

Seeing the City Breathe: DIGITAL TWINS POWERING ENVIRONMENTAL INTELLIGENCE IN SEJONG CITY

Business Challenge

Rapid urbanization in Sejong City brought growing complexity for city planners and managers. Traffic congestion, dense population clusters, inefficient energy use, and deteriorating air quality increased environmental risk and operational costs.

The city needed a reliable way to monitor environmental conditions continuously, understand how movement and occupancy impacted air quality and energy consumption, and respond proactively to emerging risks. Traditional monitoring approaches lacked the integrated, real-time visibility required to manage these challenges effectively at a city scale.

Overview

Sejong City, South Korea's master-planned administrative capital, set out to improve air quality while reducing the strain on city resources, energy consumption, and operational costs. As urban density increased, city planners needed deeper, real-time insights into environmental conditions and how human activity influenced them.

Cyient delivered an Environment and Air Quality Monitoring Solution that combined IoT sensor data with 3D city models, enabling a unified view of air quality, energy use, and occupancy patterns. By integrating digital twins with live environmental data, the city gained the ability to identify trends, respond to risks, and make informed decisions that support a cleaner, more efficient, and sustainable urban environment.

The Cyient Solution

Cyient developed an Environment and Air Quality Monitoring Solution designed to deliver actionable insights through integrated data and digital twins. The solution enabled city managers to monitor, analyze, and respond to environmental conditions through:

IoT-Driven Data Collection:

Aggregated data from air quality and occupancy sensors to generate overall air quality index ratings.

Occupancy and Movement Analysis:

Correlated traffic patterns, human movement, and gatherings with energy consumption and air quality impact.

3D Digital Twin Integration:

Combined IoT data with 3D city and building models under an Open Geospatial Consortium initiative sponsored by South Korea's Land and Housing Corporation.

Decision Support System:

Enabled trend identification and effective response to environmental events and risks through a centralized platform.

Cloud-Based Visualization:

Delivered enhanced indoor and outdoor air quality mapping via a web-based application.

The Results

The solution enabled Sejong City to progress toward its vision of becoming a smart, resilient, and sustainable city by:

Providing a **standardized platform** for accessing IoT, environmental, and building data

Introducing a **decision support system** to manage critical environmental factors effectively

Enhancing visibility into **indoor and outdoor air quality** across the city

Supporting the **monitoring** of a healthier and cleaner **environment**

Helping **reduce energy consumption** and optimize the use of city resources

Improving **planning and preparation** for large events and high-density gatherings

Embracing Intelligence

Watch how digital twins and real-time data come together to shape a cleaner, smarter city:

Environmental Monitoring Solution for Sejong City



**Design Smarter. Monitor Better.
Build Resilient Cities with Cyient.**

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