests to find the best threshold stands for 2m. But, the result may be 1 or 3m. For example, when someone turns his back at the same location, RSSI changes, but the distance does not.

Lansitec has **Bluetooth AoA (Angle of Arrival)** solution with up to 10cm accuracy. Please refer to PN: 930-00195 “**Emergency Safety & Production Management Intelligent accurate-tracking solution**”.

Dealership Car and Car Key Management

Track cars and car keys in real-time to improve efficiency and ensure you never lose a deal when finding a car.



Bluetooth tags are attached to car keys and hang on the rearview mirror .



Bluetooth gateways are deployed at the key room, car repair workbench and the parking lot.

Track Assets of All Sizes & Values

Real-time asset tracking and alert of illegal movement and theft.

Bluetooth tags are ideal for tracking tools, smaller equipment, or mid-sized non-powered assets where larger and more expensive devices are not practical, i.e., assets in hospitals and labs.

Gateway devices can be:

- Install on non-powered rooms. (Lansitec Macro Bluetooth gateway)
- DC-powered (LoRaWAN or NB-IoT/LTE-M Bluetooth gateway)
- Solar-powered for outdoor vehicle, personnel and asset tracking.
- Hard-wired into Ethernet. (Ethernet Bluetooth gateway)

A gateway receives the Bluetooth tag's signal when it is nearby, and the asset's approximate location is displayed on the tracking platform. When an asset is close to an exit, the proximity sensor can detect it, beep and flash to alert the user and administrator.



Inventory & Asset Management Across Sites

- Place gateway devices in warehouses or delivery vehicles.
- Attach Bluetooth tags to pallets or boxes of stock.
- The nearest Bluetooth gateway automatically reports its location as stock moves between warehouses and vehicles
- Easily locate the last known position of your inventory in the tracking platform.

Cold Chain Management & Sensor Monitoring

- Bluetooth sensors are used to collect data on temperature, humidity, and CO2 levels.
- Sensors are placed in freezers, refrigerated trucks, or storage rooms.
- Gateway devices installed in trailers or vehicles receive data from the sensors and report it to the tracking platform.



Smart Farming

- Attached a beacon on cattle or sheep's ear tag.
- Use a Bluetooth water level sensor to monitor the tank status to ensure water is always available.
- Bluetooth gateways can be used to track cattle and sheep when they come to drink water or back to the shelter. Then, the farm owner will know which cattle is lost if it does not come to drink water for a few days.

Lansitec Bluetooth Gateway Features

1. Versatile Power Supply and Installation:

- Indoor DC-powered with standby battery
- Indoor AC-powered with standby battery
- Outdoor IP66 rated Solar-powered
- Indoor and outdoor IP66 rated big battery-powered
- Proximity sensor for alert

2. White Label Ready

We can print your logo, slogan, and QR code on the housing with any color.

3. Universal Compatibility with third-party beacons, tags or sensors

You can choose whatever data you need from a BLE payload and have the gateway to send a maximum of 3 different kinds of BLE devices.

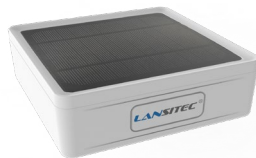
For more information about our Bluetooth tags and gateways portfolio please refer to the links below or reach out to us for our Product Catalog:

<https://www.lansitec.com/beacons/>

<https://www.lansitec.com/gateways/>



**Compact
Bluetooth Gateway**



**Solar
Bluetooth Gateway**



**Macro
Bluetooth Gateway**



**Indoor
Bluetooth Gateway**



**SocketSync
Bluetooth Gateway**

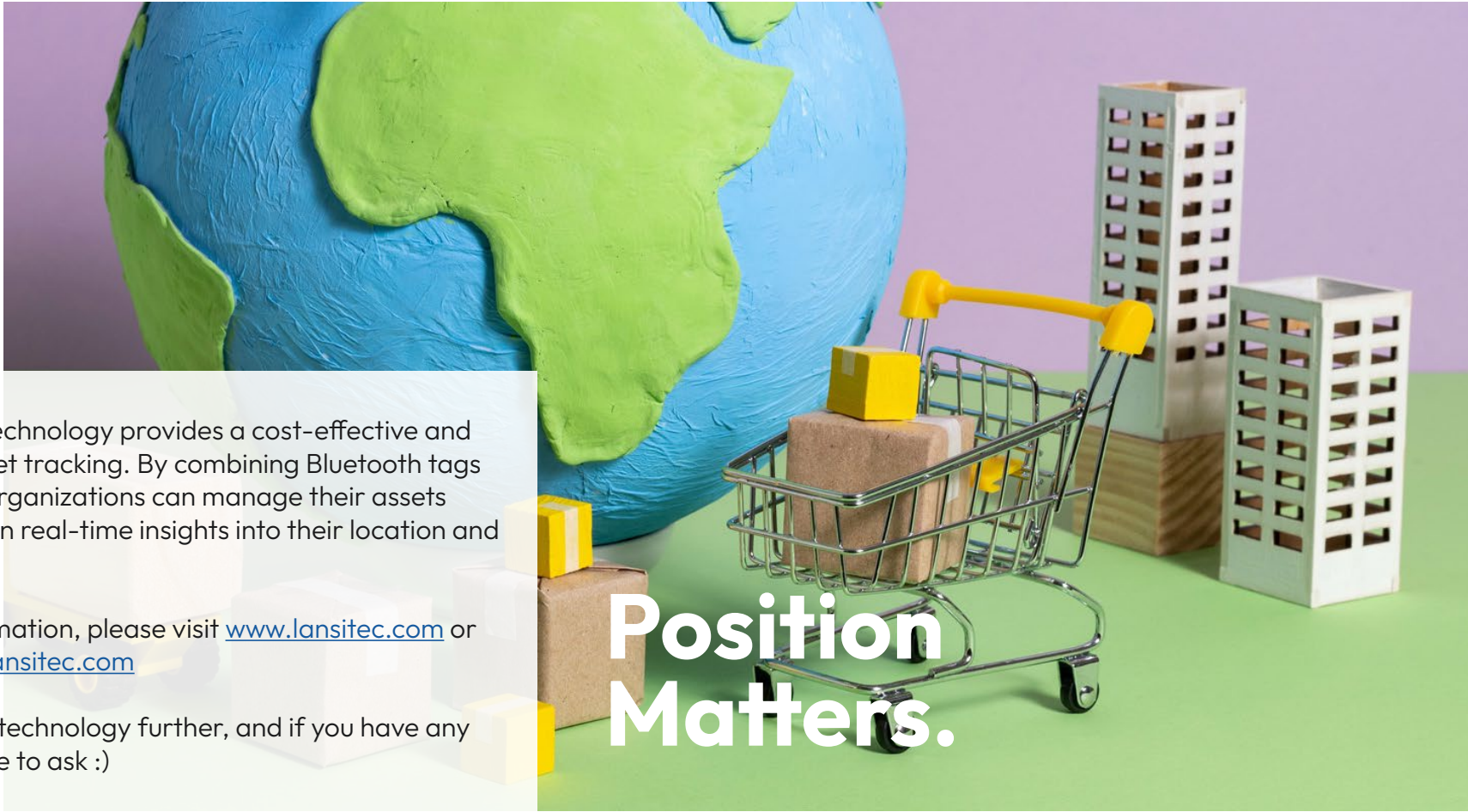
Key Features	Compact size	Solar panel charging	Large-capacity battery	PoE connection	Easy installation
Connectivity	LoRaWAN/NB-IoT	LoRaWAN/NB-IoT	LoRaWAN/NB-IoT	LoRaWAN	LoRaWAN
Environment	Indoor	Outdoor	Indoor & Outdoor	Indoor	Indoor
Dimension	97*62*7mm	160*160*55mm	160*160*55mm	120*120*31mm	81*61*26mm
IP Rating	-	IP66	IP66	-	-
Operating Temperature	-10°C ~ +60°C	-40°C ~ +85°C	-40°C ~ +85°C	-40°C ~ +85°C	-10°C ~ +60°C
Power Supply	Li-ion rechargeable, 600mAh	Li-ion rechargeable, 5300mAh	Li-SoCl ₂ Battery, 19000mAh x2	Li-ion rechargeable battery, 600mAh	Li-ion rechargeable battery 300mAh
Charging Method	Micro USB	Solar Panel, 3W	-	Power over Ethernet	Device itself pluggable



Bluetooth Low Energy technology provides a cost-effective and efficient solution for asset tracking. By combining Bluetooth tags with gateway devices, organizations can manage their assets more effectively and gain real-time insights into their location and condition.

For more detailed information, please visit www.lansitec.com or contact us at contact@lansitec.com

Feel free to explore this technology further, and if you have any other questions, feel free to ask :)

A conceptual image featuring a large globe, a shopping cart with cardboard boxes, and two white building models on a green surface. The globe is made of clay and shows the continents of Africa and Europe in green against a blue ocean. The shopping cart is a small metal cart with a yellow handle, containing several cardboard boxes. The buildings are white, rectangular structures with a grid of small square windows. The entire scene is set on a green surface against a light purple background.

Position Matters.