



LoRa

Tracking Management Solution

COMPARISON

LoRaWAN

NB-IoT

Modulation	Chirp spread spectrum modulation	Quadrature phase shift keying modulation
Frequency	“Unlicensed ISM bands 868MHz in Europe 915MHz in North America 470MHz in China”	Licensed LTE frequency Bands.
Bandwidth	125KHz, 250KHz and 500KHz	200KHz
Link Budge	165dBm	164dBm
Maximum message/day	Unlimited	Unlimited
Data Rate	300bps~21Kbps	158.5Kbps (UL), 127Kbps (DL)
Payload Length	11~242 bytes	Max. 1600 bytes, depending on the operator
Range	5 km in urban, 20 km in rural area.	1 km in urban, 10 km in rural area.
Interference Immunity	Very high	Low
Device Movement	Support	Not appropriate for moving devices
Authentication and Encryption	AES 128b	256-bit 3GPP encryption
Adaptive Data Rate	Adaptive Data Rate (ADR).	Does not support ADR
Gateway	8 uplink and 1 downlink channels, 16 uplink and 2 downlink channels	Not needed
SIM Card	Not needed	Yes
Network Capacity	The capacity can be expanded according to the needs. Please reach out to us for further information	Depending on the operators’ network
On-Premise Deployment	Yes	No
Cloud Deployment	Yes	Yes
Battery Power Consumption	x	2x
Continous TX Deploy	4s	0s

B-Mobile® Solution

B-Mobile® refers to Bluetooth Beacon Mobile.

1. Deploy Bluetooth gateways at fixed locations.
2. People wear badge beacons or put tags on assets.
3. Bluetooth beacons (badge, tag, label, bracelet, sensor) advertise UUID, major, minor, temperature, or other data periodically. The maximum transmit distance is 150m.
4. The Bluetooth gateway receives and restructures the data from the beacons and forwards it to a LoRaWAN gateway.
5. The LoRaWAN gateway sends the data to a LoRaWAN network server (Chirpstack, TTS, Senet, Everynet, .etc.) and then to your APP. Since the server knows the coordinates of the gateways, it can calculate the beacons' coordinates according to the RSSI and display them in the APP.

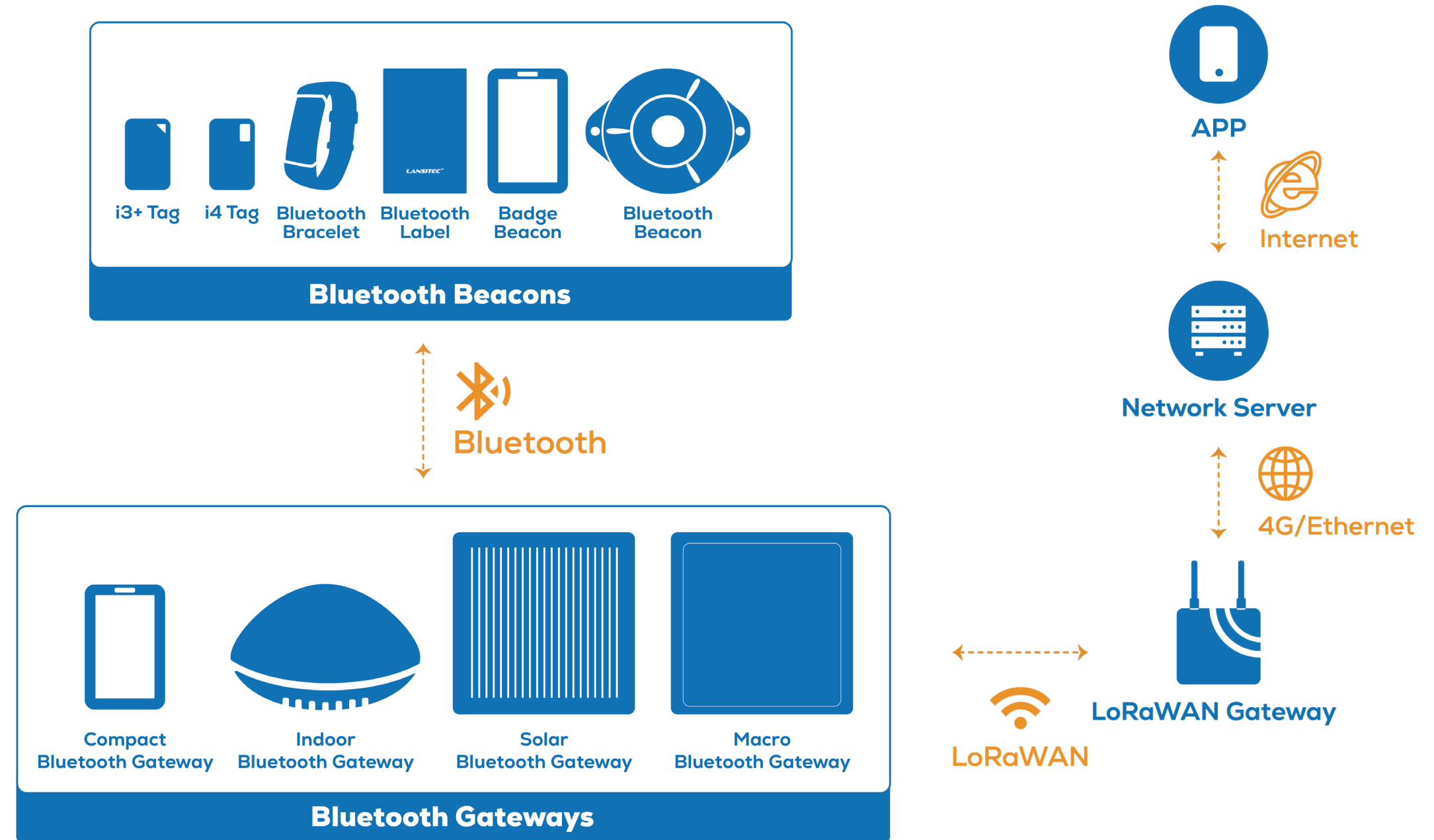


Figure 1. B-Mobile (LoRa) Solution Data Flow

B-Mobile® Deployment

Product List

Bluetooth Beacon

- Badge Beacon
- i4 Asset Management Label
- i3+ Portable Label
- iBeacon Bluetooth Beacon
- Bluetooth Bracelet
- Bluetooth Label

Bluetooth Gateway

- Solar Bluetooth Gateway
- Macro Bluetooth Gateway
- Compact Bluetooth Gateway
- Indoor Bluetooth Gateway

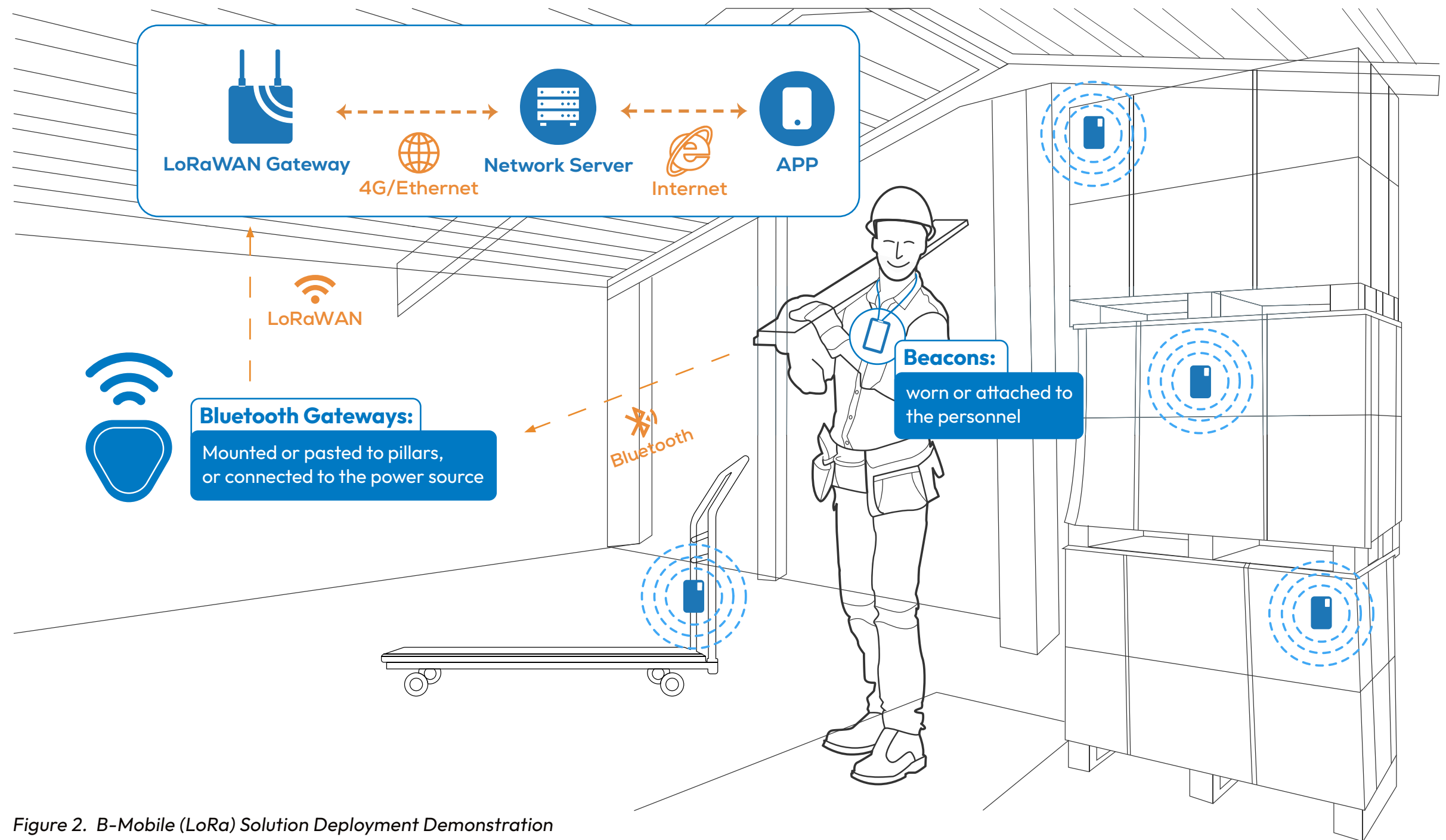


Figure 2. B-Mobile (LoRa) Solution Deployment Demonstration



Indoor Bluetooth Gateway

Tracking in indoor locations
Data collection



Solar Bluetooth Gateway

Tracking, data collection
Network cabling free , solar powered
Maintenance free



Macro Bluetooth Gateway

Tracking, data collection,
wire-arrangement free,
Up tp 8 year battery life



Compact Bluetooth Gateway

Indoor tracking, movement alarm,
Facility usage statistics,
door opening statistics,
Personnel sign-in
Build-in battery for sudden power outage



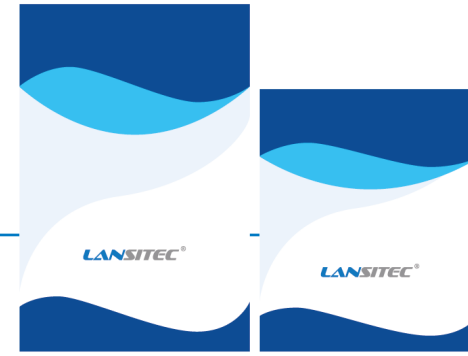
i3+ Portable Label

Indoor tracking, movement alarm,
Facility usage statistics,
door opening statistics,
Personnel sign-in



i4 Asset Management Label

Asset tracking (Tamper detection),
Box opening notification



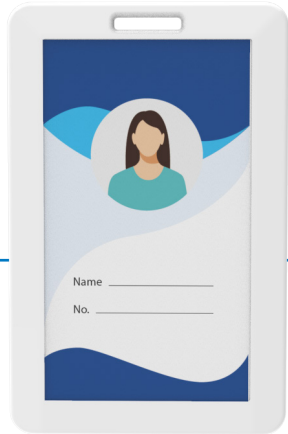
B002 Bluetooth Beacon

Flexible advertisement interval
Advertisement based on movement
Battery level report



Bluetooth Beacon

Ultra-long standby time
Indoor tracking



Badge Beacon

Worker tracking
Chemical factory staff tracking

B-Mobile® Use Cases

Personnel Management

- Geo-fence: Automatic voice remind around the area of deep foundation pit
- The working status of intelligent analysis
- Real-time attendance
- Ultra-long standby time
- Support voice alarm
- RFID supported
- Real-name authentication
- Safety certification



B-Mobile® Use Cases

Vehicle Management in parking lot

- Indoor and outdoor real-time tracking
- Car key tracking
- Geo-fence: drive in or out notification
- Vehicle self-service pickup and return

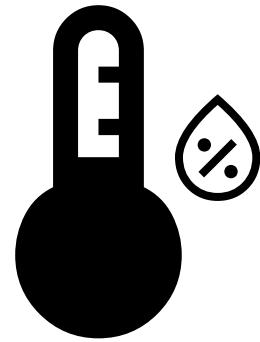


Hospital Asset Management

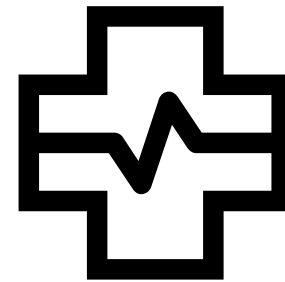
- Indoor and outdoor real-time asset and people tracking
- Emergency call
- Geo-fence: in or out notification
- Real time asset and people quantity audit



BLE Data Communication



Temperature & Humidity



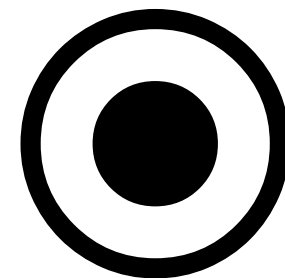
Heart Rate Monitor



Lock and Unlock



Step Counting



Panic Button



Motion Sensing

B-Mobile® Placement Scenario

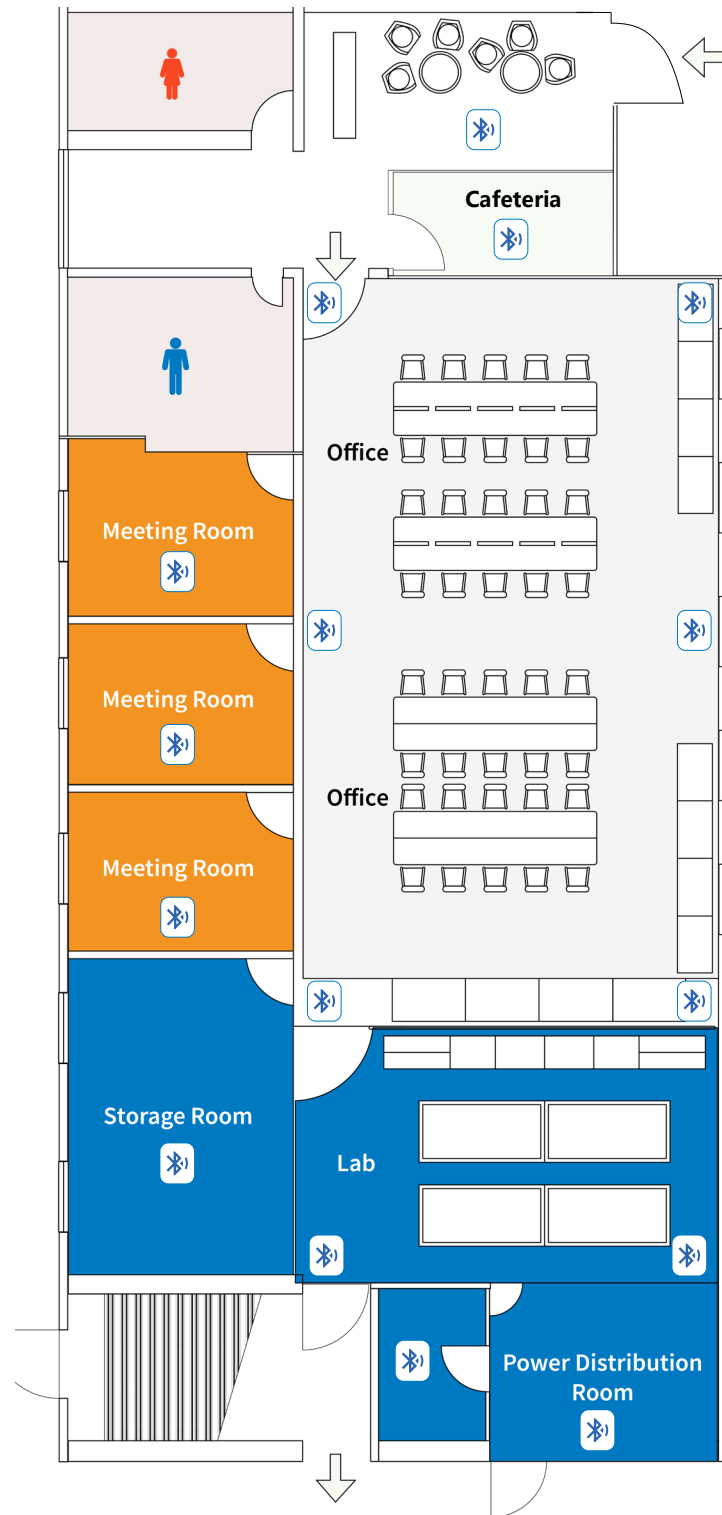


Figure 3. B-Mobile (LoRa) Solution Placement 1

PLACEMENT

This scenario applies to projects with more small rooms or security inspection.

Procedure

1. Attach a beacon on an asset, or people wear tags. The beacon and tag advertise messages periodically.
2. Deploy Solar Bluetooth Gateway outdoor.
3. The Bluetooth gateway forwards beacon information (major, minor, RSSI, or other data) to a LoRaWAN gateway when beacons enter or leave its coverage.

Accuracy

This scenario determines whether the beacon is in the room or its coverage.

Presence Detection

The distance between the beacon and gateway can be calculated, but the direction is unknown. Gateways may receive the beacon signal in nearby rooms. Please refer to B-Mobile Personal & Asset Tracking Solution (Doc. Number 990-00169) for a detailed explanation of calculating the distance and differentiating beacons.

Network Server

All LoRaWAN network servers are supported. Please refer to documents 990-00271 and 990-00272 if you want to know how to connect a Lansitec device to an NS.

APP

We provide a free web-based application for you to evaluate the hardware and demo.

B-Fixed[®] Solution

B-Fixed[®] refers to Bluetooth Beacon Fixed.

1. Deploy beacons at fixed positions, for example, check-point, on a pillar, wall, or inside a room.
2. A beacon sends UUID, major, minor, etc., periodically. The maximum transmit distance is 150m.
3. Badges and trackers receive beacon information, restructure and forward Major, Minor, and RSSI to a LoRa Gateway. The transmit distance is longer than 1km.
4. Since the server knows the beacons' coordinates, it can calculate trackers' coordinates according to the RSSI and displays them in the APP.

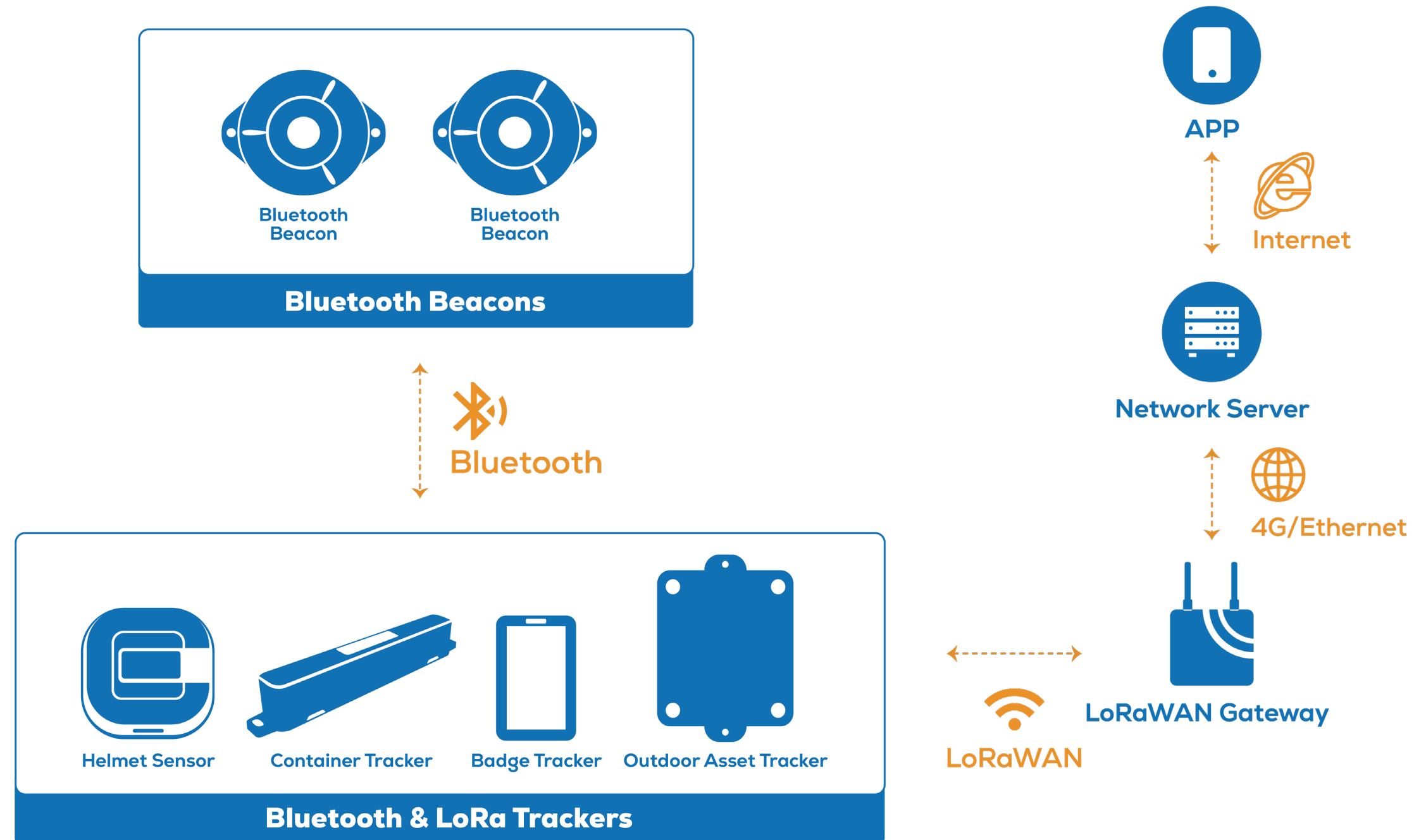


Figure 4. B-Fixed (LoRa) Solution Data Flow

B-Fixed[®] Deployment

Product List

Bluetooth Beacon

- Bluetooth Beacon
- Rail Beacon

Bluetooth & LoRa Tracker

- Badge Tracker
- Outdoor Asset Tracker
- Helmet Sensor
- Container Tracker

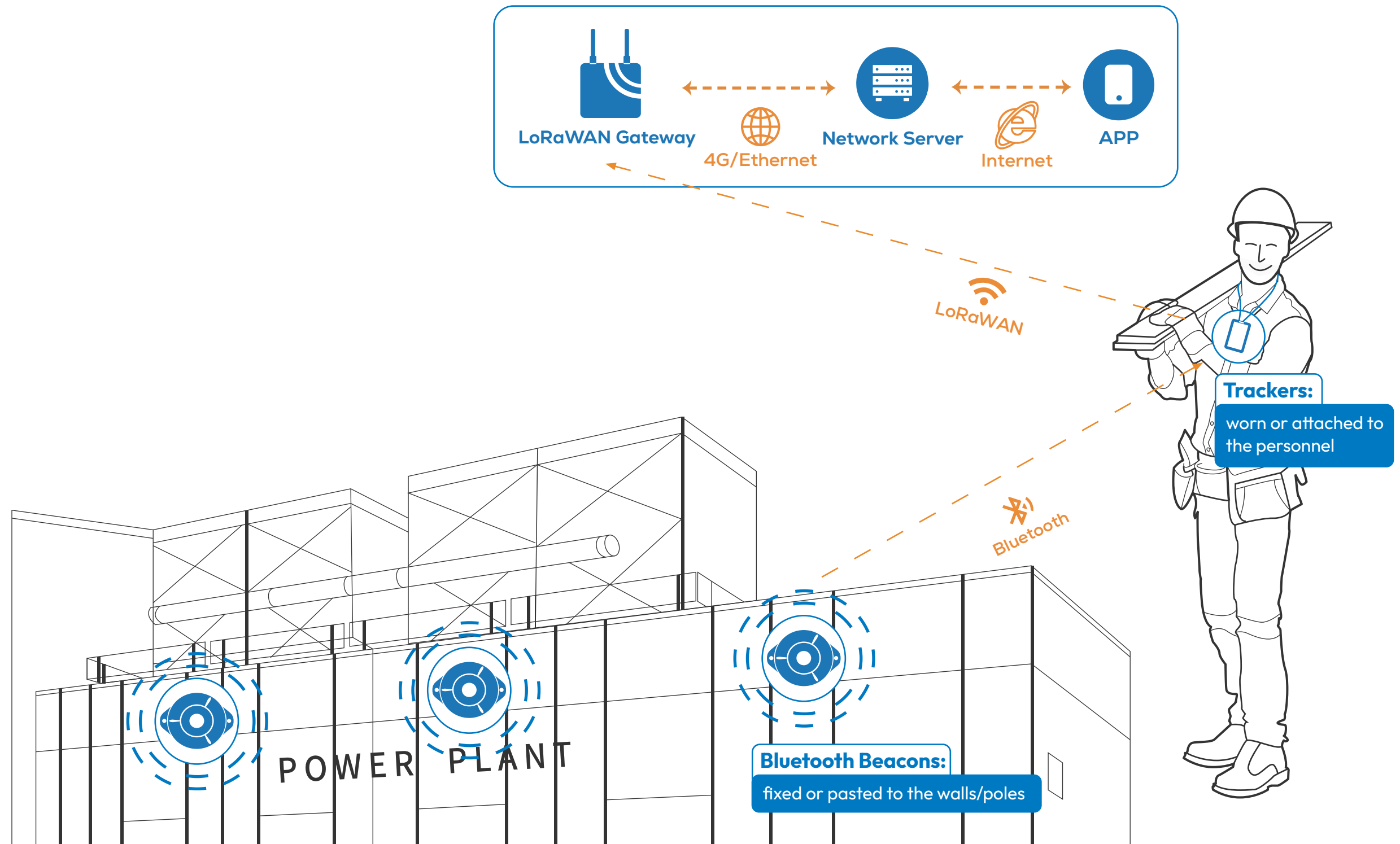
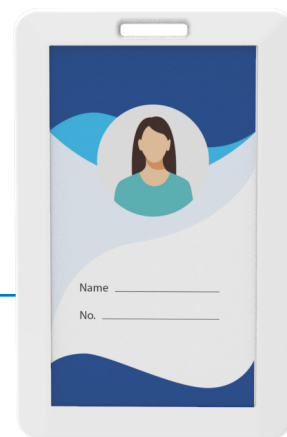


Figure 5. B-Fixed (LoRa) Solution Deployment Demonstration

B-Fixed® Products



Badge Tracker

Factories, buildings, construction sites and offshore worker tracking
(indoor and outdoor),
GPS tracking, fall-off alarm (to be supported)



Container Tracker

Highly versatile and precise tracker for
tracking logistics, containers, pallets, and vehicles



Helmet Sensor

Worker tracking, personnel sign-in, fall-off alarm
Ultra-long standby time
Wearing Detection



Outdoor Asset Tracker

Indoor and outdoor tracking, moving alert,
Ultra-Long standby time

B-Fixed[®] Use Cases

Container or Asset Management

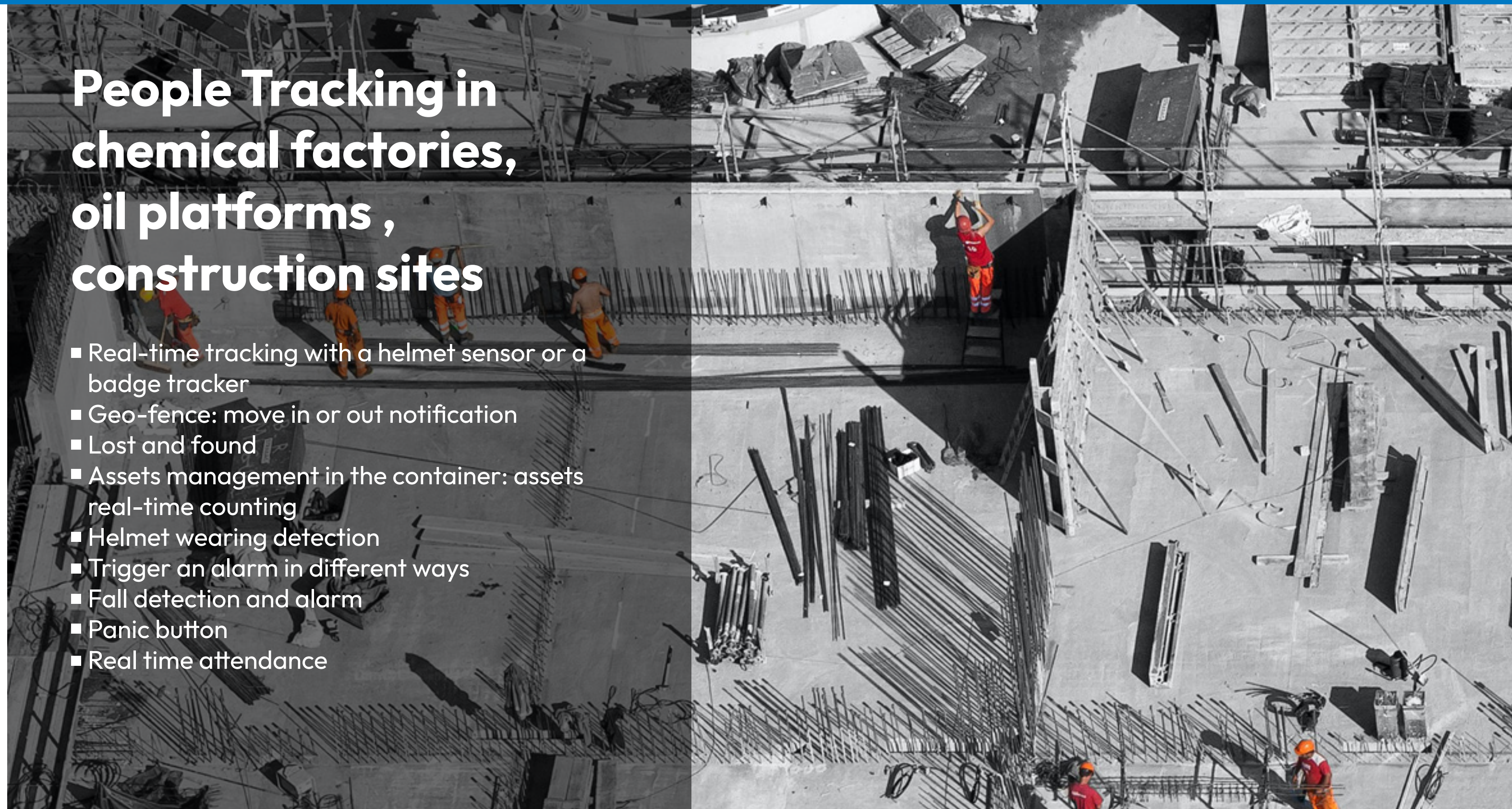
- Real-time tracking
- Geo-fence: move in or out notification
- Lost and Found
- Assets Management in the container:
assets real-time counting



B-Fixed[®] Use Cases

People Tracking in chemical factories, oil platforms , construction sites

- Real-time tracking with a helmet sensor or a badge tracker
- Geo-fence: move in or out notification
- Lost and found
- Assets management in the container: assets real-time counting
- Helmet wearing detection
- Trigger an alarm in different ways
- Fall detection and alarm
- Panic button
- Real time attendance



B-Fixed® Placement Scenario

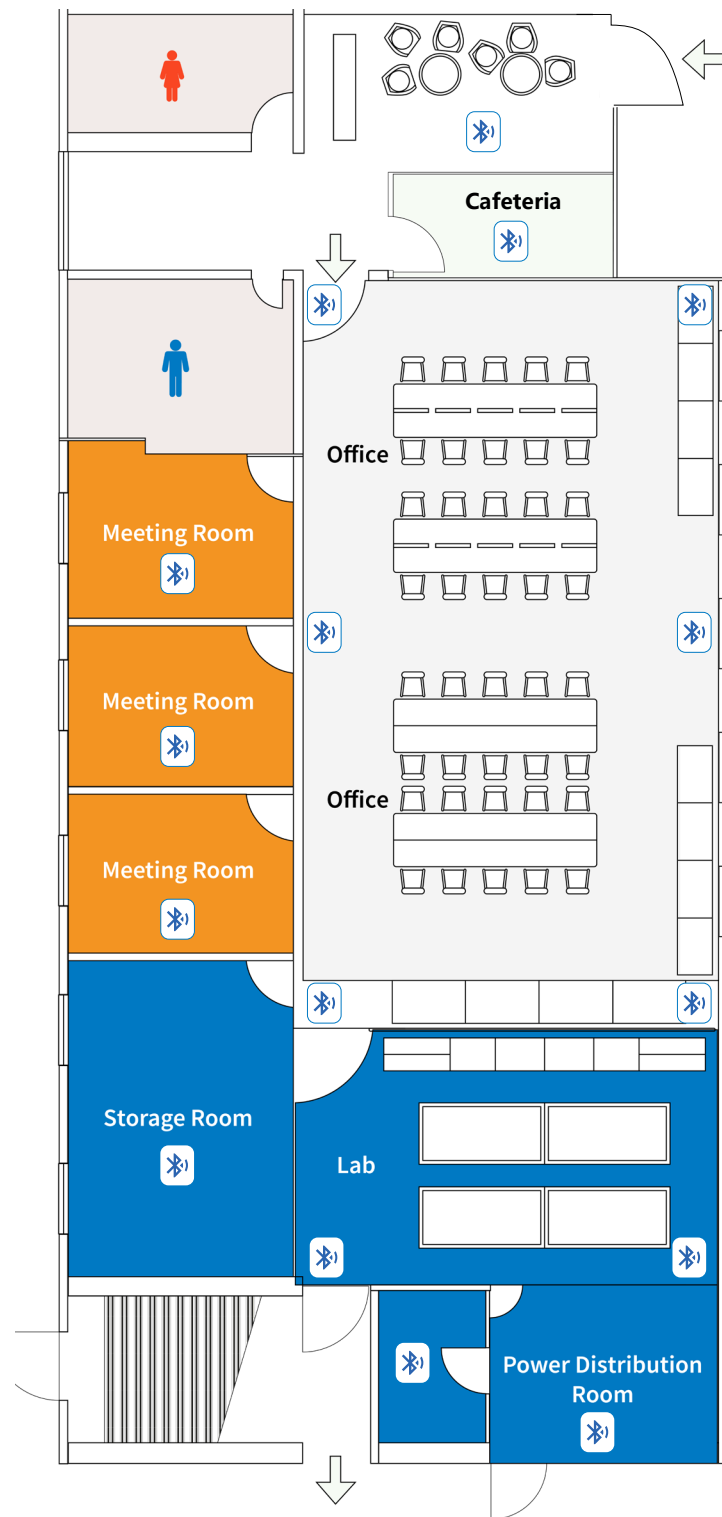


Figure 6. B-Fixed (LoRa) Solution Placement 1

PLACEMENT

Presence Detection

USE CASE

Worker Management, Asset Tracking

Procedure

1. Deploy beacons in meeting rooms, power distribution rooms, or checkpoints. Beacons keep advertising iBeacon messages.
2. The tracker receives these messages, restructures, and transmit the data (major, minor, RSSI) to a LoRaWAN gateway.
- 3 The Bluetooth gateway forwards beacon information (major, minor, RSSI, or other data) to a LoRaWAN gateway when beacons enter or leave its coverage.

Accuracy

This scenario determines whether the tracker is in the room or its coverage.

Algorithm

The distance between the beacon and tracker can be calculated, but the direction is unknown. Please refer to B-Fixed Personal & Asset Tracking Solution (Doc. Number 990-00170) for a detailed explanation of calculating the distance.

Network Server

All LoRaWAN network servers are supported. Please refer to documents 990-00271 and 990-00272 if you want to know how to connect a Lansitec device to an NS.

APP

We provide a free web-based application for you to evaluate the hardware and demo.

B-Fixed[®] Placement Scenario

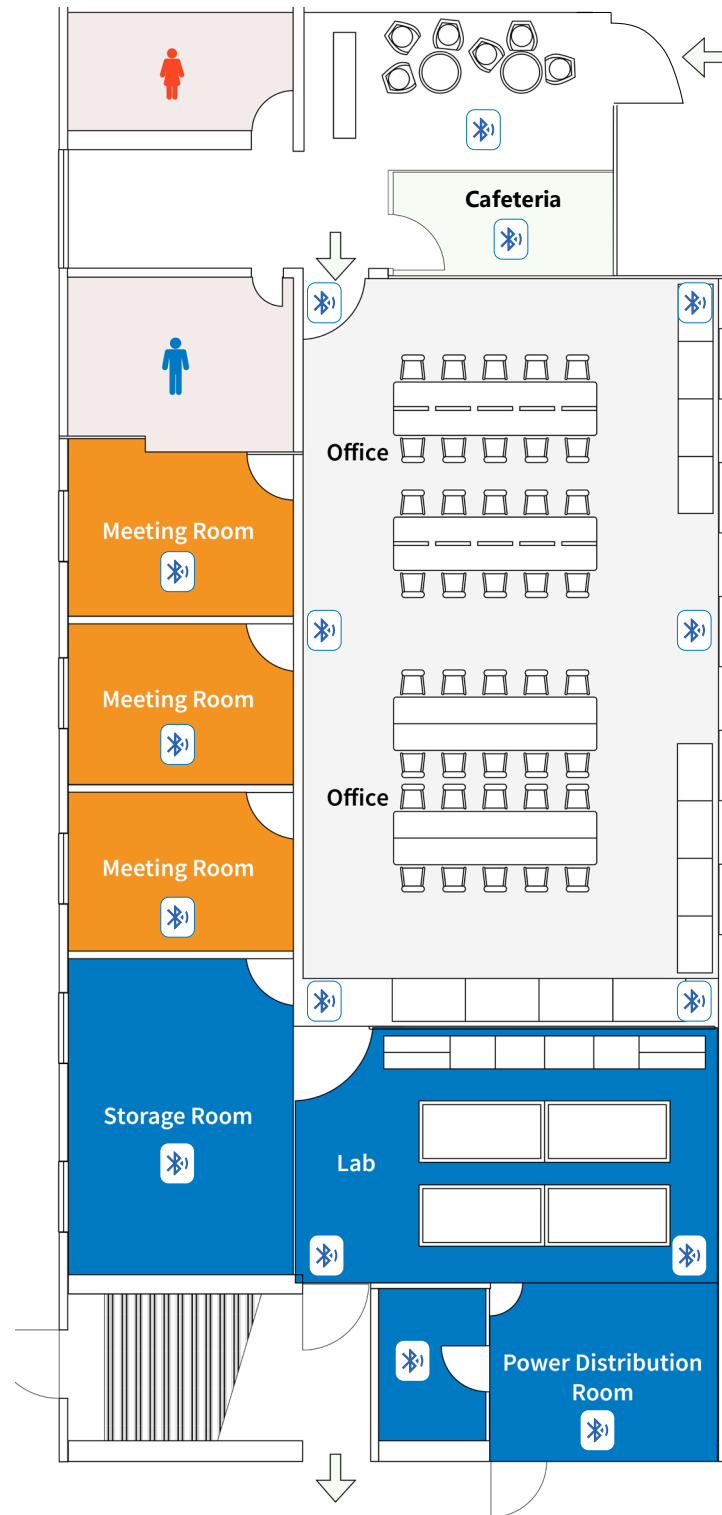


Figure 7. B-Fixed (LoRa) Solution Placement 2

PLACEMENT

Triangulation

Procedure

1. Deploy beacon about 10m from each other in each corner of the office as shown on the map.
2. Tracker sends all 3 beacons' information (major, minor, RSSI etc.) to the network when it enters beacon coverage and receives its signal.

USE CASE

Accurate asset management in warehouses and tunnels

Procedure

1. Deploy beacon about 10m from each other in each corner of the office as shown on the map.
2. Tracker sends all 3 beacons' information (major, minor, RSSI etc.) to the network when it enters beacon coverage and receives its signal.

Accuracy

Up to 3m

Algorithm

Triangulation and filtering algorithm. Please refer to B-Fixed Personal & Asset Tracking Solution (Doc. Number 990-00170) for a detailed explanation of calculating the distance.

APP

We provide a free web-based application for you to evaluate the hardware and demo.

Note

Presence detection, triangulation and GNSS can be used in the same solution. The tracker switches automatically.

Solution Comparison

B-Mobile®

B-Fixed®

Cost	Beacons are low-cost	Trackers cost higher
Standby Time	Beacon: up to 6 years	Rechargeable tracker: months
Installation	Bluetooth gateways must be powered with AC. Solar gateways must face the sun	Non-chargeable tracker: years Beacons are installed with double-side tape
Usage Cost	Beacons will be replaced when the battery drains	Trackers must be charged
Tracking Range	Only Bluetooth can be used to track both indoor and outdoor	Use Bluetooth and GNSS to track indoor or outdoor
Bluetooth Device Access Capability	Every gateway accesses a maximum of 400 beacons	The beacon sends information and there is no limit to the number of trackers which receive Bluetooth information