GROCERY RETAIL

Grocery retailer boosts efficiency and cuts waste with the Wiliot Physical AI platform

One multi-national grocery retailer brought case-level intelligence to its fresh produce in transit, storage, and handling — from a distribution center to store shelves.

WHAT THE DATA REVEALED

TOTAL VALUE OF FOOD LOSS AT THE RETAIL LEVEL

$46.7B

10°	Temperature variance across pallets in one trailer
7	Freeze/thaw cycles on one trailer's cargo
~4%	Wiliot TCO vs. a retailer's cost of wasted goods



© 2026 WILIOT

TABLE OF CONTENTS

Fresh produce is one of the biggest competitive advantages of any grocer

01	Executive summary	03
02	The challenge	04
03	The solution	05
04	How it works	06
05	The outcome	07
06	The benefits	10

RESULTS AT A GLANCE

$46.7B
FOOD LOST AT THE RETAIL LEVEL EACH YEAR

64%
FRESH STRAWBERRIES LOST BEFORE BEING EATEN

5.9%
OF SALES LOST TO OUT-OF-STOCKS

10°
VARIANCE ACROSS PALLETS IN ONE TRAILER

4+ hrs
FOR A PLANNED 20-MINUTE ROUTE

80%
EMPTY SHELF WHILE STOCK SAT IDLE 80 MIN

01

Executive summary

Every year, approximately $46.7 billion of food in the grocery retail sector is discarded[1], often due to temperature mismanagement. Even larger is the impact on customer experience and lifetime value when lesser quality produce is put on shelves, which is why fresh produce is considered one of the biggest competitive advantages of any grocer[2]. The answer lies in greater end-to-end visibility of produce: in transit, back of store, and front of store operations.

One multi-national grocery retailer recently challenged this global problem, when it partnered with Internet of Things (IoT) technology pioneer Wiliot, whose ambient IoT solution enables visibility into trillions of things. The retailer selected the Wiliot Physical AI platform to bring intelligence into its fresh produce in transit, storage and handling; from a distribution center to store shelves.

The retailer's goal. Take a leadership role in the grocery industry by understanding conditions products are exposed to, and any delays that occur, while enabling a fast response to prevent spoilage and improve customer satisfaction.

The results. By using the Wiliot Physical AI platform, this retailer identified the kind of critical issues that often go undetected industry-wide: transit delays, excess stocking dwell time and multiple temperature excursions. This Wiliot client can now solve such costly issues in real-time.



02

The challenge

To address the universal challenge of food waste the grocery retailer wanted a view into how its time- and temperature-sensitive goods were transported and stored. The retailer aimed to improve its reputation for excellence, by guaranteeing produce availability at the peak level of freshness.

Retail is an inherently human business, with people making decisions and responding to unexpected events. Without visibility into these everyday processes and any anomalies, many retailers struggle to identify, respond and correct challenges as they occur. Traditionally, tracking supply chain data is a labor-intensive process that is both time consuming and error prone. Undetected problems in the supply chain can mean loss in product quality, out-of-stock incidents and customer dissatisfaction. Out-of-stocks events alone are costing North American food retailers 5.9 percent of their total sales[3].

This retailer transports fresh products to stores across North America, and it wanted to gain a digital view into the supply chain and the conditions of those products as they moved through it. For phase one, they chose to track fresh strawberries with an aim to ensure the fruit stays within strict temperature requirements, and to understand operational efficiency to ensure product is available for consumers when it is fresh. While this initial phase focuses on strawberries, the same approach is applicable to any fresh produce.

Strawberries are highly fragile — one of the most perishable fruits sold in stores. Strawberries don't continue to ripen after they're picked, which means that they come off the plant fully ripe, and the clock is ticking as they are transported to stores, purchased and eaten.

For that reason, much of this popular fruit goes to waste. As much as 64 percent of all fresh strawberries are lost before ever being eaten[4]. Every shopper who has bought fresh strawberries knows each package is a gamble. Temperature is a huge culprit, as much as half of perishable stock loss post-harvest[5]. Even one cycle of freezing and thawing substantially impacts the taste, texture, visual appeal and shelf life of the product. And this is not isolated to strawberries, discarded food amounts to over $46.7 billion loss in stores[1].

$46.7 billion — total value of food loss at the retail level[1]

For the retailer that sells these berries, the challenge was to automatically identify when spoilage was a risk, when freshness may be compromised, and ensure that store shelves never stand empty.

03

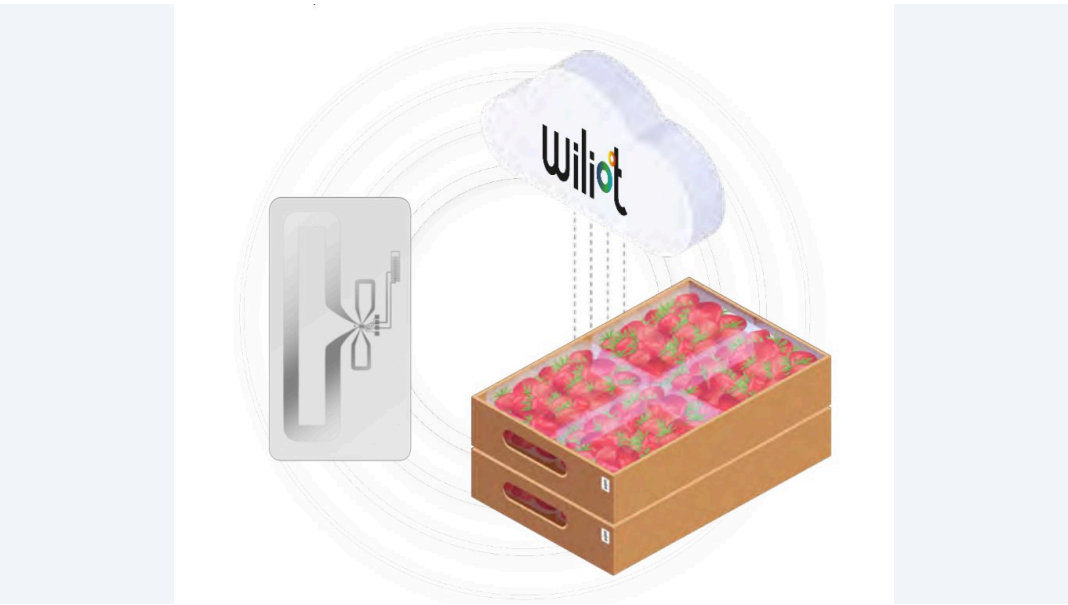
The solution

The Wiliot Physical AI platform revolutionizes how grocery retailers monitor the temperature and location of their inventory, offering comprehensive insights down to the case-level. This centralized solution improves supply chain efficiency and product quality by replacing inadequate and slow tracking methods with automated, continuous monitoring and instant, actionable alerts.

Unlike complex, expensive methods that rely heavily on manual labor, the Wiliot Physical AI platform offers a game-changing solution. It consists of three key features:

- **IoT Pixels.** Low-cost, battery-free Bluetooth sensors that attach to items and harvest energy from ambient radio signals to transmit data — such as location, temperature, and movement.
- **Network infrastructure.** Off-the-shelf bridges and gateways (hubs), which are quick to deploy, wake up nearby IoT Pixels using radio signals, receive their data, and forward it securely to the Wiliot Cloud.
- **The Wiliot Cloud.** Where raw sensing data is transformed into smart decisions and where our agents and specialized AI models live — providing alerts, analytics, and dashboards, along with flexible integration capabilities.

The Wiliot Physical AI platform replaces the burdensome task of manual scanning with fast, error-free automated data signals. With this technology, retailers gain continuous, automatic intelligence about their goods. This empowers grocery retailers to identify and resolve issues before they occur, preventing waste in real-time, in addition to the escalation of loss that can follow.



Strawberry cases affixed with Wiliot IoT Pixels, continuously streaming temperature and location data to the Wiliot Cloud

04

How it works

This grocery retailer applied Wiliot IoT Pixels to their cases of strawberries, and tracked them from the distribution center, through transit, to multiple stores.

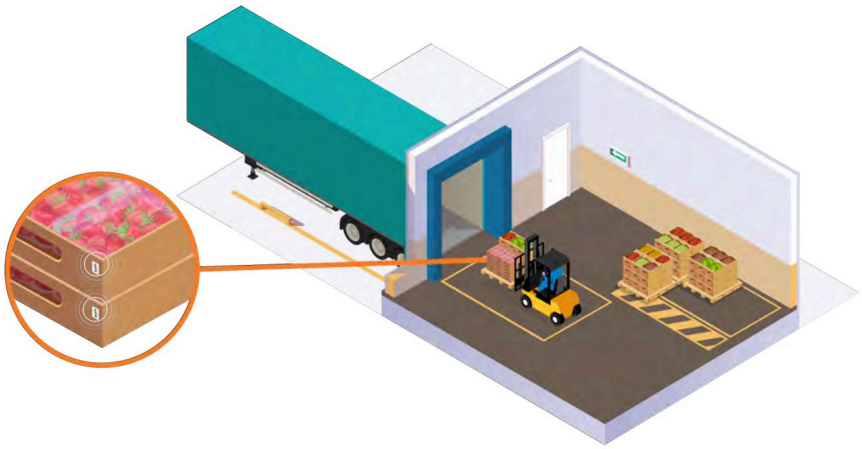
The IoT Pixels automatically transmit data about the temperature and whereabouts of every strawberry case. As often as every 30 seconds, the Wiliot Physical AI platform uses artificial intelligence (AI) algorithms to distill that data from IoT Pixels into meaningful events designed to improve the health of their entire supply chain, while delivering actionable alerts when problems arise.

As a result, the retailer had unprecedented, high-resolution insights into the state of their goods.

The data provided key indicators including any significant temperature fluctuations en route. Because the produce requires a strict temperature threshold of 0 to 5°C (32 to 40 degrees Fahrenheit) the retailer could use the data to pinpoint and resolve temperature excursions that could affect the quality, texture, taste and shelf life of the product.

The solution not only provided real-time data and alerts, but also analysis to identify logistical inefficiencies. The ambient IoT deployment enabled the retailer to gain a holistic view of all components of the supply chain, with visibility into critical events such as freezers left open, trucks taking inefficient routes or coolers breaking or needing service.

In real-time, the company could respond to such an incident, while the analytics also enabled adjustments that could impact operations or sustainability. One example: unnecessary delays could lead to excess fuel consumption, increasing the operational expenditure and carbon footprint of the retailer.



Cases of strawberries affixed with IoT Pixels generate events for the retailer to relay their status of temperature and location: an update in state of “in transit” to a state of “unloaded” to the store’s backroom

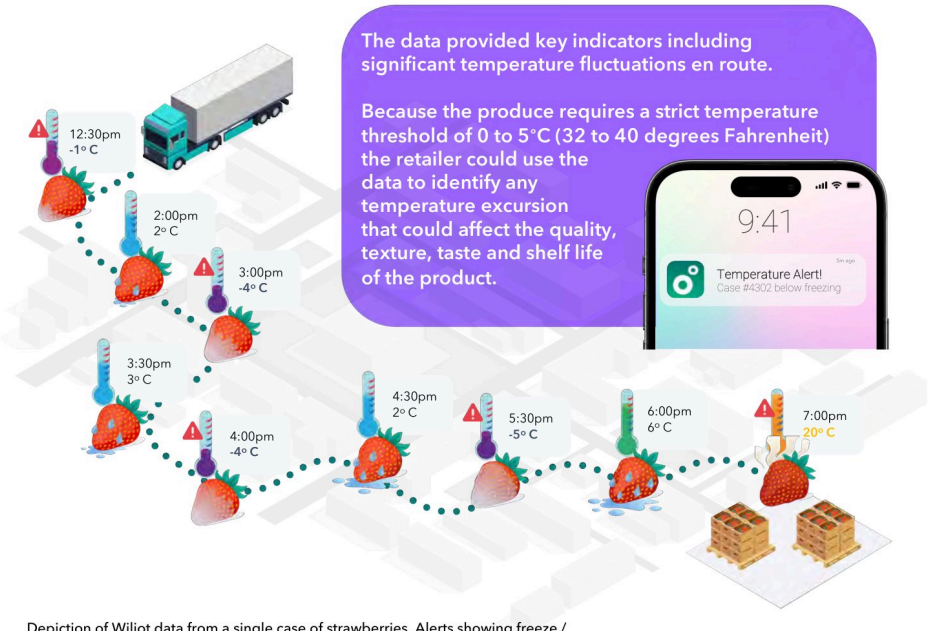
05

The outcome

Once operational, the Wiliot Physical AI platform promptly detected temperature and process compliance issues affecting produce quality and supply chain efficiency of the grocery retailer. Thanks to ongoing, timely alerts provided by the Wiliot Physical AI platform, they can now tackle underlying problems as they arise, minimizing wasted inventory and added manual labor. This effort simultaneously ensures that their customers also get fresher produce with more predictable availability.

At the start, the Wiliot Physical AI platform quickly identified numerous temperature and process compliance issues, many of which were also addressable with Wiliot’s real-time alerts.

During transit, detailed case-level visibility data uncovered significant temperature variations: trailers exhibited a temperature variance of 10 degrees across pallets within the same trailer bed, and 5 degrees across cases within the same pallet. This phenomenon, known as “microclimates,” poses major risks. Most trailers had cases of produce exposed to freezing conditions, with one trailer subjecting some cargo to 7 freeze/thaw cycles. Until now, this issue went unnoticed by the single thermostat onboard each trailer.



Depiction of Wiliot data from a single case of strawberries. Alerts showing freeze /

Wiliot data from a single case of strawberries: alerts showing freeze/thaw cycles in transit, followed by inventory left out of the cooler when received

Location and inventory visibility also pinpointed areas for improvement. For example, a planned 20-minute route ended up taking over four hours for products to reach the store. This delay potentially caused understocked shelves, operational confusion, and impacted fuel costs and sustainability as trucks idled with refrigeration running while waiting for delivery.

Upon arrival at the store, the Wiliot Physical AI platform identified a few pallets that were left unattended in unrefrigerated storage areas, while others were stored in the wrong cooler at incorrect temperatures for days. In one case, replenishment stock sat idle on the retail floor for 80 minutes, while customers encountered shelves that were 80 percent empty. This resulted in a poor merchandising experience, and compromised freshness of produce.



Wiliot data detected when a pallet was left idle on the retail floor instead of being stocked, all while the shelf was low on inventory

Continuous visibility and alerts now empower this grocery retailer to take immediate action when these issues arise. Additionally, the Wiliot Physical AI platform provides objective data at any point along the supply chain and retailer, providing a single source of truth to gauge the effectiveness of process improvements. Finally, many manual processes such as temperature checks and inbound / outbound shipment notices can be automated.

The future looks brighter with Wiliot

The retailer's commitment to uncompromising product freshness ultimately enhances their revenue and Customer Lifetime Value (CLTV), by attracting and retaining customers with high quality fresh produce and predictable availability.

Equipped with the Wiliot Physical AI platform, this grocery retailer solidifies its position as an industry leader. By adopting real-time alerts and objective, continuous data, they are making measurable improvements to supply chain and in-store processes. This ensures that their shelves are consistently stocked with high-quality produce.

Buoyed by the project's success, the retailer is scaling up, deploying millions of Wiliot IoT Pixels to track additional produce between distribution centers and stores.

06

The benefits

Intelligence delivered by the Wiliot Physical AI platform guaranteed that the retailer's produce met the highest standards of freshness and quality, directly enhancing customer trust. For reference, the Total Cost of Ownership (TCO) of implementing Wiliot technology across all freight, facilities, and produce assets is approximately just 4 percent of a retailer's cost of wasted goods[6].

Wiliot's innovative solution provides grocery retailers like this one with the necessary insights to improve their supply chain efficiency, maintain fresh produce and ensure that shelves are properly stocked. Some immediate benefits the solution offers include:

- **Detailed journey tracking.** Data from the IoT Pixels help retailers not only see temperature excursions and real-time location but also dwell times at facilities, confirmation of origin to destination delivery and the exact quantity loaded or unloaded at each stop.
- **Inventory precision.** Grocery retailers can ensure customers are never met by empty shelves. Real-time location provides critical insights into stock levels across the store and backroom.
- **Improve freshness.** Grocery retailers can now monitor produce quality end to end, ensuring the delivery of exceptionally fresh and tasty produce to customers.
- **Waste minimization.** Real-time alerts and objective data allow grocery retailers to start systematically eliminating causes of food spoilage and waste.
- **Optimized vehicle utilization.** With accurate data related to where their trucks are fully loaded or operating half full or empty, grocery retailers can streamline vehicle allocation. This reduces unnecessary trips and helps generate savings in capital, fuel, and labor.
- **Enabling "First In, First Out" (FIFO).** Precise tracking helps grocery retailers implement a more robust "First In, First Out" system. Leveraging models for dynamic expiry using temperature and dwell times of each produce case can advance retailers beyond FIFO to a "First Expiry, First Out" system.
- **Accountability improvement.** Granular tracking of the journey of each produce case significantly improves staff accountability. By meticulously monitoring each step of the supply chain, from the distribution center to the storefront, the grocery retailers can pinpoint precisely where and how processes can be improved.

EXAMPLE TOTAL COST OF OWNERSHIP[6]

Grocery chain	500 stores · 50 distribution centers · 5,000 trucks (US)
Revenue	$7B
Wastage cost (20% of food sales)	$900M
Example Wiliot TCO (fixed + variable)	$14.5M + $24.3M = $38.8M

SOURCES

[1] ERS (2012a) and the U.S. population on July 1, 2010 (309.75 million).

[2] Based on SEC filings of 4 national grocery chains.

[3] IHL Group. "Grocery Out-of-Stocks – Big Problems, Key Solutions," by Greg Buzek.

[4] Food Manufacturing. "Agri-Food Tech Company's Latest Trial Boosts the Shelf Life of Strawberries," by Save Foods, March 9, 2022.

[5] United Nations. "Sustainable Cold Chain and Food Loss Reduction," November 2019.

[6] See the TCO example above: a grocery chain with 500 stores, 50 distribution centers, and 5,000 trucks operating across the US.

ABOUT WILIOT

Wiliot is a Physical AI company that gives organizations continuous, scan-free visibility into the location and condition of every item in their supply chain. Battery-free Bluetooth sensors, called IoT Pixels, capture the data, and the Wiliot Physical AI platform refines it into actionable insights — predicting problems like shrink, mis-ships, and spoilage, and recommending the next move. Trusted by many of the world's largest retailers, carriers, and consumer brands, Wiliot has tagged more than 1 billion assets worldwide. Visit www.wiliot.com to learn more.

