((O)) Blecon | THE CURVE

Smart Beacon Asset Tracking In Distributed Environments

Blecon and The Curve deliver Smart Beacon-powered asset visibility with minimal setup and maximum flexibility, even in low-connectivity environments.

Introduction

While planning a major upgrade to their asset tracking capabilities, a leading infrastructure company set out to overcome the challenges of operating in large, fast-changing sites with patchy connectivity and limited access to power.

The business needed a reliable way to record the location and condition of key assets throughout the day, even when they were offline for long periods. Their previous approaches using Wi-Fi and cellular had fallen short, with coverage gaps, high costs and added complexity in deployment.

Working in partnership, Blecon and The Curve delivered a Smart Beacon-based solution that logs accurate, timestamped data as assets move around sites and automatically uploads it when they come near gateways. By combining Blecon's cloud-native Beacon network with The Curve's firmware development and AWS integration expertise, the project shows how enterprises can gain full asset visibility without the burden of building and maintaining complex network infrastructure.

Challenge

Dynamic sites, limited infrastructure
The customer's projects were spread across large, constantly changing sites with temporary zones, metal structures and limited access to mains power. Running cables or installing powered gateways in all areas was not practical and coverage from Wi-Fi or cellular was unreliable.

Gaps in visibility
Earlier systems could only record when an asset was within range of a network connection. When assets moved into areas with no coverage, data was lost, leaving gaps in audits, analysis and compliance records. The customer needed a way to log activity and conditions while out of range, then automatically upload that data in order when back in range.

Scaling without complexity
The rollout needed to cover hundreds and eventually thousands of tagged assets. The solution had to be low-power, low-maintenance and easy to deploy across new sites without the need to build or maintain complex network infrastructure.

The Curve's client required a system that could:
- Log asset interactions and environmental context even when offline
- Deliver a complete, timestamped audit trail of asset movements
- Scale quickly across new sites with minimal infrastructure

Solution

Anchor Beacons
Placed at key site points, they provide location references and optional sensor data, ensuring assets are tracked even without connectivity.

Smart Beacon Lanyard
Roaming device scanning nearby beacons, logging activity with secure IDs and precise timestamps, and storing data until upload.

Offline Logging
Smart Beacons keep collecting data while out of range. When back near a Blecon Hotspot, they sync seamlessly with full audit trail timestamps.

Cloud Integration
When Smart Beacons reach a Blecon Hotspot, stored data uploads directly into AWS via open JSON for seamless analysis.

Time: 11:05 AM
Dwell: 120 Mins
Temp: 5 ℃
Zone: 8

Time: 10:50 AM
Dwell: 10 Mins
Temp: 22 ℃
Zone: 7

Time: 01:00 PM
Dwell: 45 Mins
Temp: 24 ℃
Zone: 6

Time: 9:45 AM
Dwell: 60 Mins
Temp: 10 ℃
Zone: 5

Time: 5:00 PM
Dwell: 120 Mins
Temp: 19 ℃
Zone: 9

Time: 8:35 AM
Dwell: 20 Mins
Temp: 1 ℃
Zone: 3

Time: 8:30 AM
Dwell: 5 Mins
Temp: 23 ℃
Zone: 2

Time: 9:00 AM
Dwell: 45 Mins
Temp: 24 ℃
Zone: 4

Starting Event Log
On-Site: 8:30 AM
Zone: 1

+10

Off-Site: 05:30 PM
Zone: 1

Uploaded:
10 Event Logs To The Cloud

Smart Beacons and firmware
Instead of developing new hardware from scratch, the project uses off-the-shelf Bluetooth Low Energy tags connected to the Blecon Network. The network provides secure identity, global time synchronisation and store-and-forward data transfer. The Curve's custom firmware applies these features to the client's needs, enabling tags to scan for beacons, log events with precise timestamps and upload the data efficiently when in range.

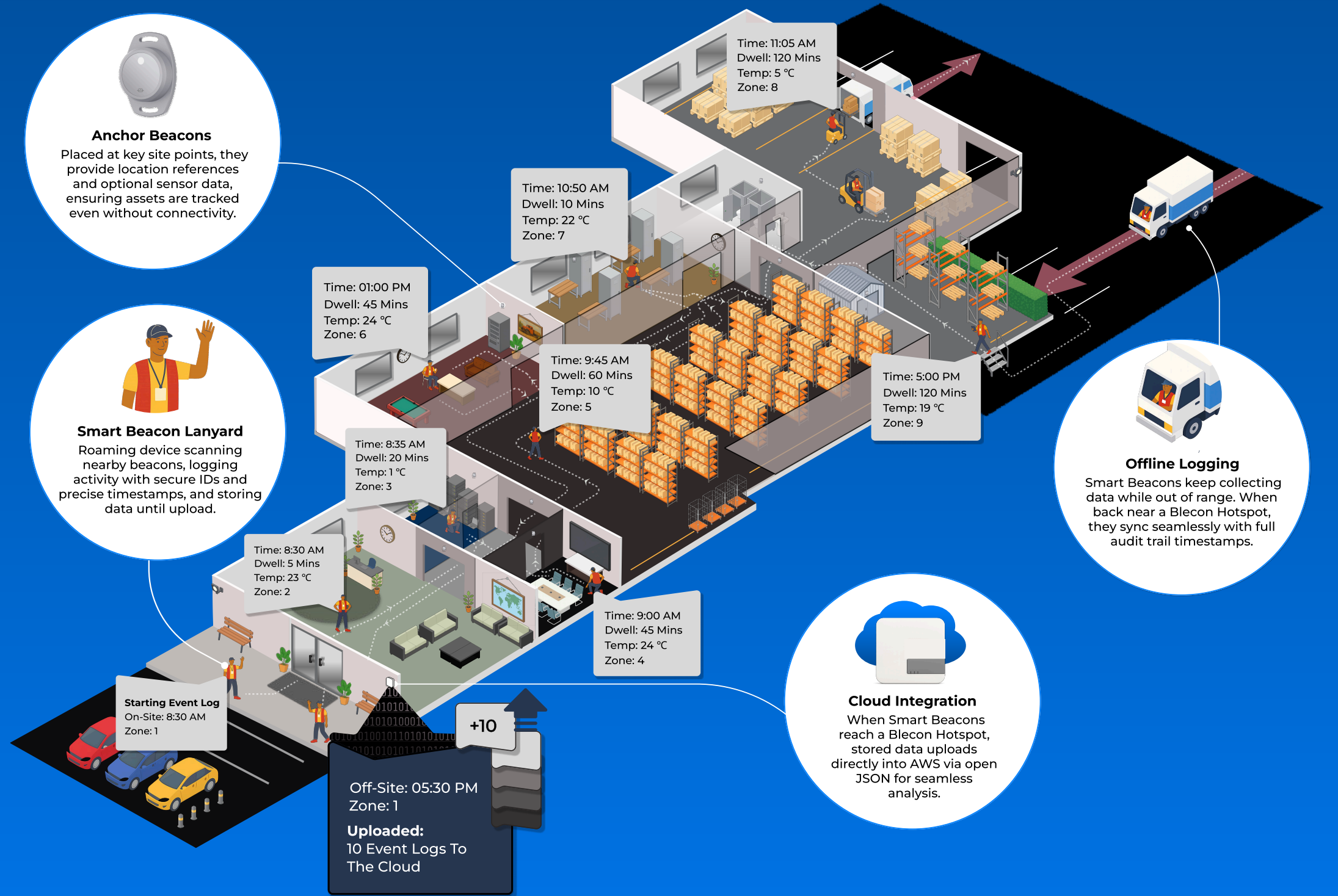## Anchor Beacons for location & sensing
Battery-powered beacons are placed at known points across the site. When a Smart Beacon comes within range, it records the encounter along with the beacon's identity and any sensor data it carries. This creates a reliable record of asset location and conditions over time, without relying on constant connectivity.

Log offline, sync when in range
Tags continue collecting and storing data even when they are out of network coverage. When they later pass a Blecon Hotspot, either a fixed hub or a mobile device running the Blecon app, all stored data is uploaded in order. Global time-stamping from the Blecon Network ensures that the resulting dataset is complete, accurate and ready for analysis.

Seamless AWS integration
The Curve developed a custom AWS backend and dashboard to display the data. Because Blecon's network outputs JSON that integrates directly with AWS services, the flow from asset to cloud is simple and reliable, allowing visualisation and analysis without additional middleware.

Results

The system is currently being utilised on active sites and is already delivering tangible benefits.

Complete data
Assets generate a continuous record of where and when they were seen, even in areas with no network coverage. Data captured offline is uploaded automatically when connectivity is available, creating a complete activity history for audits.

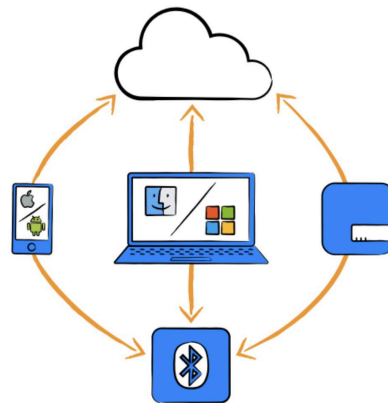### Fast deployment with minimal infrastructure
New sites require only a small number of Blecon Hubs or mobile hotspots. Because devices do not need pairing and hotspots can be positioned sparingly, The Curve's team can bring new locations online quickly: deploy anchor beacons, activate tags and let the system handle data uploads as soon as a hotspot is in range.

Low-touch, long-life hardware
Battery-powered tags and beacons are designed to operate for extended periods without replacement. This removes the need for wiring, frequent maintenance or on-site technical support, making the model well suited to remote or constantly changing sites.

Scalable by design
The architecture supports hundreds to thousands of devices with secure identity, centralised management and over-the-air firmware updates. It is built to scale as deployment expands, without adding operational complexity.

Strategic Impact

The collaboration between Blecon and The Curve shows how Smart Beacon technology can be deployed quickly, managed with minimal overhead and scaled cost effectively. By combining The Curve's full-stack engineering with Blecon's Bluetooth-to-cloud network, the client has a resilient asset visibility platform that is ready to support additional use cases in the future.

This approach is relevant to any organisation needing to track asset movements or environmental conditions in places where power, connectivity or cost make other solutions impractical. It also demonstrates how Smart Beacons can provide a competitive advantage by enabling rapid, scalable deployment without the complexity of traditional networks.

To schedule a consultation & discover how we can help you achieve similar results visit **blecon.com/contact**