oneM2M Industrial Day

oneM2M-Based IoT System Utilization

Kim Gi Eun

CONTENTS

N2M
Next Total Management

Company Introduction

001 Company Introduction

Overview

Company	N2M
CEO	Hyung-Jin, Kim
Homepage	www.n2m.co.kr
Date of Business Start	August 2004
Main Business	Smart City Service, IoT Platform & Service, Integrated Control, AI & Bigdata

History

2025 : “AIoT Sector“ Commendation from the Minister of Science and ICT

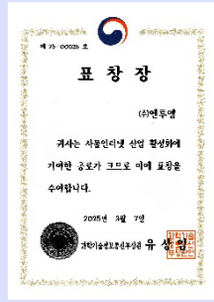
2024 : Registered as a Member of the Korea Smart City Association and Smart City Alliance

2024 : TTA, “oneM2M IoT Platform“ GCF Certification (ONEM2M0013)

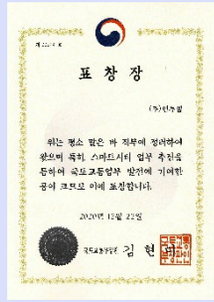
2020 : “Smart City Sector“ Commendation from the Minister of Land, Infrastructure and Transport

2019: “oneM2M Sector“ KETI MOU

Awards & Certifications

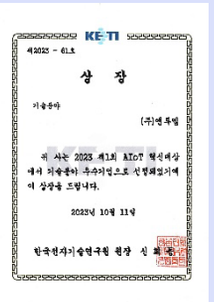


Commendation from the Minister of Science and ICT (IoT Sector)



Commendation from the Minister of Land, Infrastructure, and Transport

Presidential Citation



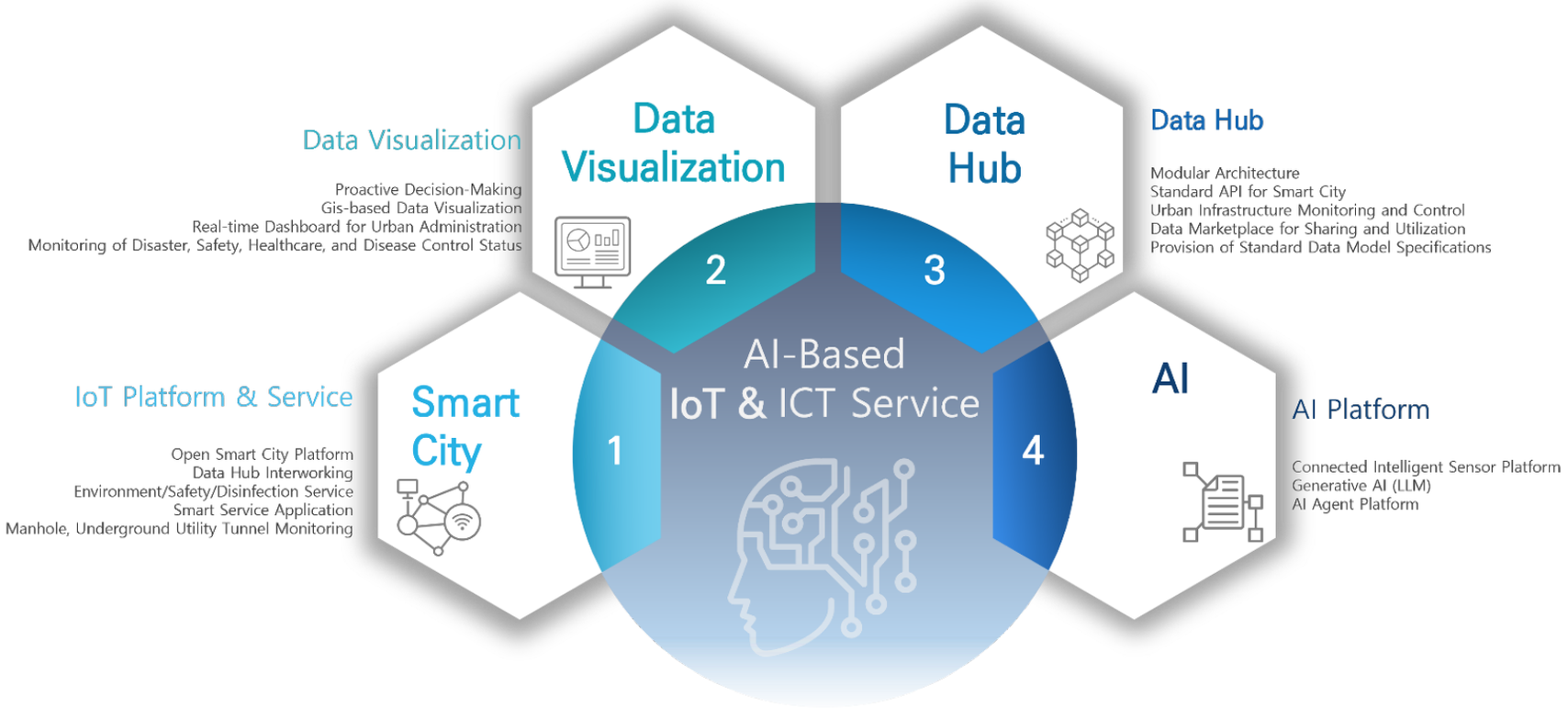
AIoT Innovation Award (Technology)

Patent: nTomDI

oneM2M GCF Certification (nTomIoT)

Business Area

Driving the Fourth Industrial Revolution
with Smart City, IoT, Big Data, and Intelligent Decision Systems



IoT & Data Solution	Scenario-based Data Visualization	AI & Bigdata Hub Platform
• IoT Platform Launched • Adopted in Smart City Projects (Goyang, Yongin) • Partnerships for Environmental and Public Health IoT Services • NoSQL Solution for High-Volume IoT Data Storage	• Big Data Visualization Consulting Project • Municipal Administration, National Disaster, and Safety Scenarios • Supporting Proactive and Real-Time Decision-Making	• Participated in the National Strategic Project – Smart City Data Hub • Developed a Connected Intelligent Sensor Platform for Network-Based Sensors· • Participated in the Development of the COVID-19 Epidemiological Investigation Support System

“nTomIoT” is an open IoT platform built on the **oneM2M international standard.** It manages IoT devices and provides core services such as **access control, authentication,** and **user management**, enabling **seamless and secure data communication among connected devices.**

GCF Test Certify Connect

CERTIFICATE

The Global Certification Forum (GCF) Ltd advises that

NTOM

has successfully demonstrated GCF requirements for:

oneM2M compliance

For

nTomIoT

oneM2M End Product (IN-CSE)

On

18-Jul-2024

GCF CC Version:	Status:	GCF Ref. Number:
3.93.0	Published	ONEM2M0013

Compliance with GCF oneM2M requirements does not indicate compliance with the full GCF Certification Criteria for all product features.

This certificate has been issued by the Global Certification Forum in accordance with the requirements of the GCF PRDs. For the actual status of a device certification, please refer to the GCF web site https://www.globalcertificationforum.org

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001 Projects for oneM2M IoT Platform

Smart City

IoT Service

Period	Description	Organization	Country
2025. 06	Smart Bus Shelter Management System (Smart City Service)	Goyang City	Korea
2024. 07	Data-driven Smart Road Integrated Platform (IoT Infrastructure Service)	Korea Expressway Corporation	Korea
2024. 05	Digital Twin-based Access Control System (IoT Service)	Incheon Port Authority	Korea
2022. 10	Autonomous Intelligent Building Energy Management System (BEMS)	Nara Controls Inc.	Korea
2022. 06	K-SENSOR Intelligent IoT Platform	Ministry of Trade, Industry and Energy	Korea
2020. 08	Air Force IoT-based Remote Monitoring System for Equipment and Facilities (IoT Asset Management Service)	Korea Air Force	Korea
2018. 05	Smart Mosquito-Borne Disease Monitoring System (Smart City Service)	Yongin City	Korea
2016. 06	Smart City IoT Convergence Project (Smart City Initiative)	Goyang City	Korea

Korea Expressway Corporation

IoT-Based Integrated Management of Road Infrastructure

한국도로공사서비스

“Providing a Safe and Convenient Platform for Future Mobility”

Purpose of Establishment

To promote road maintenance and contribute to the development of road transportation in Korea by engaging in projects related to the construction and management of national roads as a public corporation.

Main Businesses

- Construction, expansion, and maintenance of expressways
- Installation and operation of rest areas and convenience facilities
- Development of areas adjacent to expressways
- Research and development of expressway-related technologies
- Establishment of smart transportation infrastructure and intelligent transport systems (ITS)

한국도로공사서비스

Driving Factors

Environmental Changes

- Mandatory Digitalization
- Advanced Management System
- Precision GIS-Based Road Facility Management

Advanced Technologies

- Automated Data Collection
- Enhancement of Raad Data Analytics
- High-Performance Infrastructure for 3D Data

Efficient Management

- Mobile Solutions for On-Site Operations
- Integration of Dispersed Road Information
- Improvement of Search Functionality
- Minimization of Repetitive Tasks & Improvement of Work Efficiency

Integrated Management

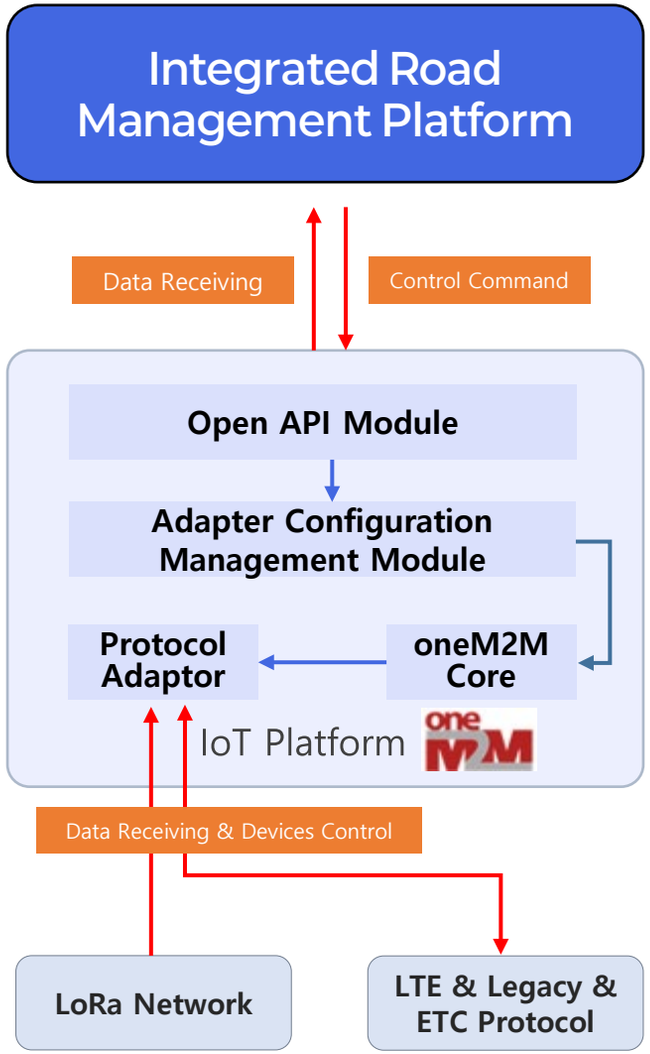
- Integrated Resource Management
- Central Management of Modules
- Device Scalability

한국도로공사서비스

Needs for Real-time Integrated Monitoring and Management Across IoT Devices and Services

AS-IS (Current Issues)

- Limited Monitoring Capabilities
- Data Management Challenge
- Challenges in Managing Devices and System Resources across Affiliated Organizations



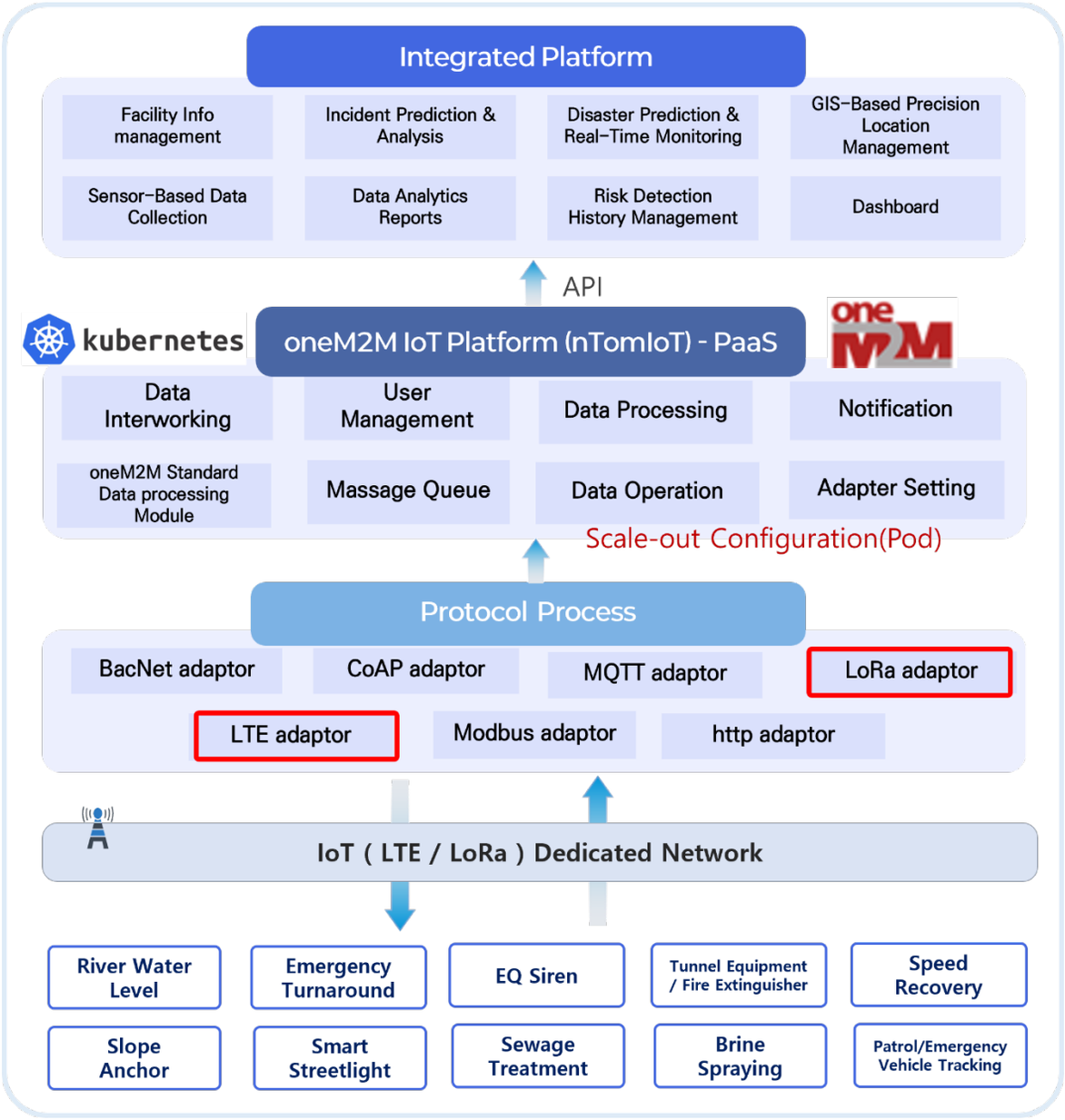
TO-BE (Expected Effects)

- oneM2M-Based IoT Platform (International Standard)
- Developing the IoT service sector within the Integrated Road Management Platform comprising 39 systems.
- Simplification of the New IoT Service Registration Process
- Efficient Resource Utilization through Integrated IoT Device Management
- Support for Diverse Protocols
- Improving Work Efficiency through API Provision and Interworking

Standard-Based Integrated IoT Platform

한국도로공사서비스

Integrated IoT Management for Highway Facilities (130,000 Sensors)



Item	Service	Number of Sensors
Tunnel	Tunnel Equipment	117,000
	Remote Fire Extinguisher Inspection	80
Electricity	Streetlights	2,600
	Lighting Towers	70
Rest Area	Sewage Treatment Facility	7,600
Bridge	Seismic Displacement Detection (EQ Siren)	10
	Stenosis Detection	90
	River Water Level Monitoring	10
Vehicle	Patrol and Snow Removal Vehicle Tracking	1,800
Sloping Surface	Slope Detection	500
	Ground Anchor	10
Snow Removal	Brine Spraying	150
Road Mgmt.	Emergency Turnaround Barrier	5
Traffic	Traffic Speed Recovery	2
Total (Approximately)		130,000

Goyang City

Smart City
IoT Convergence Project

Necessity of Smart City IoT Convergence Project

고양특례시
GOYANG CITY

Open Smart City Platform

oneM2M-Based
Smart City Platform

- System Configuration for the Deployment and Construction of an Open Smart City Platform
- Customized Function

IoT Device & Service Monitoring

Intuitive IoT Service
Monitoring and Mgmt.

- Data Visualization through Graphs and Infographics
- Admin Dashboard for Rapid Fault Detection

Open Public Data and Using Data Service

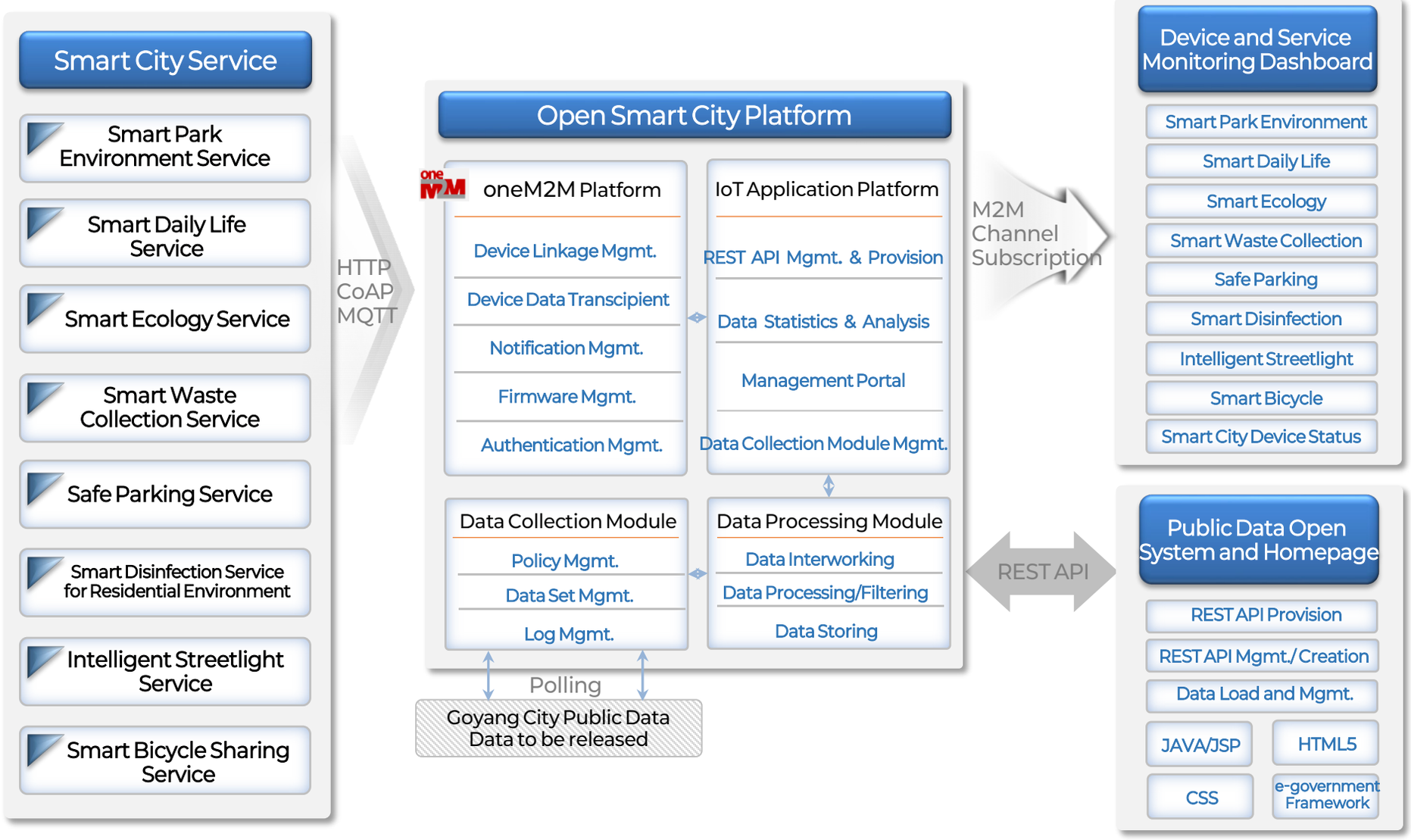
Smart City & IoT
Data Utilization

- Enhancing Data Accessibility through a Public Data System
- Improving citizen accessibility by updating website and enhancing support center mgmt. functions

Smart City IoT Convergence Platform (Goyang City)

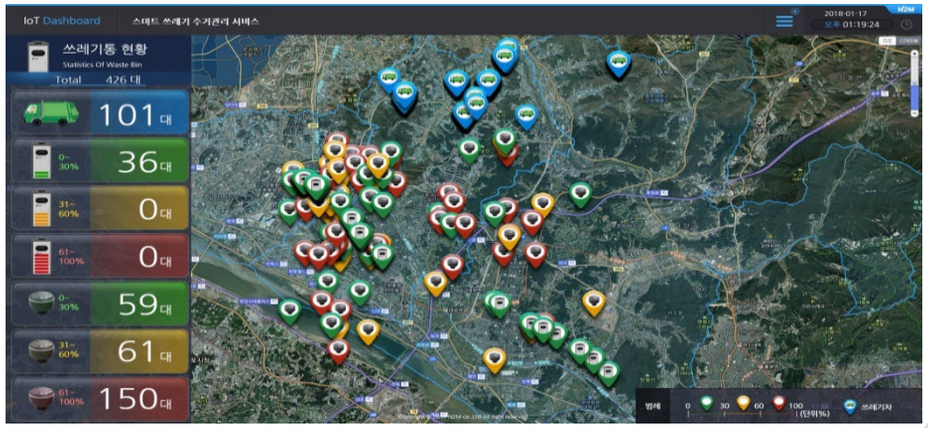
고양특례시 GOYANG CITY

Smart City Open IoT Platform for Demonstration

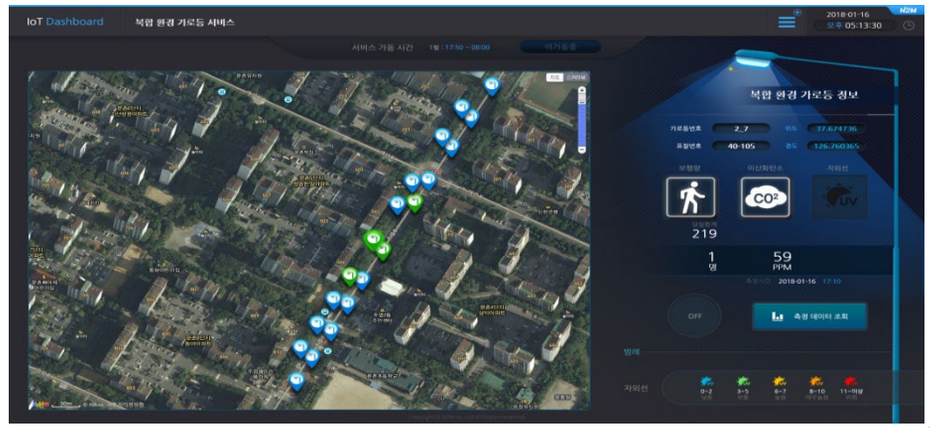


IoT Convergence Service Monitoring Dashboard

Smart Waste Collection Service

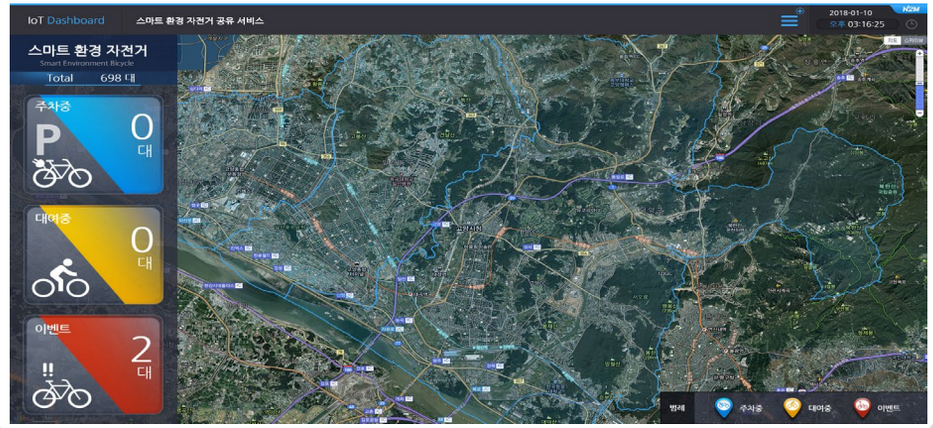


Intelligent Streetlight Service



Smart Disinfection Service for Residential Environment

Smart Bicycle Sharing Service

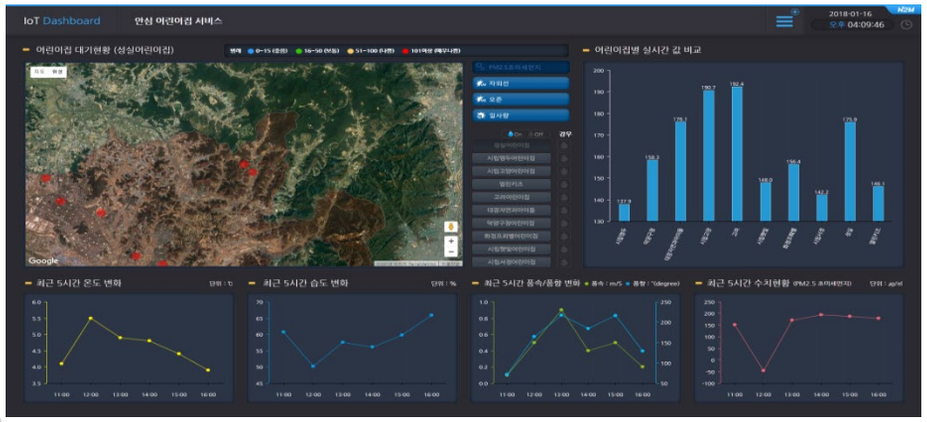


IoT Convergence Service Monitoring Dashboard

Smart Park Environment Service

Smart Ecology Service

Smart Daily Life Service



Illegal Parking Notification Service

Incheon Port Authority

Digital Twin–Based Access Control System

004 Necessity of Access Control System

인천항만공사 INCHEON PORT AUTHORITY

False Alram

Frequent False Alram

· 14 cases in 2021
· 41 cases in 2022
· 57 cases in 2023

Whole Gate Opened

Power is activated upon alarm occurrence and deactivated upon alarm clearance.

Diverse System

Different System by Vender

· Fire Extinguish System (Fire Alram)
· Access System(RFID Tag)
· Gate (EM-Lock)

Lack of Gate Control System

· Years of Inefficient
· No Solution from Vendors

Manual Check

Inefficient Working Process

· Impossible to Remote Monitoring of Gate Locking
· Manually Check after Dismiss
· Human Resource/Time Cost Increasing

Increasing of Safety Issues

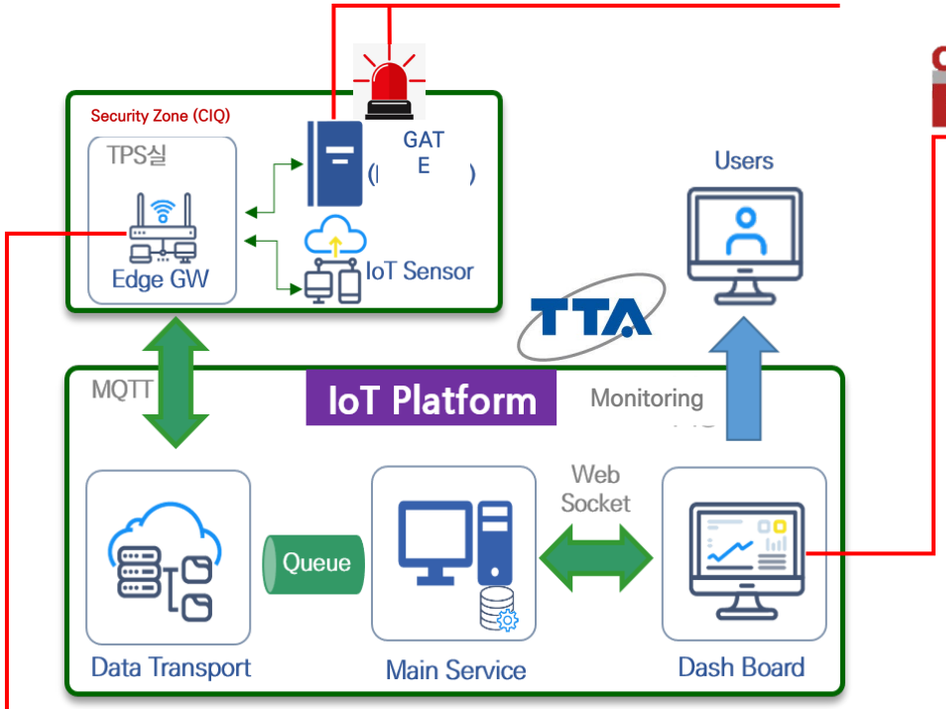
· Difficulty Responding to Unauthorized Access
· Risk of Security Incidents & Safety Hazards

Technological Effects

인천항만공사 INCHEON PORT AUTHORITY

Establishing Edge Distributed Computing Framework

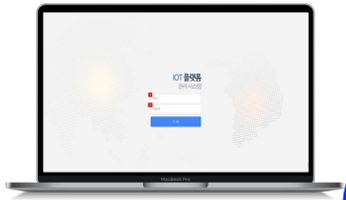
Development of Control Technology
for Diverse EM Locks, Warning Lights, and Sensor Nodes



- Securing Embedded Firmware Technology for Edge Devices
- Establishing Edge Distributed Computing Framework within the IoT Platform
- Developing a Lineup of Various Compact Edge Devices

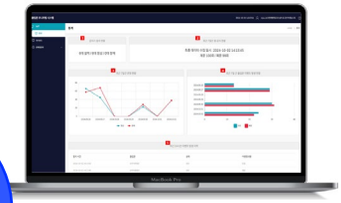
oneM2M Standard Digital Twin System

Digital Twin-Based Dashboard UI/UX



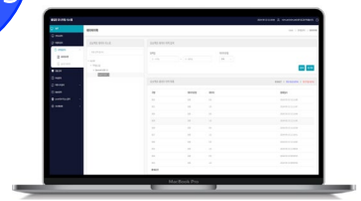
Log-In

Admin Functions



Statistics

History Mgmt.



Monitoring Point Mgmt.

Service Effects

인천항만공사 INCHEON PORT AUTHORITY

3-Step Monitoring Effects

[Step 1]
Alarm Pop-up and
Dashboard Monitoring

[Step 2]
On-site Monitoring via
CCTV and Warning Lamp

[Step 3]
Security personnel or site
managers check gate
abnormalities during patrols

Integrated Safety Control

Integrated Control of Diverse Systems	✚	Fire Extinguishing Systems CCTV RFID Access Control
Scalable Architecture	✚	Scalable IoT Platform Additional Edge Device Registration Diverse Sensor

Improving Safety Management Efficiency

Optimizing Human Resources and Time Efficiency	✚	Eliminates Manual Checks Real-time Remote Monitoring Immediate Response to Emergencies
Increasing Safety of Secured Area	✚	Minimized Security Gaps at Access Points Reduced Risk of Security Incidents Traceability of Access History When Needed

004 Enhancement of Access Control System

인천항만공사 INCHEON PORT AUTHORITY

Related Solutions

Edge Device / Sensor

AIoT-based Digital Twin

Access Method : RFID, Bio, Face	Edge Device AIoT Gateway (Embedded Firmware)	Data Analysis AI Model
Connection with CCTV Integrating with other Systems	Diverse Sensor (Environment, Fire, Sensor, Etc.)	Digital Twin-based UI/UX and Admin Functions

AIoT-based Digital Twin Integrated Access Control System

Smart City

Bus Shelter
IoT Monitoring System

The Necessity of Smart Bus Shelter Control

Project Objectives

Smart Bus Shelters for Better Public Service

· Implementation of Smart Bus Shelters for Citizen Comfort and Extreme Weather Response

· Installation of 10 New Smart Bus Shelters in Goyang City (with Future Expansion Plans)

· IoT-Based Data Collection and Real-Time Map-Based Control of Air Conditioning and Ventilation Systems

· Integrated Operation through an Administrator Dashboard

Functional Requirements

Integrated Control and Monitoring of HVAC Systems

· Air Conditioner ON/OFF

· Real-time Monitoring and Remote Control Such as Temperature/Direction of the Wind, Etc.

· Map-Linked Control Based on Bus Stop Location

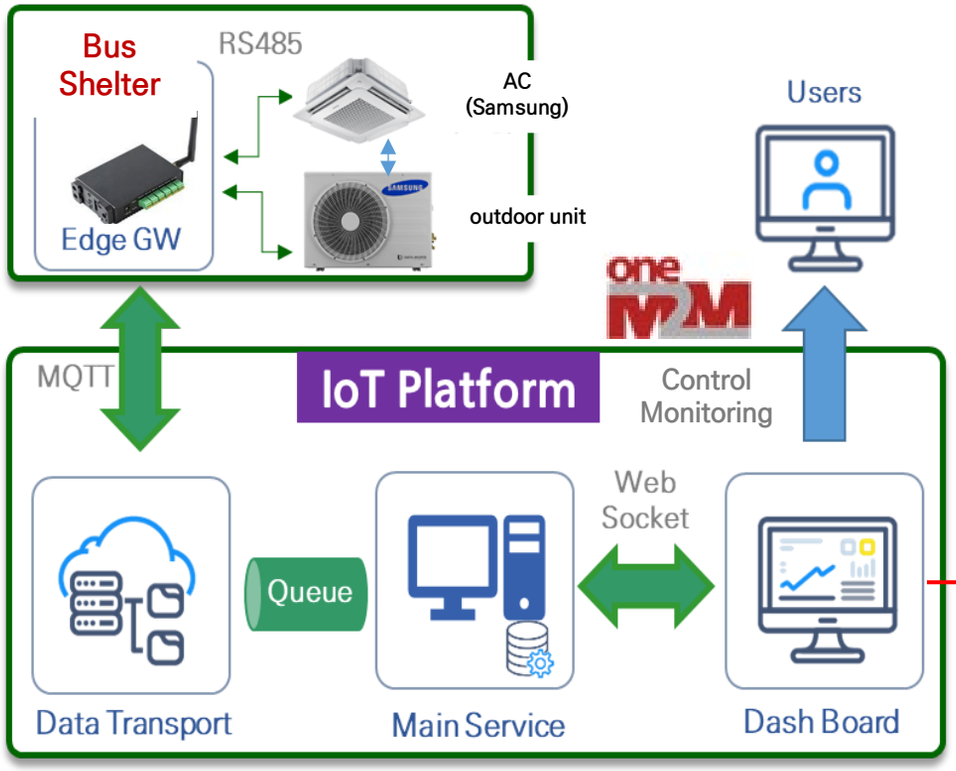
· Provision of History Graphs and Notification Functions

005 Bus Shelter IoT Control (Goyang City)

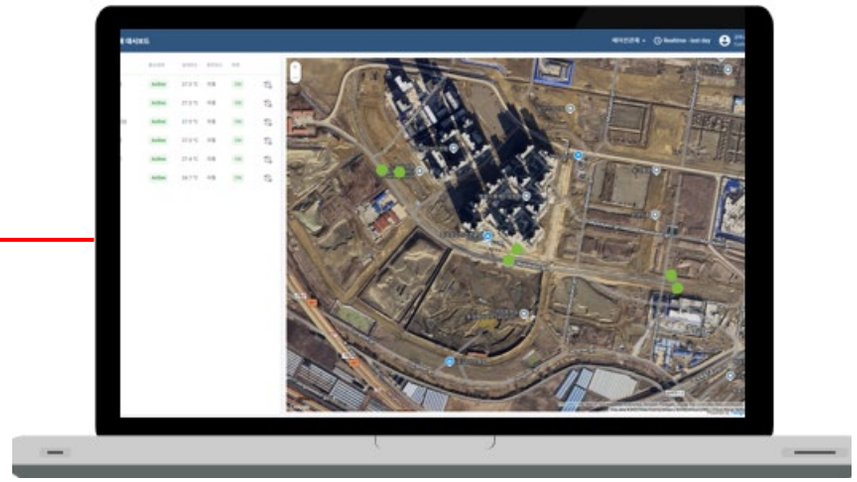
고양특례시 GOYANG CITY

System Configuration

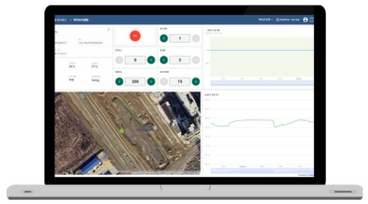
* AC : Samsung (Modbus Repeater)
* Ventilation : Himpel (Owned Modbus)



oneM2M Standard-Based Real Time Control System

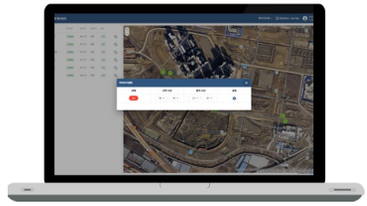


Map-Based UI/UX for Bus Shelter Management by Bus Stop

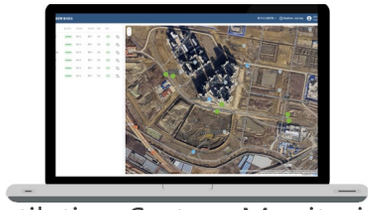


AC Status & Control

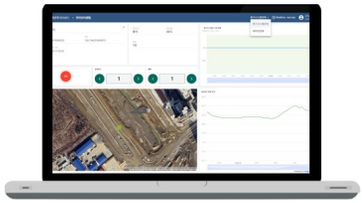
Functions



Scheduling



Ventilation System Monitoring



Ventilation System Status & Control

SUMMARY

1. Korea Expressway Corporation : IoT-Based Integrated Management of Road Infrastructure

A system that collects data from various IoT services/devices and monitors it to comprehensively manage highway facilities.

2. Goyang City : Smart City IoT Convergence Project

Providing integrated smart city monitoring services through an open oneM2M-based IoT convergence platform.

3. Incheon Port Authority : Digital Twin–Based Access Control System

Demonstrating a gate open/close monitoring system for the security area (CIQ) using an oneM2M-based IoT platform.

4. Smart City : Bus Shelter IoT Monitoring System

A system that applies oneM2M IoT services for remote integrated control of HVAC systems inside bus shelters.

Thank You!

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