

### PROJECT TYPE

IoT architecture consulting and proof of concept for cold chain temperature monitoring

### TECHNOLOGIES

Ruuvi tags (BLE temperature and humidity sensors)  
 Teltonika FMB920 (BLE-to-LTE in-cab gateway)  
 MQTT protocol  
 AWS IoT Core, AWS Lambda, Amazon DynamoDB  
 Grafana (monitoring dashboard, PoC)  
 Twilio (SMS alerting)  
 React

### DURATION

4 months

### TEAM

IoT architect (engagement lead)  
 Backend developer  
 DevOps engineer  
 Business analyst  
 QA engineer

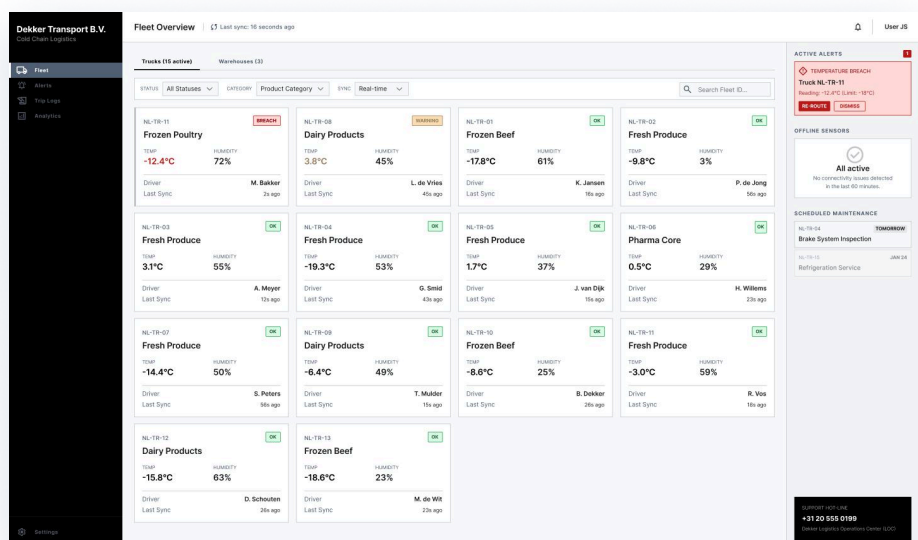
# IoT monitoring PoC for EU cold chain operator

Architecture consulting and proof of concept for real-time temperature monitoring across 15 refrigerated trucks and 3 warehouse zones, replacing paper-based end-of-trip checks and meeting EU GDP compliance requirements.

## Project background

The Client is a Netherlands-based food distribution company operating 15 refrigerated trucks and three warehouse zones, serving customers across the Netherlands, Belgium, and Germany. Founded 12 years earlier, the business had grown to 85 employees and annual revenues of nearly €8 million, making it a mid-size regional operator with a strong customer base in retail grocery and pharmaceutical distribution.

Temperature control across the fleet and warehouses relied entirely on manual end-of-trip checks: drivers recorded compartment temperatures on paper at each stop, and warehouse staff logged readings twice per shift. The Client had no IoT infrastructure in place and no in-house expertise to evaluate sensor technologies, connectivity options, or cloud architecture. Spoilage and penalty incidents traced to undiscovered temperature excursions cost the business approximately €200k per year.



## Project Distinctive Features

- ✓ Real-time temperature and humidity streams from truck cargo compartments and warehouse zones at 60-second intervals



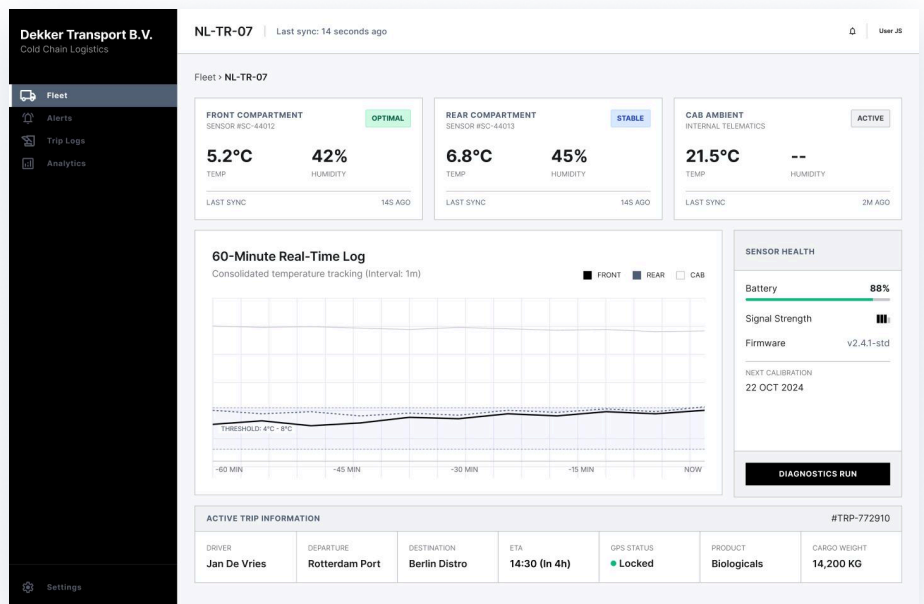
We had been discussing IoT monitoring for two years but had no clear path forward. SumatoSoft structured the decision for us: they came back with a documented vendor comparison, a clear architecture recommendation, and a working PoC in under two months. By week 4 our dispatchers were catching temperature events we would have missed entirely before.

CEO

- ✓ Configurable alert thresholds per product category (dairy, produce, frozen goods)
- ✓ Three-tier alert escalation: in-cab display, dispatcher dashboard notification, SMS to logistics manager
- ✓ GPS-correlated temperature log per delivery, exportable as an EU GDP compliance record
- ✓ Battery-powered Bluetooth sensors with 18-month autonomy and no wiring modifications to existing trucks
- ✓ Web dashboard with historical trend charts, anomaly markers, and per-truck and per-zone breakdown
- ✓ Structured vendor evaluation covering 5 sensor options and 3 connectivity models, documented for Client handoff

## Business challenge

The Client needed to replace manual end-of-trip temperature checks with continuous real-time monitoring across 15 refrigerated trucks and 3 warehouse zones. Additional challenges: the Client had no IoT infrastructure or in-house expertise to evaluate and select sensor technologies, connectivity models, and cloud architecture; GDP (Good Distribution Practice) compliance documentation requirements imposed audit-trail obligations that manual paper logs could not satisfy.

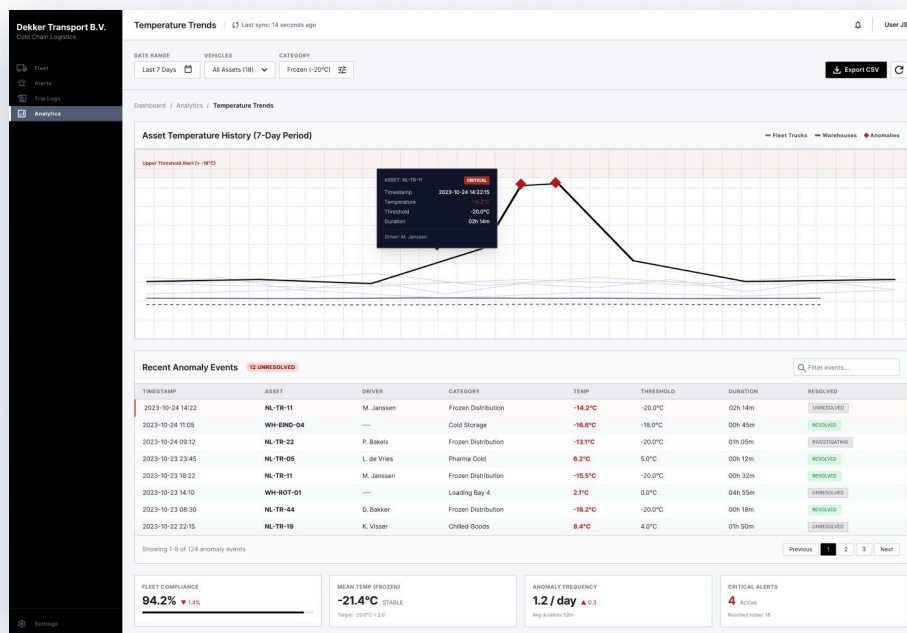


## Our solution

We structured the engagement in two phases: a 6-week architecture consulting phase and a 6-week proof of concept across 3 trucks and 1 warehouse zone. The architecture phase evaluated 5 sensor options and 3 connectivity models against cold-environment reliability, battery autonomy, LTE resilience, and unit cost. We recommended Ruuvi BLE tags paired with Teltonika FMB920 BLE-to-LTE gateways: a configuration that required no wiring changes to truck refrigeration units and came in 35% below the cellular-native alternative. The PoC then covered MQTT data pipelines on AWS IoT Core, configurable per-category temperature thresholds, a three-tier alert escalation path, and a Grafana dashboard with GDP-compliant trip logs.

## Architecture assessment and vendor selection

We evaluated 5 sensor vendors and 3 connectivity configurations against four criteria: cold-environment sensor reliability (tested to -22°C), battery autonomy (target: 12+ months per charge), connectivity resilience under LTE coverage gaps, and total cost per monitored unit. We selected Ruuvi BLE tags paired with Teltonika FMB920 BLE-to-LTE gateways: they met all four criteria and came in 35% below the initially favored cellular-native option because BLE sensors require no SIM card per unit and the gateway handles LTE connectivity for the entire cargo compartment. The selection rationale was documented in a vendor comparison report handed off to the Client for procurement.



## PoC infrastructure and data pipeline

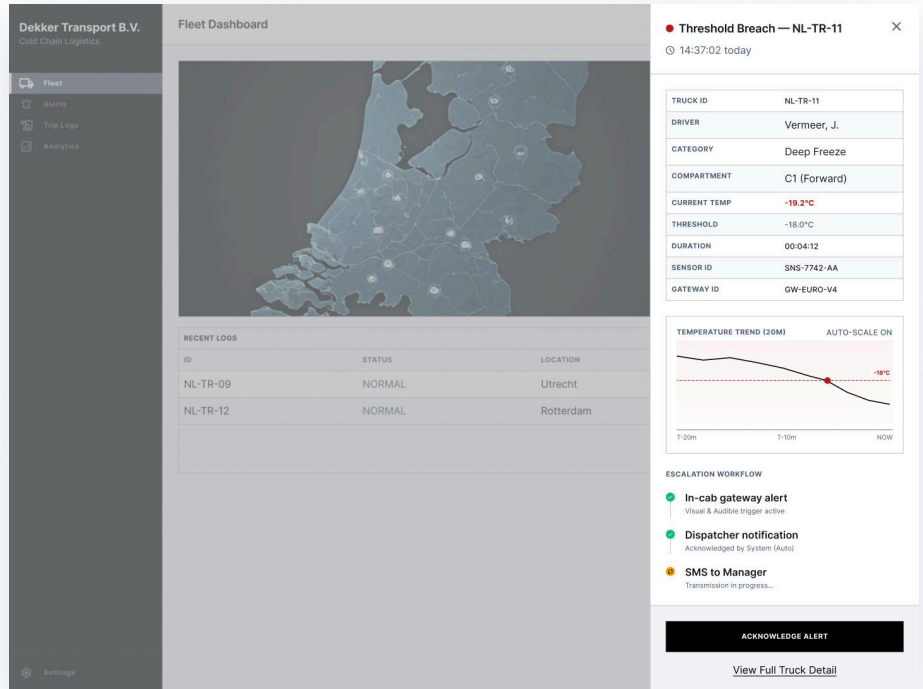
We deployed BLE sensors in cargo compartments across 3 trucks and in one warehouse zone. Sensor data streams over MQTT to AWS IoT Core, where Lambda functions process incoming events, write readings to DynamoDB, and evaluate each reading against configurable product-category thresholds. The pipeline handled a sustained load of approximately 1,200 sensor readings per hour during the PoC with no dropped events.

## Alert and compliance layer

We configured threshold profiles for three product categories: dairy (2°C to 6°C), produce (4°C to 8°C), and frozen goods (below -18°C). Each threshold breach triggers the three-tier escalation path: an in-cab alert displays on the Teltonika gateway, a notification appears on the Grafana dispatcher dashboard within 4 minutes, and an SMS reaches the logistics manager via Twilio. Each excursion generates a timestamped event record attached to the trip log, meeting the documentation obligation under EU GDP guidelines without additional manual steps from the driver or dispatcher.

## Monitoring dashboard

We delivered a Grafana-based dashboard for the PoC, covering live temperature and humidity per truck and zone, historical trend charts with anomaly markers, and a per-delivery compliance export. The Client's dispatcher team adopted the dashboard from week 2 of the PoC without a formal training session.



## Customer's benefits

The PoC detected 100% of temperature threshold breaches within 4 minutes across the 3 monitored trucks and 1 warehouse zone over 6 weeks. The Client's logistics team documented 3 prevented spoilage incidents during the PoC period, estimating €18k in avoided losses and penalty charges.

## What's happening with the project right now?

The Client has approved full fleet and warehouse rollout based on the PoC results and is currently procuring hardware for the remaining 12 trucks and 2 warehouse zones.