

IoT-Powered Digital Twin Enables Net-Zero Station Optimization in the UK

2024 Impact Awards Winner Case

Location: London, the UK

Milesight Partner
Twin4Green

Location
London, Great Britain

Devices Deployed
UG65*21/ WS301*21/ WS302*21/ CT101*6/GS301/
WS156/WSS58/WS558 controller switch/WS202/
VS350

Applications
Smart Building

Background

The railway industry is experiencing increasing demands for both operational efficiency and sustainable development. As passenger numbers grow and environmental regulations tighten, traditional management methods struggle to meet the needs. This challenge is particularly acute for London North Eastern Railway (LNER), the UK's third largest rail operator.

Our partner Twin4Green has developed an interactive cognitive digital twin with Milesight gateway and sensors across multiple stations. Integrating with its existing AWS IoT Core, the system provided real-time visibility and intelligent analytics, helping LNER optimize maintenance schedules and build net-zero stations.



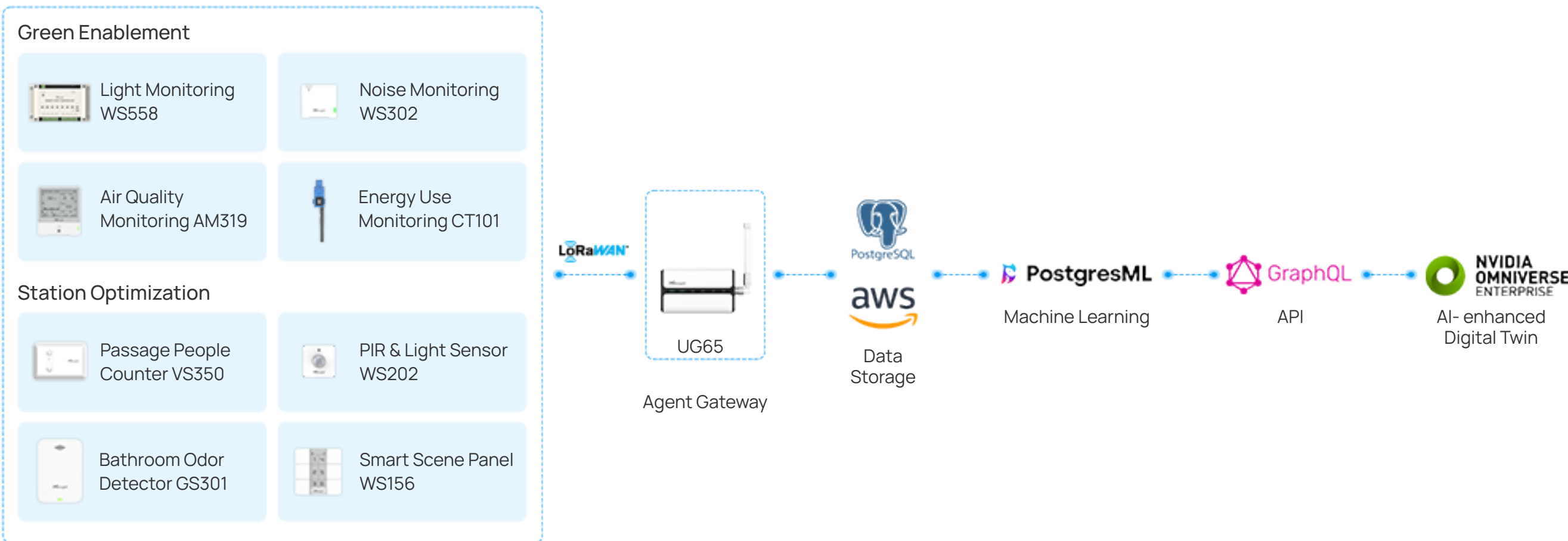
Challenges

The existing digital twins were not user-friendly enough for operators and they encountered limited APIs and scalability issues in analytics and data extraction. In addition, the rail sector requires real-time operational data to upgrade management systems and optimize resources, while also meeting sustainability targets by reducing energy waste and carbon footprint. Moreover, the vast number of stations demands cost-efficient, scalable IoT deployment solutions to ensure comprehensive coverage. These challenges highlight the critical need for smart, integrated systems that can transform traditional rail operations into greener ones.

Solution

Smart Interactive Cognitive Digital Twin for Rail Operations

Twin4Green's innovative digital twin solution integrates Milesight sensors with the existing AWS IoT Core system to build interactive 3D models of rail sites. The availability of up-to-date payload decoders for all Milesight devices significantly streamlined API development, while also simplifying data storage and integration for vision-based analytics. By streaming real-time equipment and environmental data to photorealistic digital replicas enhanced with AI voice controls, it helps operators visualize and optimize operations while reducing energy waste - all through an intuitive cognitive interface.



Empowering Green Upgrades with Real-Time Environmental Sensing

Twin4Green deployed WS558 controller across station platforms and indoor spaces to measure accurate energy baseline, enabling data-driven LED lighting retrofits while improving passenger comfort, safety, and energy efficiency. To identify energy usage patterns, CT101 smart current transformers were applied. With one-second interval ampere-hour tracking, CT101 offers precise, real-time electrical disaggregation insights to monitor energy use and cut operational costs. 9-in-1 indoor air quality sensor AM319 was also used to provide localized, cost-effective monitoring of critical air quality data like PM2.5 and PM10. Its Works with WELL certification demonstrates its strength in enabling health-driven indoor air quality optimization. Finally, Twin4Green deployed WS302 noise sensors across multiple stations. Featuring switchable A & C weighting, the product adapts to stations' fluctuating noise levels, delivering consistent accuracy 24/7.



Optimize Space and Energy with Power-Efficient People Counting

The VS350 people-counting sensors were installed in the visitor center to improve space utilization, and resource allocation. Additionally, the integration of LoRaWAN technology ensures the VS350 operates with low power consumption, supports long-range data transmission, provides strong signal penetration, and maintains anonymous detection to protect privacy.



Impact

London North Eastern Railway (LNER) achieved significant operational improvements by deploying the system across 18 UK stations from London to Scotland, enabling stations to solve energy waste and overcrowding with real-time analytics. The sustainability benefits are expected to come into effect in early 2025.

Net-zero station goal

Energy optimization

Real-time visibility

Predictive insights

AI-driven building

Why Choose Milesight



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“Reliability, competitive pricing, good documentation and support as well as responsiveness.” Milesight stands out for offering a broad range of devices that fit diverse scenarios — which is unique in the market. Moreover, device deployment is fast and simple; installing a gateway and two sensors takes just 30 minutes.

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Milesight Partner

About Twin4Green

Twin4Green was founded in June 2022 by two Engineers who are passionate about sustainability. It is an innovative technology provider that develops photorealistic 3D digital twin solutions integrated with real-time bidirectional IoT data for sustainability applications. The company offers end-to-end services including hardware procurement, deployment and management, enabling businesses to gain unprecedented operational insights and measurable benefits.