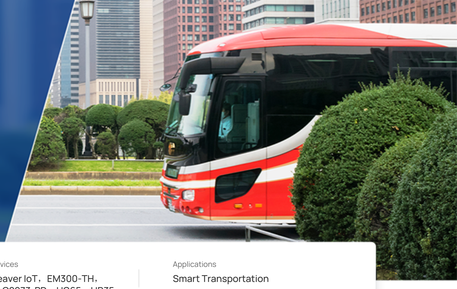
Milesight

Beaver IoT-enabled Real-Time Bus Monitoring System

2025 Milesight Hackathon winner solution: enhance safety and efficiency for Japan's long-distance bus operators

Location：Japan



Milesight Partner	Location	Platforms & Devices	Applications
SHN	Japan	Milesight Beaver IoT，EM300-TH，VS122，MS-C2973-PD，UG65，UR35	Smart Transportation

Background

At the 2025 Milesight Beaver IoT Hackathon, participants were challenged to develop real-world solutions using the Beaver IoT platform. SHN entered the competition with a project idea that modernizes Japan's long-distance bus transportation process with an IoT-based automation system, and emerged as the final winner for its innovative solution and meticulous attention to details.

Challenges & Needs Analysis

Manual Data Collection

- Drivers currently record passenger boarding/arrival numbers on paper at each stop.
- Paper records are later manually collected and compiled at depots.

Regulatory Reporting Requirements

- Japan's Ministry requires detailed monthly reports from long-distance bus companies.
- Current manual process makes compliance reporting inefficient.

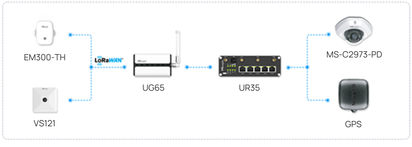
Limited Operational Visibility

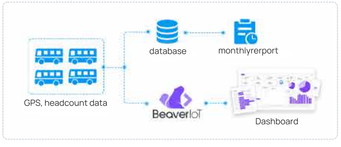
- No real-time monitoring of bus locations, passenger counts, or cabin conditions
- Management lacks live data for fleet oversight

Solution

SHN developed a Beaver IoT-based real-time monitoring system for long-distance buses that automates data collection and reporting. The solution uses Beaver IoT to integrate GPS tracking (UR35), passenger counting (VS121), environmental monitoring (EM300-TH), and interior surveillance (MSC2973 IP camera) through a LoRaWAN gateway (UG65), with all data processed locally on the U65 device for reduced infrastructure load.

The system provides depot and headquarters staff with a Japanese-localized dashboard displaying real-time bus locations, passenger counts, cabin conditions, and minute-by-minute interior snapshots, while automatically generating the detailed monthly reports required by Japan's Ministry of Land, Infrastructure, Transport and Tourism, replacing current manual paper-based recording methods.



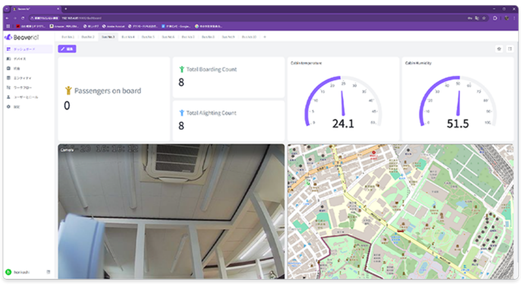


Devices

- EM300-TH:
  Environmental sensor that monitors cabin temperature and humidity in real-time.
- VS121:
  Pressure sensor used for protective monitoring of water lines and pumps.
- MS-C2973-PD:
  IP camera that captures interior snapshots (updated every minute) and records video to microSD.
- UG65:
  LoRaWAN gateway that processes GPS data and camera snapshots locally to reduce cloud load.
- UR35:
  Industrial router providing primary VPN connectivity via bus network, backup SIM forfailover and 2 available PoE ports for additional cameras.

Platform

- Milesight Beaver IoT:
  Integrate real-time sensor data to power the monitoring dashboard and automate regulatory reporting.



Results & Key Features

Automated Monitoring & Data Collection

- Replaces manual passenger counting and paper reporting with real-time sensor tracking of locations, passenger flows, and cabin conditions
- Provides live dashboard with Japanese interface for fleet oversight

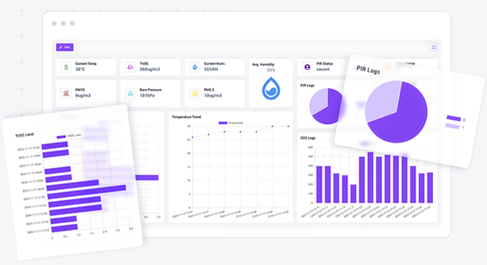
Regulatory Compliance

- Automatically generates ministry-required reports
- Eliminates manual data errors and processing delays

Scalable IoT Architecture

- Edge-based processing ensures reliability
- Modular design supports fleet expansion
- Enables future sensor/feature additions

What is Beaver IoT



Beaver IoT is Milesight's open-source IoT platform that lets you Intuitively create your unique IoT application where you can collect, visualize, and analyze data, or custom develop your own integrations for extended possibilities.

Milesight

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