BLE is a beacon-based asset tracking system, which is more cost-effective and scalable. One of the best things about using BLE or any Bluetooth-based tracking system is the ability to design the entire system. You can stylize it any way you want, depending on your requirements and budget. For instance, it is possible to generate a system that tracks assets indoors without human intervention. The transmission is automatic, which therefore reduces the costs needed to pay an employee.

Bluetooth Low Energy can be combined with other methods of tracking, including barcode and QR code scanning using Bluetooth beacons. Another way to use the system is to have an existing Bluetooth mesh network, which can transmit the location of an asset to the cloud.

An Overview of How BLE Technology Works

Bluetooth Low Energy is used in different gadgets, including blood pressure monitors, smartwatches, and industrial monitoring sensors. It is also quite popular in promotions that target a location. Public transportation apps utilize BLE as well.

When used in asset tracking, it has a specific device's Gateway and the Bluetooth Tag. In essence, the relationship between the gateway and the tag involves the tag sending a beacon, which the Gateway devices will pick up.

Bluetooth tags are positioned on an asset that is typically smaller or has a much lower value. These tags will then send beacon signals periodically. The frequency can be configured, but it is usually every few seconds. The Bluetooth Gateway Devices detect these beacon signals, and the tracker will provide the GPS location of an asset. They can also find other Bluetooth signals in the area.

Once a signal is picked up by the Gateway device, it will send a list of the existing tags in a particular site to the main central device. From there, the user can see the approximate location of an object on the map.

Advantages of BLE

BLE (Active RFID)

- **If your goal is to make compliance easier and more streamlined, BLE may be your best bet**. For instance, you can use an active RFID system to track and report equipment that is shipped to or from your building for reporting purposes.

- **If you need to get a handle on quality control, BLE is ideal**. You can use an active Bluetooth-based RFID system to, say, track pallets to ensure all of your fresh produce leaves the plant on schedule.
- **If you want to monitor visitors or vendors on your property or job site, look into a BLE system**. You can integrate active RFID into an ID or visitor badge and help mitigate any potentially harmful or hazardous situations.

Pros: In the case of a BLE location system, beacons function as signal transmitters that are majorly battery-powered and can be configured with the help of a mobile app. This makes them scalable and highly portable. Adding on to that, the capability of beacons to allow smartphones to primarily act as the receivers makes it a highly accessible location technology.

Cons: Beacons once installed need to be checked regularly for battery levels, etc. One of the ways of going about this would be to walk around with a scanner app in the area where you have deployed beacons, to detect which beacon has run out of battery. However, that is a very painful and time taking process when done on a daily basis. Instead, businesses could opt for a beacon management platform such as Beaconstac that comes with a dashboard that allows businesses to keep a check on the health of beacons with ease.

Pros: Since beacons are primarily detection devices that broadcast outbound signals, there is no inherent security risk in the transmission.

Pros: Beacons typically have a wireless range of 1m to 70 m.

The main costs associated with a beacon system are:

(a) Beacon hardware (including the cost of deployment) – While beacons by themselves are relatively cheap (a typical beacon would cost you anywhere between $10 to $70), the number of beacons required depends on the size of the space and range required.

(b) Licensing/data service costs – This is typically dependent on the volume of interactions being processed.

(c) App and integration costs – This includes fees associated with leveraging a third-party app and integrating it with your third-party software such as CRM.

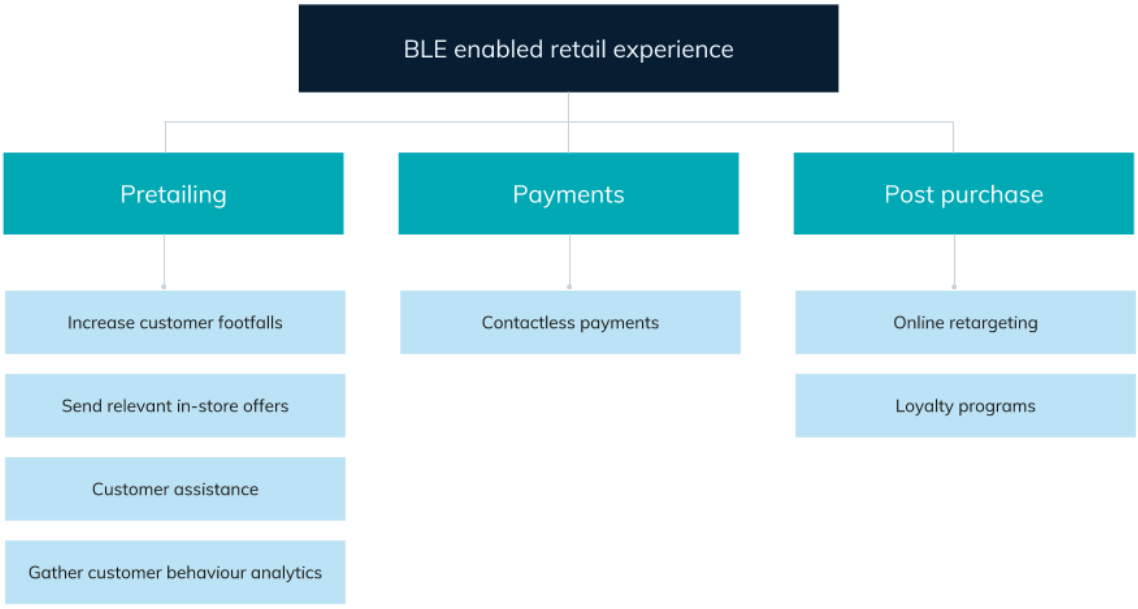
(d) Gateway costs - No additional costs will be incurred since mobile phones can be used to integrate the IoT platforms and monitor the information provided by the tags.

Data acquired by BLE Tags:

1. Location
2. Temperature
3. Humidity
4. Vibration(via inbuilt accelerometers in some models): Useful while checking the condition of in-transit fragile goods.

   **Instead of broadcasting IDs to mobile devices, the BLE beacon “listens” for the unique IDs of BLE tags attached to objects. Because these tags can be equipped with sensors—for things such as light, sound, movement, and temperature—the

applications are many, from the tracking of wheelchairs and infusion pumps in hospitals to monitor the movement, speed, and vibration of an airport baggage conveyor.



Source websites:
https://blog.beaconstac.com/2015/10/rfid-vs-ibeacon-ble-technology/

https://simply-unified.com.au/asset-tracking-with-bluetooth/#:~:text=Manufacturing%3A%20Bluetooth%20Low%20Energy%20technology,can%20also%20measure%20their%20efficiency